

REDMOND PAIRED WATERSHED STUDY

WATER YEAR 2016 DATA SUMMARY REPORT

**Prepared for
City of Redmond**

**Prepared by
Herrera Environmental Consultants, Inc.**



Note:

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WATER YEAR 2016 DATA SUMMARY REPORT

**Prepared for
City of Redmond
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Redmond, Washington 98052**

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August 31, 2017

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INTRODUCTION

The Redmond Paired Watershed Study (RPWS) is one of several effectiveness monitoring studies that was selected for implementation starting in 2014 for the Regional Stormwater Monitoring Program (RSMP) for Puget Sound. The goal of effectiveness monitoring under the RSMP is to provide widely applicable information for improving stormwater management in the region. Phase I and Phase II Municipal Stormwater Permittees in the Puget Sound Region contribute to a Pooled Stormwater Resources Fund that supports the RSMP and associated effectiveness monitoring studies. Selection of the RPWS for implementation under the RSMP was made based on a monitoring proposal that was presented to permittee representatives at workshops that were held on March 20, 2014, and May 6, 2014. The specific study question to be addressed through the RPWS is as follows:

How effective are watershed rehabilitation efforts at improving receiving water conditions at the watershed scale?

To address this study question, a conceptual experimental design for the RPWS was subsequently developed and summarized in the *Redmond Paired Watershed Study Experimental Design Report* (Herrera 2015a). This conceptual experimental design was informed by a literature review (Herrera 2015b) that was conducted to identify lessons learned from past studies that have been implemented to achieve similar objectives. The conceptual experimental design was also developed based on input from a technical advisory committee that was formed for the study. This technical advisory committee includes representation from the following jurisdictions and agencies:

City of Redmond

City of Seattle

King County

Kitsap County

US Environmental Protection Agency

US Geological Society

Washington State Department of Ecology (Ecology)

Building on this previous work, a Quality Assurance Project Plan (QAPP) was developed to guide the implementation of all subsequent phases of the RPWS (Herrera 2015c). This QAPP

documents the experimental design and procedures that will be used during data collection, processing, and analysis to ensure all results obtained for the RPWS are scientifically defensible.

Monitoring pursuant to this QAPP initiated in 2016 and is anticipated to continue for a 10-year timeframe. Data summary reports will be prepared on an annual basis over this period to summarize compiled monitoring data collected through each of the major components of the RPWS. These reports will also document any quality assurance issues associated with these data and resultant limitations (if any) on their use or interpretation. Finally, these reports will document all rehabilitation efforts that have been implemented by the City of Redmond (City) over the previous year. Included will be detailed information on the design and operational status of structural stormwater controls and the frequency and geographic extent of nonstructural stormwater control implementation. Each annual data summary report will document this information based on monitoring that was conducted over the previous water year (i.e., October through September).

In years 4, 6, 8, and 10 of the RPWS' implementation, trend analyses reports will also be prepared as companion documents to the data summary reports described above. These reports will summarize the results of statistical analyses that will be performed on the compiled data from all previous years of monitoring to detect potential relationships between rehabilitation efforts and improved receiving water conditions. Each report will also present major conclusions from these analyses.

This document represents the data summary report for monitoring that occurred over water year 2016 (WY2016) for the RPWS. It is organized to include the following sections:

- **Background** – An explanation of why the project is needed
- **Experimental Design** – The sampling process design for the study, including sample types, monitoring locations, and sampling frequency
- **Sampling Procedures** – A description of any major deviations from the sampling procedures that were identified in the QAPP for the study (Herrera 2015c).
- **Rehabilitation Effort Summary** – A description of all watershed rehabilitation efforts that were implemented by the City over the preceding water year.
- **Monitoring Results Summary** – A summary of compiled monitoring data collected through each of the major component of the study over the preceding water year.

BACKGROUND

Municipal Stormwater Permits are issued by Ecology to regulate discharges from separated storm sewers owned or operated by Phase I and Phase II cities and counties. The Municipal Stormwater Permits establish the minimum requirements for permittees to address existing and future impacts to receiving waters from urbanization. Municipal Stormwater Permits require cities and counties to execute programmatic (nonstructural) activities and establish design standards for stormwater structural controls triggered by development (low impact development, runoff treatment, and flow control facilities). In theory, if all developed land in a watershed is equipped with nonstructural and structural stormwater controls, the receiving water would be protected from hydrologic and water quality impacts caused by urbanization. However, while the effectiveness of nonstructural and structural controls has been well documented at the site and parcel scale, limited data exists on the effectiveness of these controls in aggregate for improving conditions in receiving waters at the watershed scale (Herrera 2015b).

In February 2014, Ecology approved a Citywide Watershed Management Plan (WMP) (Herrera 2013) for the City that allows use of a watershed approach for stormwater management pursuant to the Municipal Stormwater Permit, Section 303(d) of the Clean Water Act, and salmon recovery. Through the implementation of this WMP, the City will focus stormwater best management practices (BMPs) in a subset of priority watersheds that are moderately impacted by urbanization and therefore expected to respond more quickly to rehabilitation efforts. This provides a unique opportunity to study the effectiveness of stormwater BMPs for improving receiving water conditions on an accelerated time frame and at a watershed scale. Recognizing this opportunity, the City is implementing the RPWS to quantify improvements in receiving water conditions with support from the RSMP.

EXPERIMENTAL DESIGN

As described in the *Introduction* to this report, the specific study question to be addressed through the RPWS is as follows:

How effective are watershed rehabilitation efforts at improving receiving water conditions at the watershed scale?

In this context, rehabilitation efforts could include any of the following practices:

- Stormwater management retrofits in upland areas that would include facilities for onsite stormwater management (e.g., low impact development [LID] practices), runoff treatment, and flow control
- Riparian and in-stream habitat improvements
- Programmatic practices for stormwater management

To answer the study question identified above, the experimental design for the RPWP has two primary components:

- **Status and Trends Monitoring:** routine and continuous measurements of various hydrologic, chemical, physical habitat, and biological indicators of stream health over an extended time frame to quantify improvements in receiving water conditions in response to watershed rehabilitation efforts.
- **Effectiveness Monitoring:** measurements of hydrologic and chemical parameters over a relatively short timeframe to document the effectiveness of specific structural stormwater controls that have been constructed to improve receiving water conditions.

The Status and Trends Monitoring utilizes a “paired watershed” experimental design that involves collecting these measurements in seven watersheds categorized as follows:

- Three “Application” watersheds with wadeable lowland streams that are moderately impacted by urbanization and prioritized for rehabilitation efforts pursuant to the WMP.
- Two “Reference” watersheds with relatively pristine wadeable lowland streams that do not require rehabilitation.
- Two “Control” watersheds with wadeable lowland streams that are significantly impacted by urbanization and not currently prioritized for rehabilitation.

Table 1 identifies the name, predominant land use/cover, and size of each watershed; the location of all the watersheds is shown in Figure 1. A detailed summary of conditions within each watershed is also provided in the QAPP that was prepared for the study (Herrera 2015c) with information on planned rehabilitation efforts in the Application watersheds as applicable.

Table 1. Application, Reference, and Control Watersheds for the Redmond Paired Watershed Study.				
Watershed Name	Watershed Type	Dominant Land Use/Cover	Watershed Total Area (acres)	Watershed Areas Inside Redmond (acres)
Evans Creek Tributary 108	Application	Residential	397	NA ^a
Monticello Creek	Application	Residential/Commercial	345	264
Tosh Creek	Application	Residential/Commercial	299	276
Colin Creek	Reference	Forest	1,990	90
Seidel Creek	Reference	Forest	1,188	615
Country Creek	Control	Residential/Commercial	212	212
Tyler's Creek	Control	Residential/Commercial	168	167

NA: Not applicable.

Fixed monitoring stations were established in each watershed for monitoring various indicators of stream health. Due to the scale of the RPWP and the anticipated lag between applying stormwater controls and resultant improvements in receiving water conditions, quantifying a cause and effect relationship between these events may take many years. Therefore, monitoring at the fixed monitoring stations will occur over an anticipated 10-year timeframe. Furthermore, because the effectiveness of watershed rehabilitation practices (e.g., stormwater retrofits, in-stream habitat improvements, and programmatic practices) may vary for different types of receiving water impairments, a broad suite of indicators for assessing potential improvements are being monitored within the following categories: hydrologic, water quality, physical habitat, sediment quality, and biological. The pattern of interest will be evidence that receiving water conditions are improving based on one or more of these indicators in the Application watersheds while conditions in the Reference and Control watersheds remain relatively static.

Subsequent subsections then provide more detailed information on the Status and Trends Monitoring and Effectiveness Monitoring, respectively, including the monitoring stations, measurement frequency, indicators, and data analysis methods where applicable.

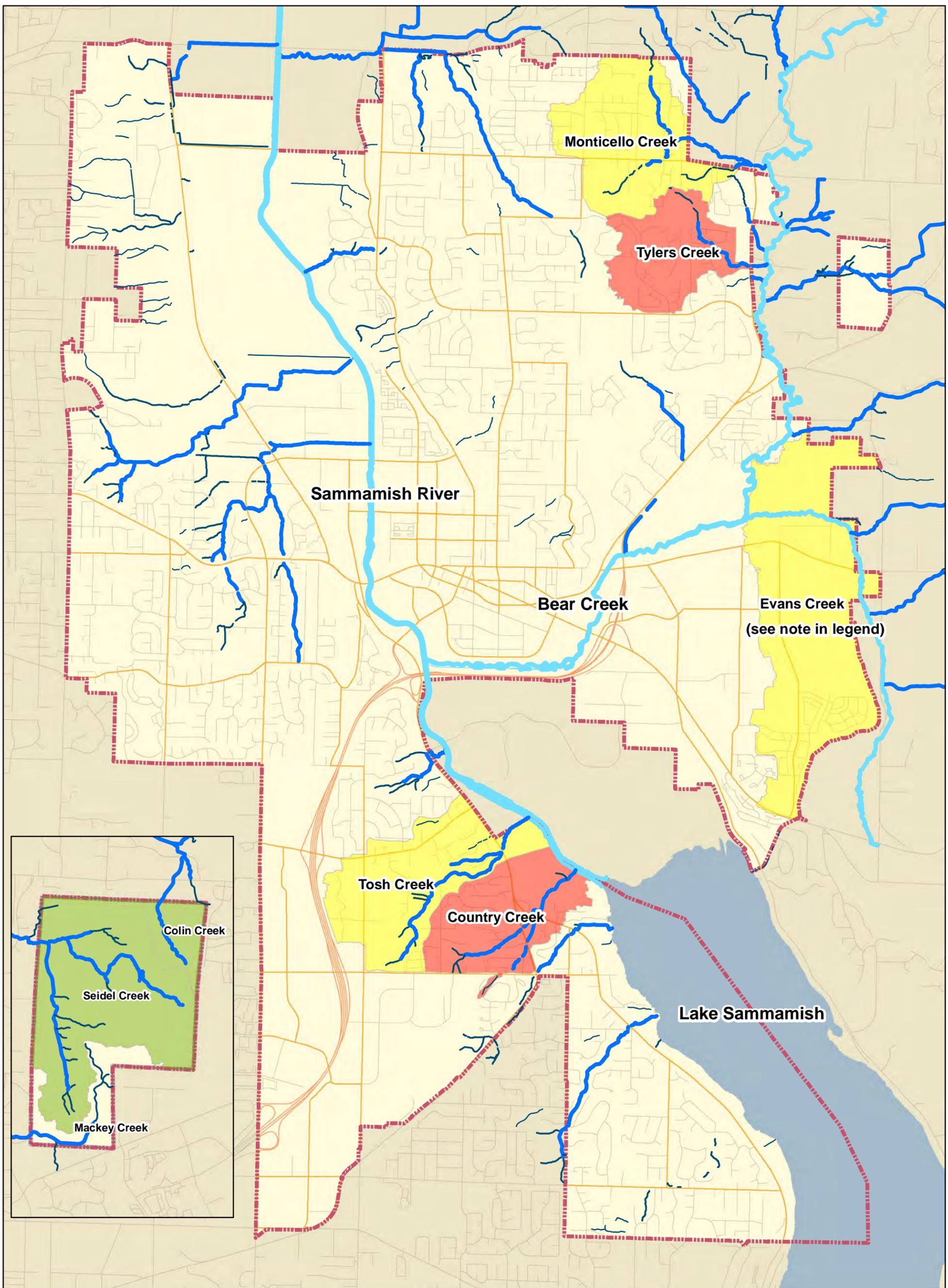
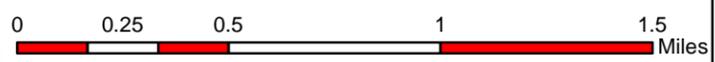


Figure 1. Application, Reference, and Control Watersheds.

City of Redmond, Washington
06/18/2015



Legend

- Class I Stream
- Class II Stream
- Class III Stream
- Class IV Stream
- City Limits
- Reference Watersheds
- Application Watersheds
- Control Watersheds

This figure shows Evans Creek watershed within Redmond. Evans 108 is east of Redmond and illustrated in Figure 2.

Disclaimer: This map is created and maintained by the Natural Resources Division of the City of Redmond, Washington, for reference purposes only. The City makes no guarantee as to the accuracy or completeness of the features shown on this map.

STATUS AND TRENDS MONITORING

This section describes the monitoring stations, measurement frequency, indicators, and data analysis methods that will be used for the Status and Trends Monitoring component of the RPWS. This information is organized under separate subsections for the following monitoring categories: hydrologic, water quality, physical habitat, sediment quality, and biological. The specific indicators of stream health that will be evaluated in these categories are also summarized in Table 2 with their associated measurement frequency.

Table 2. Indicators of Stream Health for the Redmond Paired Watershed Study.	
Indicator	Measurement Frequency
Hydrology Monitoring	
Flow	Continuous
High pulse count	Post-processed from continuous flow measurements
High pulse duration	
High pulse range	
Low pulse count	
Low pulse duration	
Low pulse range	
Richards-Baker (RB) flashiness index	
TQ Mean	
Storm flow volume	
Base flow volume	
Total flow volume	
Water Quality Monitoring	
Total suspended solids	Twelve grab samples collected annually during storm events (three each quarter)
Turbidity	
Conductivity	Four grab samples collected annually during base flow (one each quarter)
Hardness	
Dissolved organic carbon	
Fecal coliform bacteria	
Total phosphorus	
Total nitrogen	
Copper, total and dissolved	
Zinc, total and dissolved	
Temperature	Continuous
Conductivity	
Physical Habitat Monitoring	
Bank-full width	Annually
Wetted width	
Cumulative bar width	

Table 2 (continued). Indicators of Stream Health for the Redmond Paired Watershed Study.

Indicator	Measurement Frequency
Physical Habitat Monitoring (continued)	
Bank-full depth Wetted depth Substrate class Substrate embeddedness Fish cover Thalweg depth Presence of bars Presence of edge pools Main channel slope and bearing Large woody debris tally, including notation of diameter, length, category, zone, and key-pieces Evidence of vegetation colonization below OHWM that persists more than 1 year Slopes vegetated over the crown of the bank Presence of desirable native plant species Presence of invasive plant species Presence of good-habitat indicator liverwort species Channel incision or aggradation Channel widening, narrowing, or migration Changes in channel slope, sinuosity, and/or bed-form type	Annually
Sediment Quality Monitoring	
Total organic carbon Copper Zinc Polycyclic aromatic hydrocarbons Phthalates	Annually
Biological Monitoring	
Benthic macroinvertebrates	Annually
Benthic Index of Biotic Integrity Taxa Richness Ephemeroptera Richness Plecoptera Richness Trichoptera Richness Clinger Percent Long-Lived Richness Intolerant Richness Percent Dominant Predator Percent Tolerant Percent	Post-processed from benthic macroinvertebrate data

OHWM: Ordinary high water mark.

Hydrologic Monitoring

A total of 14 fixed monitoring stations were established to facilitate hydrologic monitoring in each of the study watersheds. As noted in the literature review (Herrera 2001b) that was performed to inform the experimental design for the RPWS, numerous studies have been conducted with similar goals, but they have generally been conducted at the subbasin scale. In these studies, a hydrologic monitoring station was typically located at the outlet of the study subbasin. Therefore, efforts were made to establish hydrologic monitoring stations at the outlet of each of the study watersheds. However, because the watersheds are relatively large and because much of the rehabilitation will occur in the upper reaches of the Application watersheds, efforts were made to establish hydrologic monitoring stations at a mid-point location in each of the study watersheds as well. This goal could not be achieved for all of the study watersheds due to issues relating to their size and drainage patterns. The following deviations are specifically noted:

- Monticello Creek has two major tributaries that will be the target of rehabilitation efforts; therefore, three hydrologic monitoring stations were established in the watershed at the outlet and on each of the tributaries.
- The relatively pristine reach of Colin Creek that was identified for monitoring is confined to the Redmond Watershed Preserve Park. Because the watershed area within this park is relatively small, only one hydrologic monitoring station was established in this study watershed.
- The relatively pristine reach of Seidel Creek that was identified for monitoring is confined to the Redmond Watershed Preserve Park. Within this area, two major tributaries of the creek flow into a large wetland complex near the border of the park. To avoid confounding hydrologic and water quality influences from this wetland, hydrologic monitoring stations were established on each tributary; and no outlet station was identified.

In addition to these considerations, the specific location of each monitoring station was also influenced by safety and property access issues. The monitoring stations established in each of the study watersheds are as follows:

Application Watersheds

- Evans Creek Tributary 108: two stations designated Lower Stream Station (EVALSS) and Midstream Station (EVAMS), respectively (see locations in Figure 2).
- Monticello Creek: one station at the mouth designated Mont-Mouth (MONM); one station at the approximate midpoint of the watershed on the north tributary designated Mont-Mid-N (MONMN); and one station at the approximate midpoint of the watershed on the south tributary designated Mont-Mid-S (MONMS) (see locations in Figure 3).

- Tosh Creek: one station at the mouth designated Tosh-Mouth (TOSMO); and one station at the approximate midpoint of the watershed designated Tosh-Mid (TOSMI) (see locations in Figure 4).

Reference Watersheds

- Colin Creek: one station at the approximate midpoint of the watershed designated Colin-Mid (COLM) (see locations in Figure 5).
- Seidel Creek: one station at the approximate midpoint of the watershed on the north tributary designated Seidel-Mid-N (SEIMN); one station at the approximate midpoint of the watershed on the south tributary designated Seidel-Mid-S (SEIMS) (see locations in Figure 6).

Control Watersheds

- Country Creek: one station at the mouth designated Country-Mouth (COUMO); and one station at the approximate midpoint of the watershed designated Country-Mid (COUMI) (see locations in Figure 7).
- Tyler's Creek: one station at the mouth designated Tylers-Mouth (TYLMO); and one station at the approximate midpoint of the watershed designated Tylers-Mid (TYLMI) (see locations in Figure 8).

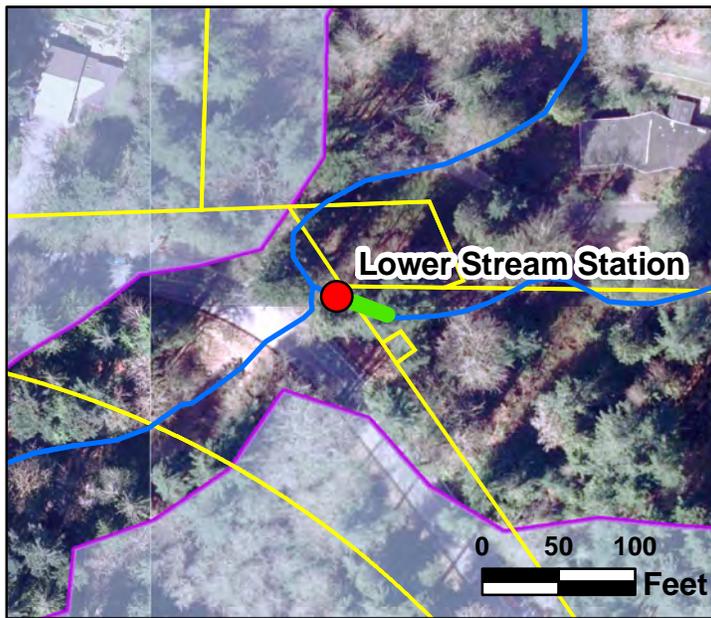
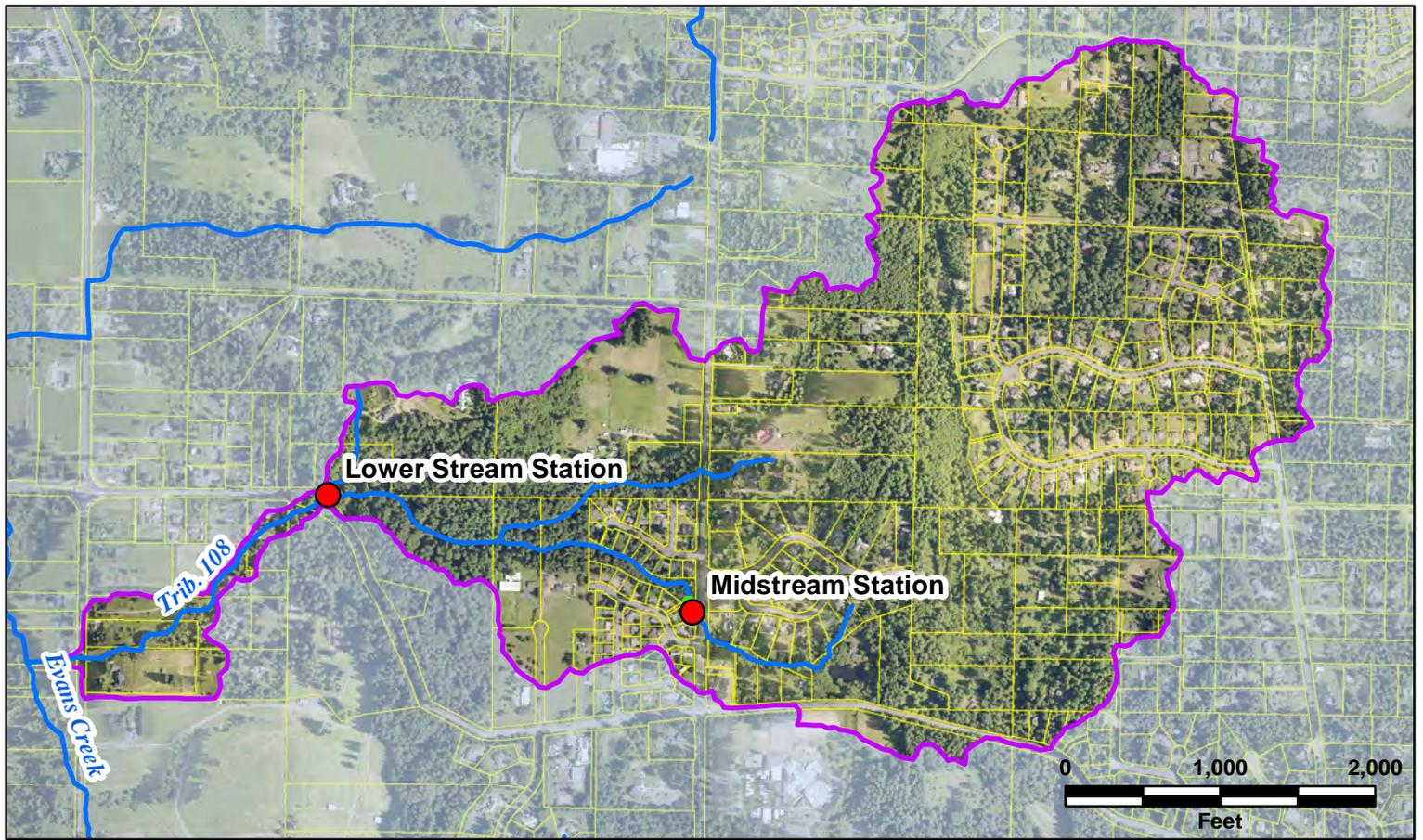


Figure 2. Evans Trib. 108 Paired Watershed Study Monitoring Locations.

King County, Washington

Dec. 17, 2015



Department of Natural Resources and Parks
Water and Land Resources Division

- Flow and WQ Monitoring
- Habitat, Biological, and Sediment Monitoring
- ~ Streams and Rivers
- King County Parcels
- Basin Boundary

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Continuous flow monitoring will occur at all 14 monitoring stations for the duration of the RPWS. Data from the continuous flow monitoring will be processed to calculate the following indicators for evaluating hydrologic impacts from urban development as described in DeGasperi et al. (2009):

- **High flow pulse:** occurrence of daily average flows that are equal to or greater than a threshold set at twice (two times) the long-term daily average flow rate.
 - **High pulse count:** number of days each water year that discrete high flow pulses occur.
 - **High pulse duration:** annual average duration (in days) of high flow pulses during a water year.
 - **High pulse range:** range in days between the start of the first high flow pulse and the end of the last high flow pulse during a water year.
- **Low pulse count:** occurrence of daily average flows that are equal to or less than a threshold set at 50 percent of the long-term daily average flow rate.
 - **Low pulse count:** number of times each calendar year that discrete low flow pulses occurred.
 - **Low pulse duration:** annual average duration (in days) of low flow pulses during a calendar year.
 - **Low pulse range:** range in days between the start of the first low flow pulse and the end of the last low flow pulse during a calendar year.
- **Flow Reversal:** The number of times that the flow rate changed from an increase to a decrease or vice versa during a water year. Flow changes of less than 2 percent are not considered.
- **Richards-Baker (RB) flashiness index:** a dimensionless index of flow oscillations relative to total flow based on daily average discharge measured during a water year.
- **TQ Mean:** the fraction of a year that mean daily discharge exceeds annual mean discharge.
- **Storm flow volume:** total discharge volume during storm events over a water year.
- **Base flow volume:** total discharge volume during base flow over a water year.
- **Total flow volume:** total discharge volume over a water year.

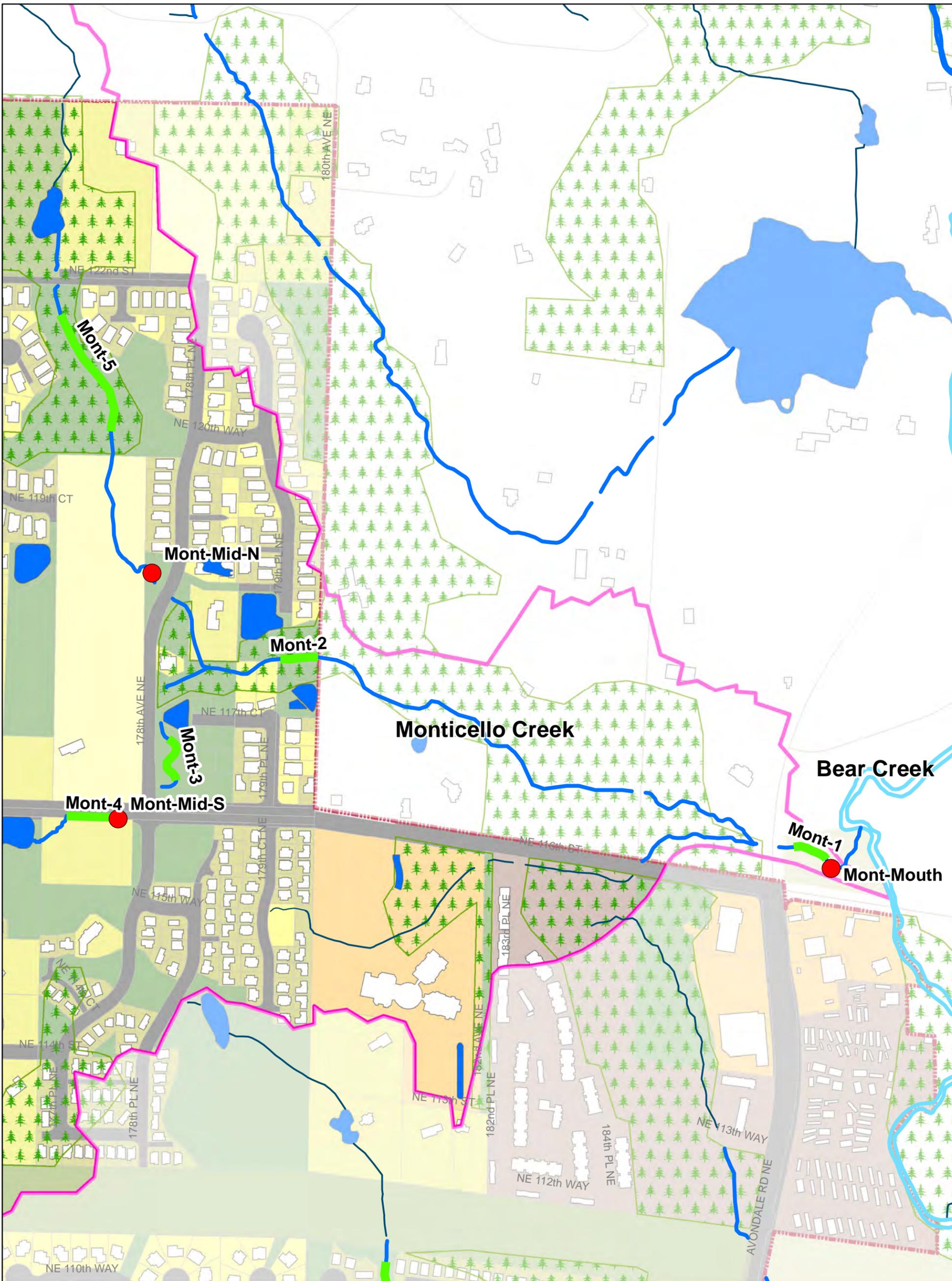


Figure 3. Monticello Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
6/25/2015



0 0.0375 0.075 0.15 Miles



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Legend

- | | | | |
|--------------------|--------------------|------------------------------|---|
| Class I Stream | Commercial | Single Family High Density | Flow & WQ Monitoring |
| Class II Stream | Industrial | Single Family Low Density | Habitat, Sediment & Biological Monitoring |
| Class III Stream | Multifamily | Single Family Medium Density | |
| Class IV Stream | Park / Undeveloped | Single Family Rural Density | |
| Ponds | Public ROW | | |
| City Limits | | | |
| Watershed Boundary | | | |

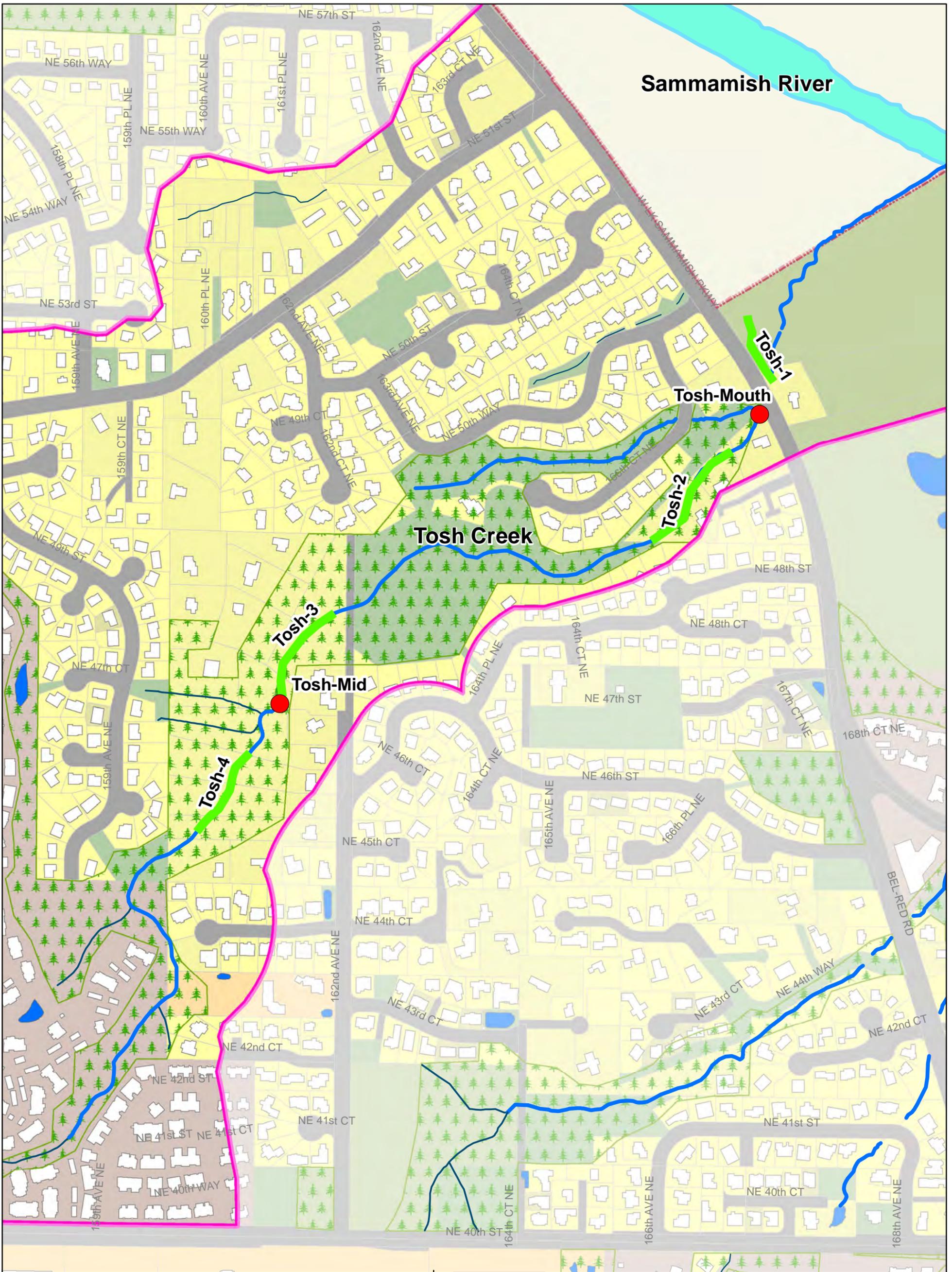


Figure 4. Tosh Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
11/22/2013



0 0.0375 0.075 0.15 Miles



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Legend

- | | | | |
|--------------------|--------------------|------------------------------|---|
| Class I Stream | Commercial | Single Family High Density | Hydrology & WQ Monitoring |
| Class II Stream | Industrial | Single Family Low Density | Physical Habitat, sediment & B-IBI Monitoring |
| Class III Stream | Multifamily | Single Family Medium Density | |
| Class IV Stream | Park / Undeveloped | Single Family Rural Density | |
| Ponds | Public ROW | | |
| City Limits | | | |
| Watershed Boundary | | | |

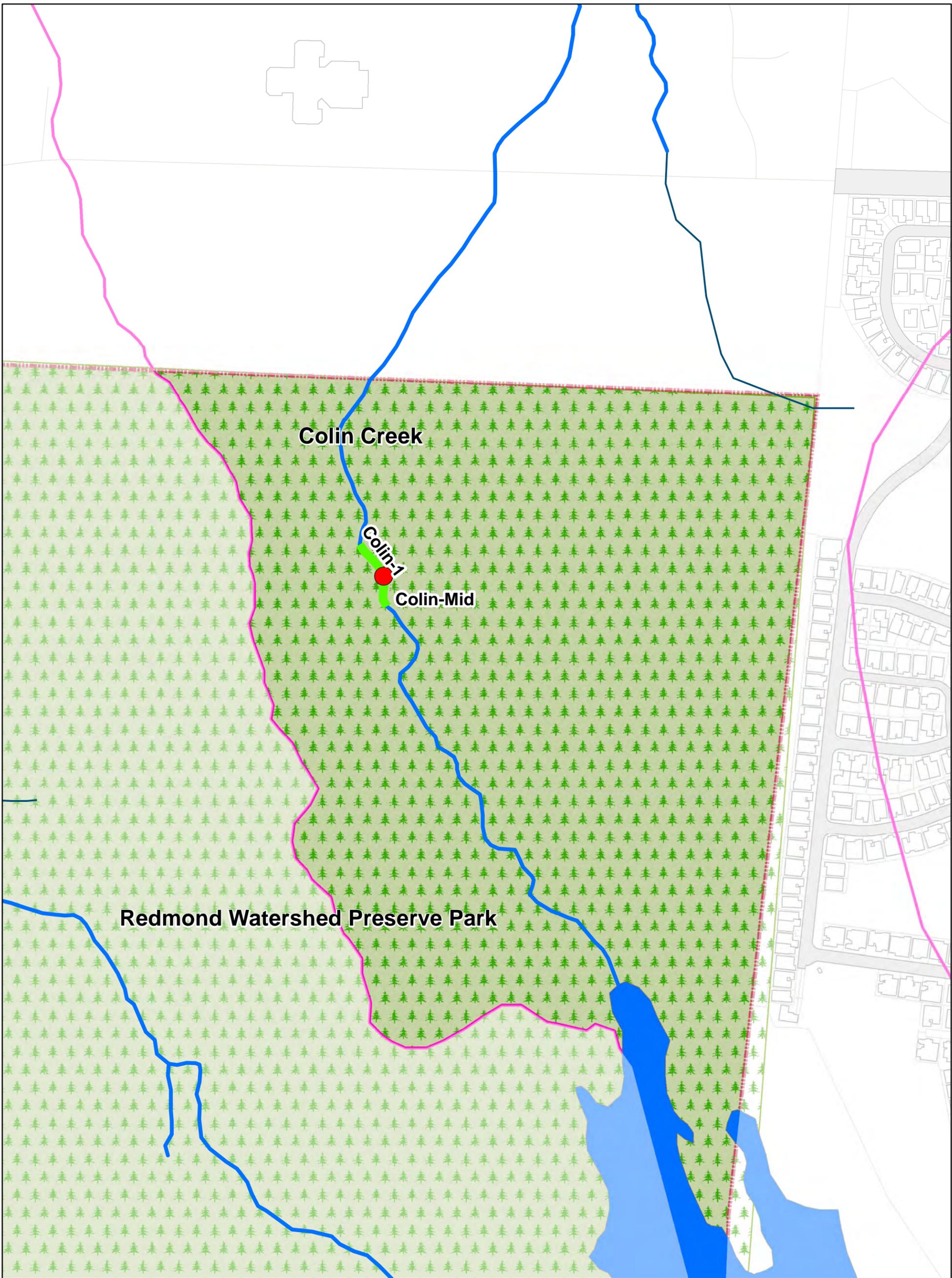


Figure 5. Colin Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
6/25/2015



0 0.0325 0.065 0.13 Miles

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Legend

- | | | | |
|--------------------|--------------------|------------------------------|---|
| Class I Stream | Commercial | Single Family High Density | Flow & WQ Monitoring |
| Class II Stream | Industrial | Single Family Low Density | Habitat, sediment & Biological Monitoring |
| Class III Stream | Multifamily | Single Family Medium Density | |
| Class IV Stream | Park / Undeveloped | Single Family Rural Density | |
| Ponds | Public ROW | | |
| City Limits | | | |
| Watershed Boundary | | | |

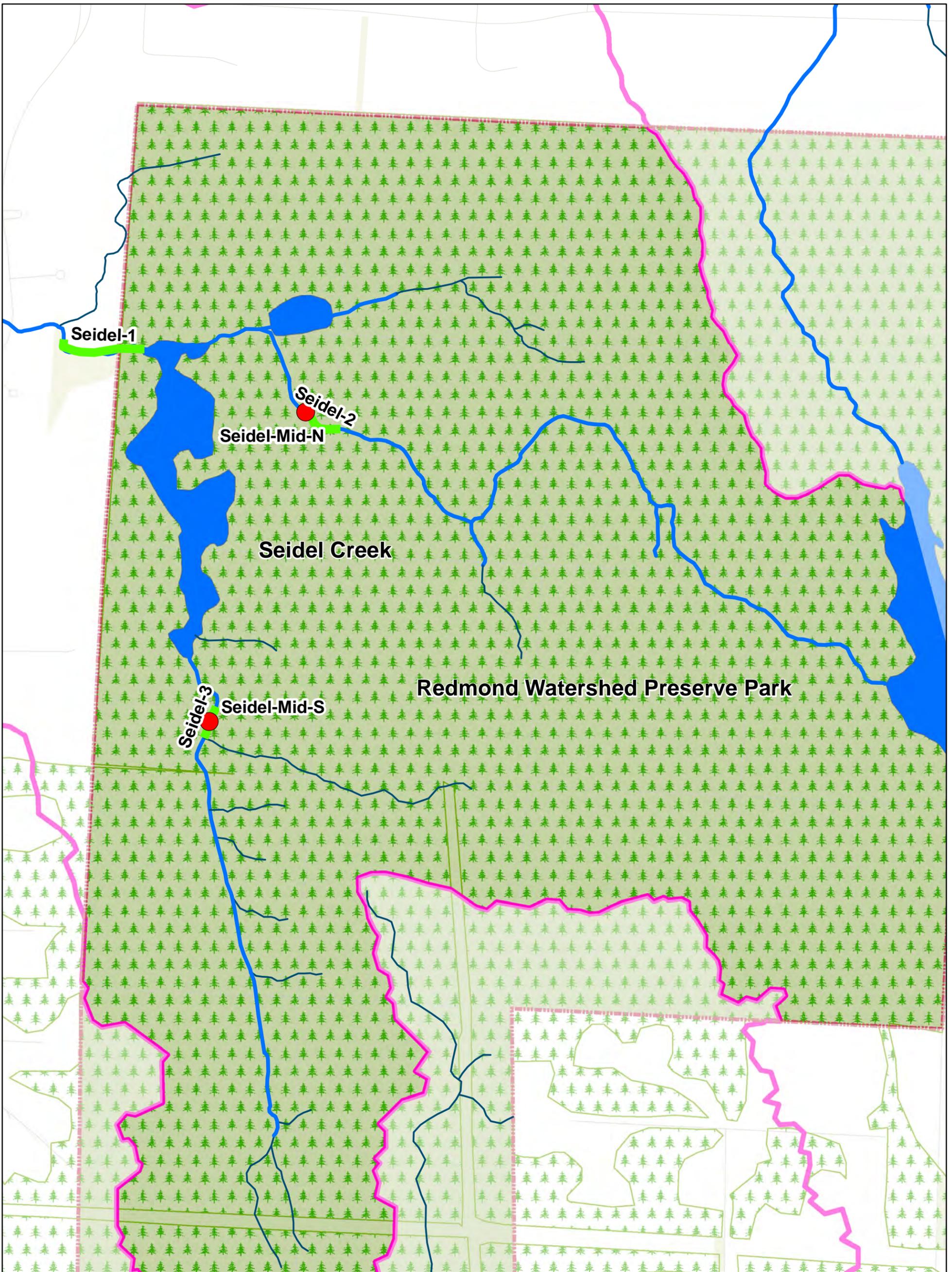


Figure 6. Seidel Creek Paired Watershed Study Monitoring Locations.

City of Redmond, Washington
11/22/2013



0 0.05 0.1 0.2 Miles



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Legend

- | | | | |
|--------------------|--------------------|------------------------------|---|
| Class I Stream | Commercial | Single Family High Density | Flow & WQ Monitoring |
| Class II Stream | Industrial | Single Family Low Density | Habitat, Sediment & Biological Monitoring |
| Class III Stream | Multifamily | Single Family Medium Density | |
| Class IV Stream | Park / Undeveloped | Single Family Rural Density | |
| Ponds | Public ROW | | |
| City Limits | | | |
| Watershed Boundary | | | |

Trends over time at each monitoring station will be evaluated using parametric (Pearson's r) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these indicators and time. Statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.05 for a one-tailed test. The pattern of interest will be evidence that receiving water conditions are improving based on the detection of statistically significant trends in the data for one or more of these indicators in the Application watersheds while these same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

In addition to the correlation analyses, separate analyses will be performed to compare measured flows in Tosh Creek and Monticello Creek to modeled flows for forested and existing conditions in these watersheds that were derived using Hydrological Simulation Program—Fortran (HSPF) models. For these analyses, local rainfall data collected concurrently with the measured flows will serve as model input for predicting flows for forested and existing conditions. Using a custom program that is described in the QAPP for the study (Herrera 2015c), both the measured and modeled flows will be post-processed to delineate individual periods of base and storm flow, respectively, across the entire time series for a given water year. Separate statistical analyses (Paired Wilcoxon signed rank tests or Paired T-tests) will then be performed to determine if measured peak flows and flow volumes, respectively, during storm flow are significantly different from modeled flows for either the forested and existing conditions. Statistical significance in these tests will be evaluated based on an α -level of 0.05 for a one-tailed test. If watershed rehabilitation efforts are effective, measured peak flows and flow volumes should depart from the modeled equivalent for existing conditions and more closely resemble those for forested conditions.

Water Quality Monitoring

A total of 14 fixed monitoring stations were established to facilitate water quality monitoring in each of the study watersheds. These stations were co-located with the monitoring stations described above for hydrologic monitoring (see Figures 2 through 8). Twelve grab samples will be collected annually during storm events (three each quarter) at all 14 monitoring stations for the duration of the RPWS. In addition, four grab samples will also be collected annually during base flow (one each quarter) at these stations. Each sample will be analyzed for the following indicators for evaluating water quality impacts from urban development:

- Total suspended solids
- Turbidity
- Conductivity
- Hardness
- Dissolved organic carbon
- Fecal coliform bacteria

- Total phosphorus
- Total nitrogen
- Copper, total and dissolved
- Zinc, total and dissolved

In addition, the following indicators will be continuously measured *in situ* at each station using probes:

- Temperature
- Conductivity

Trends over time at each monitoring station will be evaluated using parametric (Pearson's *r*) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these indicators and time. Where possible, variation in the indicator data related to changes in stream flow will be removed prior to performing the correlation analyses using methods described in Helsel and Hirsch (2002). Use of these methods is generally applicable for indicators that tend to increase (or decrease) as a function of flow (e.g., total suspended solids). By removing this variation, trends in the indicator data can be more readily detected in the correlation analyses. In all cases, statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.05 for a one-tailed test.

The sample frequency identified above for water quality monitoring was evaluated using power tests that were performed for totals suspended solids and total zinc. Power tests are used to determine the probability of detecting a trend given: 1) sample size, 2) the desired α -level, 3) magnitude of the trend, and 4) amount of variation within the data. With 16 samples collected annually (12 samples during storm events and 4 samples during base flow) over a 10-year period and a desired α -level of 0.05, results from these tests showed there was a 66 to 100 percent probability of detecting a 4 milligram per liter (mg/L) decrease in total suspended solids concentrations depending on the variability that is assumed for the data and characteristics of the trend over time (i.e., linear or non-linear). These same tests showed there is a 38 to 100 percent probability of detecting a 2 microgram per liter ($\mu\text{g/L}$) decrease in total zinc concentrations. Results from these tests are documented in the QAPP that was prepared for the study (Herrera 2015c).

Annual mass load estimates will also be derived for the following subset of indicators using the nonparametric "smearing" approach described in Helsel and Hirsch (2002): total suspended solids, total phosphorus, total nitrogen, total copper, and total zinc. Trends over time at each monitoring station will again be evaluated using parametric (Pearson's *r*) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these mass load estimates and time. Statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.05 for a one-tailed test. These analyses will be used to detect potential improvements in

receiving water conditions from the combined effects of improved water quality and reduced stormwater runoff.

In all cases, the pattern of interest will be evidence that receiving water conditions are improving based on the detection of statistically significant trends in the data for one or more of these indicators in the Application watersheds while the same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

Physical Habitat Monitoring

A total of 19 fixed monitoring stations were established to facilitate physical habitat monitoring in each of the study watersheds. As described in the literature review (Herrera 2001b) that was performed to inform the experimental design for the RPWS, most past studies that have been performed to assess physical habitat response to watershed rehabilitation were conducted in reaches where channel rehabilitation measures were directly applied. Consequently, they were designed to only assess the localized effects of these efforts. The RPWS involves both localized channel rehabilitation and watershed scale rehabilitation through the application of structural and programmatic practices for stormwater management. Therefore, a synoptic approach was applied for establishing monitoring stations for physical habitat monitoring where stations were established in the Application watersheds in reaches that will be restored and in reaches where no physical alterations to the channel are planned. In this way, the RPWS can assess physical habitat response to both localized and basin-wide rehabilitation efforts. In addition to these considerations, the specific location of each monitoring station was also influenced by safety and property access issues. The monitoring stations established in each of the study watersheds are as follows:

Application Watersheds

- Evans Creek Tributary 108: two stations designated Lower Stream Station (EVALSS) and Midstream Station (EVAMS), respectively (see locations in Figure 2).
- Monticello Creek: five stations designated Mont-1, Mont-2, Mont-3, Mont-4, and Mont-5, respectively (see locations in Figure 3).
- Tosh Creek: four stations designated Tosh-1, Tosh-2, Tosh-3, and Tosh-4, respectively (see locations in Figure 4).

Reference Watersheds

- Colin Creek: one designated Colin-1 (see locations in Figure 5).
- Seidel Creek: three stations designated Seidel-1, Seidel-2, and Seidel-3, respectively (see locations in Figure 6).

Control Watersheds

- Country Creek: two stations designated Country-1 and Country-2, respectively (see locations in Figure 7).
- Tyler's Creek: two stations designated Tylers-1 and Tylers-2, respectively (see locations in Figure 8).

The following monitoring stations were specifically selected to measure the localized physical habitat response in reaches that have either been recently restored or are likely to be restored in the future:

- Mont-3
- Mont-4
- Mont-5
- Tosh-1
- Tosh-3
- Tosh-4

Physical habitat monitoring will be conducted annually at each monitoring station for the duration of the RPWS. The characteristic bed-form type will be recorded at each monitoring station as a whole, and physical habitat quality indicators will be measured at 11 cross-sections (transects) and thalweg (line of steepest descent along the streambed) profile for each habitat monitoring station.

The following indicators will be measured at each transect:

- Bank-full width, wetted width, and cumulative bar width
- Bank-full depth, wetted depth, substrate class and embeddedness at 11 or more stations across the section
- Fish cover
- Human influence
- Riparian shading
- Riparian vegetation structure
- Presence of desirable/undesirable plant species

The following indicators will be measured along the thalweg profile:

- Thalweg depth and the presence of bars and/or edge pools
- Large woody debris and habit unit descriptions
- Side-channel descriptions
- Main channel slope and bearing
- Presence, source, size, of culvert or pipes draining to creek

Post-processing of recorded physical habitat indicators will allow monitoring of:

- Channel incision or aggradation
- Channel widening, narrowing, or migration
- Changes in channel slope, sinuosity, and/or bed-form type

The pattern of interest will be evidence that receiving water conditions are improving based on the detection of trends in the data for one or more of these indicators in the Application watersheds while the same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

Sediment Quality Monitoring

A total of 19 fixed monitoring stations were established to facilitate sediment quality monitoring in each of the study watersheds. These stations were co-located with the monitoring stations described above for physical habitat monitoring (see Figures 2 through 8). Sediment samples will be collected annually at all 19 monitoring stations for the duration of the RPWS. Each sample will be analyzed for the following indicators for evaluating sediment quality impacts from urban development:

- Total organic carbon
- Copper
- Zinc
- Polycyclic aromatic hydrocarbons
- Phthalates

Trends over time at each monitoring station will be evaluated using parametric (Pearson's r) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these indicators

and time. Statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.05 for a one-tailed test. The pattern of interest will be evidence that receiving water conditions are improving based on the detection of statistically significant trends in the data for one or more of these indicators in the Application watersheds while the same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

Biological Monitoring

A total of 19 fixed monitoring stations were established to facilitate biological monitoring in each of the study watersheds. These stations were co-located with the monitoring stations described above for physical habitat monitoring (see Figures 2 through 8). Benthic macroinvertebrate samples will be collected annually at each monitoring station for the duration of the RPWS. Each sample will be processed to calculate the following indicators for use in evaluating stream health:

- Benthic Index of Biotic Integrity (B-IBI)
- Taxa Richness
- Ephemeroptera Richness
- Plecoptera Richness
- Trichoptera Richness
- Clinger Percent
- Long-Lived Richness
- Intolerant Richness
- Percent Dominant
- Predator Percent
- Tolerant Percent

Trends over time at each monitoring station will be evaluated using parametric (Pearson's r) and nonparametric (Kendall's tau or Spearman's rho) tests of correlation between these indicators and time. Statistical significance of the correlation coefficients will be evaluated based on an α -level of 0.1 for a one-tailed test. The pattern of interest will be evidence that receiving water conditions are improving based on the detection of statistically significant trends in the data for one or more of these indicators in the Application watersheds while the same trends are not detected in the data for the same indicators in the Reference and Control watersheds.

The sampling frequency identified above for biological monitoring was evaluated using the power tests described above in the *Water Quality Monitoring* subsection. With samples collected annually over a 10-year period and a desired α -level of 0.05, results from these tests showed there was a 63 to 96 percent probability of detecting a 9-unit increase in B-IBI scores (equivalent to a change from “fair” to “good” in biological condition) depending on the variability that is assumed for the data and characteristics of the trend over time (i.e., linear or non-linear). Results from these tests are documented in the QAPP that was prepared for study (Herrera 2015c).

Effectiveness Monitoring

As described above, roving stations will be established for the Effectiveness Monitoring component of the RPWS to verify specific structural stormwater controls are constructed properly and performing as designed. The roving stations will be moved from one year to the next once a facility’s effectiveness has been verified and new facilities come online. The specific types of monitoring to be performed at each roving station will depend on the type of structural stormwater control that is being evaluated. For example, it is anticipated that only hydrologic monitoring would be performed at roving stations for facilities that are only designed for flow control (e.g., vaults). In these cases, a facility’s performance would be verified based on comparisons of measured flow from the roving station to the facility’s predicted flow based on models used in its design. For facilities that are designed for runoff treatment, monitoring will follow guidelines from Ecology’s Technology Assessment Protocol-Ecology (TAPE) (Ecology 2011) and include both hydrologic (e.g., influent and effluent flow) and water quality monitoring. In these cases, a facility’s performance would be verified based on comparisons of its measured pollutant removal efficiency relative to targets that are identified in TAPE for specific treatment categories.

At present, no new structural stormwater controls have come online in an Application watershed that are suitable for Effectiveness Monitoring. For planning purposes, it is anticipated that two separate facilities will be completed and made available for monitoring in years 2 and 3 of the study, respectively. For each facility, detailed information on the procedures that will be used for data collection, quality assurance and control, management, and analysis will be provided in separate addendums to the QAPP that was prepared for the study (Herrera 2015c).

REHABILITATION EFFORT SUMMARY

As noted in the previous section, the pattern of interest for this study will be evidence that receiving water conditions are improving based on one or more indicators in the Application watersheds while conditions in the Reference and Control watersheds remain relatively static. To increase the likelihood of detecting this trend, it is important to characterize conditions in the Application watersheds over a "baseline" period prior to the implementation of any rehabilitation efforts. To that end, no rehabilitation efforts occurred over WY2016 as this marked the first full year of monitoring for the study. It is anticipated that some rehabilitation efforts within the Application watersheds will initiate in WR2017 and then gradually increase over the 10-year duration of the study. These efforts will be documented in subsequent data summary reports.

SAMPLING PROCEDURES

The QAPP that was prepared for the RPWS (Herrera 2015c) provides detailed information on the sampling procedures that are being used for each of the following monitoring categories: hydrologic, water quality, physical habitat, sediment quality, and biological. There was one minor deviation from these procedures during monitoring that was conducted over WY2016; the YSI Pro Model 2030 that was used to make discrete *in situ* measurements of water temperature and conductivity was calibrated using a 1,000 μS standard instead of a 100 μS standard as specified in the QAPP. This change was made based on manufacturer recommendations for meter calibration. Given this change, the calibration of the meter was subsequently checked before and after each sampling event using both the 100 and 1,000 μS standards. Results from these calibration checks were documented on standardized field forms.

MONITORING RESULTS SUMMARY

This section summarizes results for the Status and Trends Monitoring component of the RPWS from monitoring that was conducted over WY2016; as noted previously, no monitoring for the Effectiveness Monitoring component of the study occurred over this period. The presentation of these results is organized under separate subsections for the following monitoring categories: hydrologic, water quality, physical habitat, sediment quality, and biological. As noted in the *Introduction* section of this document, trend analyses reports will be prepared in years 4, 6, 8, and 10 of the RPWS' implementation to summarize the results of statistical analyses that will be performed on the compiled data from all previous years of monitoring to detect potential relationships between rehabilitation efforts and improved receiving water conditions. Therefore, this data summary report does not provide detailed analyses of the monitoring results from WY2016.

HYDROLOGIC MONITORING

Hydrologic monitoring for WY2016 initiated on October 1, 2015, at the 14 fixed monitoring stations that are identified in the *Experimental Design* section of this document and continued through September 31, 2016. In addition, continuous precipitation monitoring occurred over the same period at the Marymoor Park Inflow and Infiltration (I&I) Rain Gage (Marymoor rain gauge) that is maintained by King County. Line plots showing the continuous flow and precipitation data collected at each of these stations (grouped by watershed) are provided in Appendix A. The quality assurance review memorandum for these data is provided in Appendix B while Appendix C documents the manual flow measurements that were used to develop discharge rating curves for each station. In general, the quality assurance review memorandum indicates there were no serious quality assurance problems associated with these data that would impose severe limitations on their use and interpretation although the record for one station (MONMN) was rated "poor." There were also significant gaps in the continuous flow data for several stations (MONMN, TOSMO, COLM, TYLMI) as shown in Table 3.

To facilitate future analyses of hydrologic trends, the gaps identified in Table 3 were filled using estimated flow data. These estimates were derived by first importing the continuous flow data from all stations into the Aquarius Continuous Data Management System software package (Aquarius software package). Using the Aquarius software package's built-in capabilities, gaps of less than 5 hours were filled using linear interpolation. Longer gaps were filled using models that were developed to estimate missing flow data for one station based on measured flow data from another station having a similar hydrograph form and response. The Aquarius software package was used to determine whether a linear or adaptive network-based fuzzy inference system (ANFIS) model provided the best fit based on a training period where measured data were available for both stations. The specific type of model that was used for each station and

the associated source of input data, where applicable, are identified in Table 3. The average model error across all the stations was 17.4 percent. Modeled values are shown in grey as opposed to black in the line plots showing the continuous flow and precipitation data collected at each of these stations in Appendix A.

Table 3. Gaps in Continuous Flow Data.				
Station	Gap Start Date/ Time^a	Gap Stop Date/ Time^a	Gap Duration in Hours	Flow Estimation Method
MONMN	9/16/2016 11:30	9/23/2016 17:15	173.75	Linear model using input data from MONM
MONMS	9/8/2016 12:15	9/8/2016 13:00	0.75	Linear interpolation
MONMS	9/27/2016 9:15	9/27/2016 13:45	4.50	Linear interpolation
TOSMO	3/14/2016 11:45	4/25/2016 11:15	1,007.50	ANFIS model using input data from COUMO
COLM	12/31/2015 23:00	5/20/2016 13:30	3,374.50	ANFIS model using input data from SEIMN
COUMI	8/11/2016 14:15	8/11/2016 14:45	0.50	Linear interpolation
COUMI	8/11/2016 15:15	8/11/2016 15:30	0.25	Linear interpolation
TYLMI	9/16/2016 14:30	9/30/2016 15:45	337.25	Linear model using input data from MONMM

^a All times are reported as Pacific Standard Time.

ANFIS: adaptive network-based fuzzy inference system.

Once a complete data record was available for all the stations using either estimated or measured flow, the continuous flow data from each station and precipitation data from Marymoor rain gauge were post-processed using a custom program written in Visual Basic that delineates the start and stop time of individual storm events based on user selectable storm criteria (e.g., antecedent dry period, minimum rainfall, interevent dry period, etc.). The program then computes the following suite of summary statistics for each storm event:

- Precipitation start and stop time
- Precipitation duration
- Precipitation depth
- Precipitation average intensity
- Precipitation maximum intensity
- Precipitation antecedent dry period

- Flow start and stop time
- Flow duration
- Average flow rate
- Maximum flow rate
- Flow volume

Appendix D provides these summary statistics for the individual storm events that were delineated based on the continuous flow data from each station. Summary statistics computed across all the events for each station are provided in Table 4.

Station	Median Average Flow Rate (cfs)	Maximum Flow Rate (cfs)	Median Flow Volume (cf)	Maximum Flow Volume (cf)
EVALSS	1.78	23.40	197,343	2,607,039
EVAMS	0.65	5.79	66,159	741,681
MONM	1.50	19.34	125,982	2,690,181
MONMN	0.41	7.26	33,165	961,641
MONMS	0.23	1.73	18,954	304,866
TOSMO	0.80	13.13	83,079	1,257,264
TOSMI	0.60	15.41	58,734	1,060,263
COLM	0.43	16.54	99,593	3,276,656
SEIMN	0.47	6.40	41,715	900,361
SEIMS	0.55	6.49	55,422	887,112
COUMO	0.59	12.06	54,180	1,099,838
COUMI	0.16	2.60	13,644	344,124
TYLMO	0.58	10.00	53,154	1,304,434
TYLMI	0.13	5.65	11,160	558,676

cfs: cubic feet per second

cf: cubic feet

As described in the *Experimental Design* section of this document, data from the continuous flow monitoring are processed to calculate a suite of thirteen indicators for evaluating hydrologic impacts from urban development. Values for the following five indicators were derived using a custom script that was developed using the R statistical programming language:

- High pulse count
- High pulse duration
- High pulse range

- Flow reversal
- Richards-Baker flashiness index
- TQ Mean

Values for the following three indicators were derived using a hydrograph separation algorithm that has been successfully used in several other local studies (Herrera 2004, 2011) for this purpose:

- Storm flow volume
- Base flow volume
- Total flow volume

The computed values for these nine of these indicators are shown in Table 5. Values for the three remaining indicators (low pulse count, low pulse duration, low pulse range) could not be computed at this time because they rely on data collected over a calendar year as opposed to a water year.

Table 5. Computed Indicator Values for Evaluating Hydrologic Impacts.

Station	High Pulse Count (count)	High Pulse Duration (days)	High Pulse Range (days)	Flow Reversal (count)	Richards-Baker Flashiness Index	TQ Mean (fraction of year)	Storm Flow Volume (cf)	Base Flow Volume (cf)	Total Flow Volume (cf)
EVALLS	19	2.7	90	123	0.18	0.26	11,510,577	45,643,149	57,153,726
EVAMS	18	2.6	94	143	0.18	0.31	3,602,447	15,419,242	19,021,689
MONM	62	4.1	148	142	0.33	0.32	15,804,168	19,381,569	35,185,737
MONMN	67	5.2	148	140	0.39	0.28	7,496,811	3,783,333	11,280,144
MONMS	66	4.1	148	156	0.32	0.34	2,101,186	2,779,688	4,880,874
TOSMO	27	1.8	222	131	0.38	0.28	6,603,402	13,028,763	19,632,166
TOSMI	43	1.7	225	167	0.57	0.28	6,828,026	5,933,212	12,761,238
COLM	54	7.7	96	151	0.43	0.23	13,376,639	9,169,813	22,546,452
SEIMN	64	9.1	117	136	0.22	0.35	4,405,464	8,817,075	13,222,539
SEIMS	24	2.7	104	141	0.21	0.34	3,755,124	11,649,084	15,404,208
COUMO	34	1.9	169	160	0.39	0.29	5,537,209	8,827,406	14,364,615
COUMI	33	1.9	149	140	0.32	0.32	1,410,494	2,681,155	4,091,649
TYLMO	50	2.4	329	165	0.56	0.27	9,016,066	4,558,238	13,574,304
TYLMI	40	2.7	152	153	0.50	0.23	2,557,027	1,768,734	4,325,761

cf: cubic feet.

WATER QUALITY MONITORING

Although WY2016 spanned from October 1, 2015, through September 30, 2016, the collection of discrete samples during storm events and base flow for the RPWS did not initiate until March 2016. Pursuant to the QAPP that was prepared for the study (Herrera 2015c), 12 grab samples are to be collected during storm events (three each quarter) at the 14 fixed monitoring stations that are identified in the *Experimental Design* section of this document for water quality monitoring. In addition, four grab samples are to be collected during base flow (one each quarter) at these same stations. The following criteria serve as guidelines for defining the acceptability of specific storm events for sampling:

- **Target precipitation depth:** A minimum of 0.25 inches of precipitation over a 24-hour period
- **Antecedent conditions:** A period of at least 24 hours preceding the event with less than 0.04 inches of precipitation

Base flow samples should be collected following a period of at least 48 hours without rain.

The dates when samples were collected during storm events are identified in Table 6 with a comparison to the criteria identified above for target storm depth and antecedent conditions. This comparison shows the criterion for target storm depth was met for four of the six storm events sampled during WY2016. For the two storms where this criterion was not met, the measured precipitation depths were 0.22 and 0.18 inches. The criterion for antecedent dry period was met for all the storm events sampled during WY2016. To provide additional information for assessing the acceptability of sampled storm events, line plots showing the actual time samples were collected at each station relative to the storm event hydrograph are provided in Appendix E; storm event hydrographs in these plots are shaded grey to distinguish them from periods of base flow. These plots generally show most samples were collected on the rising limb or peak of the hydrograph with the following exceptions:

- During the storm event on September 6, 2016, samples were collected at the following stations after rainfall was observed but before there was an appreciable rise in the hydrograph: EVALSS, EVAMS, TOSMO, TOSMI, SEIMN, COUMO, COUMI, TYLMO, and TYMI.
- During the storm event on May 21, samples were collected at the MONM, MONNMN, and MONMS stations after rainfall was observed before there was an appreciable rise in the hydrograph.

Water Year Quarter	Sample Date	Precipitation Duration (hour)	Precipitation Depth^a (inch)	Antecedent Dry Period^b (hour)
3	4/24/2016	20	0.55	236
3	5/21/2016	15	0.22	33
3	6/18/2016	21	0.48	163
4	9/3/2016	43	0.91	26
4	9/6/2016	7	0.18	61
4	9/17/2016	15	0.22	239

^a Criteria for precipitation total is ≥ 0.25 inches in 24 hours.

^b Criteria for antecedent dry period is ≥ 24 hours with < 0.04 inches of rain.

Bold values indicate events which did not meet the storm criteria.

The dates when samples were collected during base flow are identified in Table 7 with a comparison to the criteria identified above for antecedent conditions. This comparison shows the criterion for antecedent conditions was met during all sampling events.

Water Year Quarter	Sample Date^a	Antecedent Dry Period^{a,b}
1	3/18/16, 10:15	88.3
2	3/31/16, 9:35	72.9
3	6/1/16, 8:20	67.3
4	7/21/16, 8:15	68.1

^a As a conservative estimate, the antecedent dry period was assessed based on the time the first station was sampled on each sample date as opposed to the time subsequent stations were sampled.

^b Criteria for antecedent dry period is ≥ 48 hours with no rain.

Field data collection forms, laboratory reports, and data quality audit forms from the storm event and base flow sampling during WY2016 are provided in Appendix F. The memorandum documenting results from the quality assurance review that was performed on these data is provided in Appendix G. Based on this review, thirteen values were qualified as estimates as documented in Table 8 and no values were rejected.

Water Year Quarter	Station	Parameter	Reason for Qualification	Data Flag
3/18/2016	TOSMI	Total nitrogen	Holding time exceedance	J
3/18/2016	COUMO	Total nitrogen	Holding time exceedance	J
3/18/2016	COUMI	Total nitrogen	Holding time exceedance	J
3/31/2016	MOMN	Turbidity	Field duplicate exceedance	J
3/31/2016	MOMN	Total nitrogen	Field duplicate exceedance	J
5/21/2016	SEIMN	Fecal coliform	Field duplicate exceedance	J
6/1/2016	COLM	Turbidity	Field duplicate exceedance	J
6/18/2016	MONMN	Total nitrogen	Field duplicate exceedance	J
7/21/2016	EVALSS	Fecal coliform	Field duplicate exceedance	J
9/6/2016	TOSMI	Total suspended solids	Field duplicate exceedance	J
9/6/2016	TOSMI	Turbidity	Field duplicate exceedance	J
9/6/2016	TOSMI	Fecal coliform	Field duplicate exceedance	J
9/17/2016	SEIMS	Turbidity	Field duplicate exceedance	J

J: Value qualified as an estimate based on analytical results.

Appendix H presents tables with the following summary statistics for pollutant concentrations measured in storm event and base flow samples over WY2016:

- N (sample size)
- Minimum
- 25th Percentile
- Median
- 75th Percentile
- Maximum
- Quartile range
- Percent detected
- Percent exceeding the Washington State water quality standard, where applicable

In addition, Appendix I presents box and whisker plots that were developed from these same data that show the minimum and maximum values (lower and upper whiskers, respectively), 25th and 75th percentile values (lower and upper box edges, respectively), and median value (line in box). Following guidance from Helsel and Hirsch (2002), regression on order statistics (ROS) was used to estimate the summary statistics identified above when nondetect values were present in the data.

In addition to the collection of grab samples during storm events and base flow, continuous monitoring of temperature was performed at all 14 of the fixed monitoring stations that are identified in the *Experimental Design* section of this document for water quality monitoring. Continuous monitoring of conductivity was also performed at the following subset of stations: EVALSS, EVAMS, MONM, MONMS, TOSMO, SEIMN, and COUMO. Line plots showing the continuous temperature and conductivity data collected at each of these stations are provided in Appendices J and K, respectively. The line plots for the continuous temperature data also show the 7-day average of the daily maximum temperatures (7-DADMAX) relative to the applicable aquatic life temperature criterion for Washington State (Washington Administrative Code [WAC] 173-201A-200).

Based on reviews of the continuous temperature and conductivity data presented in Appendices J and K, the following quality assurance issues were identified in connection with these data:

- No continuous temperature data are available for the TOSMO station over the period from November 20, 2015, through January 19, 2016.
- Continuous conductivity data for the SEIMN station appear erratic and anomalous over large portions of the record for WY2016.

PHYSICAL HABITAT MONITORING

Physical habitat monitoring for WY2016 was completed at the 19 fixed monitoring stations that are identified in the *Experimental Design* section of this document on the following dates:

- EVALSS 8/3/2016
- EVAMS 7/28/2016
- MONT-1 8/5/2016
- MONT-2 8/10/2016
- MONT-3 8/25/2016
- MONT-4 8/22/2016
- MONT-5 9/9/2016
- TOSH-1 8/25/2016
- TOSH-2 9/26/2016
- TOSH-3 9/19/2016

- TOSH-4 9/1/2016
- COLIN-1 7/21/2016
- SIDL-1 7/25/2016
- SIDL-2 7/25/2016
- SIDL-3 7/27/2016
- CTRY-1 8/24/2016
- CTRY-2 8/29/2016
- TYLR-1 8/22/2016
- TYLR-2 8/26/2016

Compiled field data from this monitoring are presented in Appendix L and the computed indicators for evaluating physical habitat quality are presented in Appendix M. Finally, Appendix N provides tables with summary statistics for the indicators that are organized in the following categories:

- Bed stability (Table N-1)
- Channel dimensions (Table N-2)
- Fish cover (Table N-3)
- Habitat dimensions (Table N-4)
- Habitat unit extents (Table N-5)
- Large woody debris (Table N-6)
- Riparian cover (Table N-7)
- Riparian Disturbance (Table N-8)
- Riparian vegetation structure (Table N-9)
- Sinuosity (Table N-10)
- Substrate (Table N-11)

SEDIMENT QUALITY MONITORING

Sediment quality monitoring for WY2016 was completed at the 19 fixed monitoring stations that are identified in the *Experimental Design* section of this document on the following dates:

- EVALSS 9/16/2016
- EVAMS 9/16/2016
- MONT-1 8/19/2016
- MONT-2 9/1/2016
- MONT-3 9/1/2016
- MONT-4 9/12/2016
- MONT-5 9/12/2016
- TOSH-1 9/22/2016
- TOSH-2 9/22/2016
- TOSH-3 9/22/2016
- TOSH-4 9/12/2016
- COLIN-1 8/17/2016
- SIDL-1 10/11/2016
- SIDL-2 10/11/2016
- SIDL-3 8/19/2016
- CTRY-1 9/9/2016
- CTRY-2 9/9/2016
- TYLR-1 8/30/2016
- TYLR-2 8/30/2016

Field data laboratory reports and data quality audit forms from sediment quality sampling in WY2016 are provided in Appendix O. The memorandum documenting results from the quality assurance review that was performed on these data is provided in Appendix P. Based on this review, three values for bis(2-ethylhexyl) phthalate from samples collected at the CTRY-1,

CTRY-2, and TOSH-2 stations, respectively, were qualified as estimates due to method blank contamination. No values were rejected based on this review.

Total organic carbon, zinc, and copper concentrations measured in sediment samples are presented in Table 9. Concentrations of polycyclic aromatic hydrocarbons (PAHs) and phthalates are presented in Tables 10 and 11, respectively.

Station	Total Organic Carbon (%)	Copper (mg/Kg)	Zinc (mg/Kg)
EVALSS	2.1	30	99
EVAMS	4.4	21	85
MONT-1	10	30	420
MONT-2	3.6	38	790
MONT-3	2.1	51	730
MONT-4	12	51	270
MONT-5	3.5	34	200
TOSH-1	2.7	30	240
TOSH-2	2.1	29	250
TOSH-3	1.3	40	420
TOSH-4	0.82	29	410
COLIN-1	5.9	17	70
SIDL-1	1.2	27	86
SIDL-2	1.2	23	51
SIDL-3	4.3	20	81
CTRY-1	2.9	23	210
CTRY-2	3.7	16	130
TYLR-1	3.0	36	300
TYLR-2	5.9	120	720

^a Samples were processed (sieved) in the field to make two unique samples. The first sample was sieved to less than 2.0 mm and analyzed for multiple organic compounds (PAHs and phthalates) and total-organic carbon. The second sample was sieved to less than 63 µm and analyzed for metals (copper and zinc).

mg/Kg: milligram/kilogram.

Table 10. Concentrations of Polycyclic Aromatic Hydrocarbons Measured in Sediment Samples.^a

Station	1-Methyl-naphthalene (mg/Kg)	2-Methyl-naphthalene (mg/Kg)	Ace-naphthene (mg/Kg)	Ace-naphthylene (mg/Kg)	Anthracene (mg/Kg)	Benz[a]-anthracene (mg/Kg)	Benzo(a)-pyrene (mg/Kg)	Benzo(b)-fluoranthene (mg/Kg)	Benzo(ghi)-perylene (mg/Kg)	Benzo(j,k)-fluoranthene (mg/Kg)	Chrysene (mg/Kg)	Dibenzo(a,h)-anthracene (mg/Kg)	Fluoranthene (mg/Kg)	Fluorene (mg/Kg)	Indeno-(1,2,3-cd)-pyrene (mg/Kg)	Naphthalene (mg/Kg)	Phenanthrene (mg/Kg)	Pyrene (mg/Kg)	Total PAHs (mg/Kg)
VALSS	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0310	0.0280	0.0380	0.0120	0.0120	0.032	0.0056 U	0.0260	0.0056 U	0.0099	0.0056 U	0.0056 U	0.0400	0.2289
EVAMS	0.0430 U	0.0430 U	0.0430 U	0.0430 U	0.0430 U	0.0430 U	0.0430 U	0.0430 U	0.0430 U	0.0430 U	0.043 U	0.043 U	0.0520	0.0430 U	0.0430 U	0.0430 U	0.0430 U	0.0430 U	0.0950
MONT-1	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0260	0.0150	0.0140 U	0.0140 U	0.014 U	0.014 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0140 U	0.0550
MONT-2	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U
MONT-3	0.0064 U	0.0064 U	0.0064 U	0.0064 U	0.0064 U	0.0064 U	0.0120	0.0120	0.0110	0.0064 U	0.0064 U	0.0064 U	0.0092	0.0064 U	0.0064 U	0.0064 U	0.0064 U	0.0098	0.0540
MONT-4	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.02 U	0.02 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U
MONT-5	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U
TOSH-1	0.0070 U	0.0070 U	0.0070 U	0.0070 U	0.0078	0.0310	0.0340	0.0480	0.0260	0.0150	0.035	0.007 U	0.0750	0.0070 U	0.0210	0.0070 U	0.0390	0.0640	0.3958
TOSH-2	0.0058 U	0.0058 U	0.0058 U	0.0058 U	0.0110	0.0310	0.0360	0.0440	0.0240	0.0160	0.038	0.006	0.0810	0.0058 U	0.0220	0.0058 U	0.0440	0.0640	0.4170
TOSH-3	0.0058 U	0.0058 U	0.0058 U	0.0058 U	0.0110	0.0350	0.0360	0.0550	0.0270	0.0150	0.041	0.0065	0.0990	0.0058 U	0.0240	0.0058 U	0.0510	0.0730	0.4735
TOSH-4	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U	0.0052 U
COLIN-1	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.012 U	0.012 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U
SIDL-1	0.0073 U	0.0073 U	0.0073 U	0.0083 U	0.0110	0.0290	0.0340	0.0350	0.0160	0.0100	0.032	0.0073 U	0.0290	0.0073 U	0.0120	0.0073 U	0.0230	0.0460	0.2770
SIDL-2	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U	0.0056 U
SIDL-3	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0068	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0066 U	0.0076	0.0144
CTRY-1	0.0058 U	0.0058 U	0.0058 U	0.0058 U	0.0210	0.0810	0.0890	0.1300	0.0640	0.0450	0.11	0.017	0.2200	0.0064	0.0570	0.0058 U	0.1100	0.1900	1.1404
CTRY-2	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U	0.0075 U
TYLR-1	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U	0.0061 U
TYLR-2	0.0078 U	0.0078 U	0.0078 U	0.0078 U	0.0078 U	0.0093	0.0180	0.0170	0.0130	0.0078 U	0.0078 U	0.0078 U	0.0130	0.0078 U	0.0078 U	0.0078 U	0.0078 U	0.0130	0.0911

^a Samples were processed (sieved) in the field to make two unique samples. The first sample was sieved to less than 2.0 mm and analyzed for multiple organic compounds (PAHs and phthalates) and total-organic carbon. The second sample was sieved to less than 63 µm and analyzed for metals (copper and zinc).

mg/Kg: milligram/kilogram

U: Undetected at the detection limit noted.

J: Estimated value based on the data quality assurance review (Appendix P).

Table 11. Concentrations of Phthalates Measured in Sediment Samples.^a

Station	bis(2-Ethylhexyl)phthalate (mg/Kg)	Butylbenzylphthalate (mg/Kg)	Diethylphthalate (mg/Kg)	Dimethylphthalate (mg/Kg)	Di-n-butylphthalate (mg/Kg)	Di-n-octylphthalate (mg/Kg)
EVASS	0.028 U	0.028 U	0.14 U	0.028 U	0.14 U	0.028 U
EVAMS	0.210 U	0.210 U	1.10 U	0.210 U	1.10 U	0.210 U
MONT-1	0.210	0.070 U	0.35 U	0.070 U	0.35 U	0.070 U
MONT-2	0.067	0.034 U	0.17 U	0.034 U	0.17 U	0.034 U
MONT-3	0.097	0.032 U	0.16 U	0.032 U	0.16 U	0.032 U
MONT-4	0.099 U	0.099 U	0.50 U	0.099 U	0.50 U	0.099 U
MONT-5	0.044	0.036	0.17 U	0.034 U	0.17 U	0.034 U
TOSH-1	0.140	0.035 U	0.18 U	0.035 U	0.18 U	0.035 U
TOSH-2	0.049 J	0.029 U	0.15 U	0.029 U	0.15 U	0.029 U
TOSH-3	0.180	0.029 U	0.14 U	0.029 U	0.14 U	0.029 U
TOSH-4	0.031	0.026 U	0.13 U	0.026 U	0.13 U	0.026 U
COLIN-1	0.210	0.059 U	0.30 U	0.059 U	0.30 U	0.059 U
SIDL-1	0.120	0.036 U	0.18 U	0.036 U	0.18 U	0.036 U
SIDL-2	0.066	0.028 U	0.14 U	0.028 U	0.14 U	0.028 U
SIDL-3	0.043	0.033 U	0.17 U	0.033 U	0.17 U	0.033 U
CTRY-1	0.290 J	0.029 U	0.15 U	0.029 U	0.15 U	0.029 U
CTRY-2	0.052 J	0.037 U	0.19 U	0.037 U	0.19 U	0.037 U
TYLR-1	0.120	0.031 U	0.15 U	0.031 U	0.15 U	0.031 U
TYLR-2	0.160	0.039 U	0.20 U	0.039 U	0.20 U	0.039 U

^a Samples were processed (sieved) in the field to make two unique samples. The first sample was sieved to less than 2.0 mm and analyzed for multiple organic compounds (PAHs and phthalates) and total-organic carbon. The second sample was sieved to less than 63 µm and analyzed for metals (copper and zinc).

mg/Kg: milligram/kilogram.

U: Undetected at the detection limit noted.

J: Estimated value based on the data quality assurance review (Appendix P).

BIOLOGICAL MONITORING

Biological monitoring for WY2016 was completed at the 19 fixed monitoring stations that are identified in the *Experimental Design* section of this document on the following dates:

- EVALSS 9/16/2016
- EVAMS 9/16/2016
- MONT-1 8/17/2016
- MONT-2 9/2/2016
- MONT-3 9/2/2016
- MONT-4 9/12/2016
- MONT-5 9/12/2016
- TOSH-1 9/21/2016
- TOSH-2 9/21/2016
- TOSH-3 9/21/2016
- TOSH-4 9/12/2016
- COLIN-1 8/19/2016
- SIDL-1 8/17/2016
- SIDL-2 8/17/2016
- SIDL-3 8/19/2016
- CTRY-1 9/9/2016
- CTRY-2 9/9/2016
- TYLR-1 8/30/2016
- TYLR-2 8/30/2016

The laboratory report for biological monitoring in WY2016 is provided in Appendix Q. Quality assurance review documentation for these data is provided in Appendix R. Results from this review indicated there were no significant quality assurance issues that would limit the use of the data. The indicators computed from these data for use in evaluating stream health are summarized in Table 12.

Table 12. Computed Biological Indicators for Evaluating Stream Health.

Station	Overall Condition	Benthic Index of Biotic Integrity	Total Taxa Richness	Ephemeroptera Richness	Plecoptera Richness	Trichoptera Richness	Clinger Taxa Richness	Long-Lived Taxa Richness	Intolerant Taxa Richness	Percent Dominant (top 3)	Percent Predator Individuals	Percent Tolerant Individuals
VALSS	Fair	56.2	27	2	5	7	16	10	2	60.9	6.9	6.4
EVAMS	Good	76.0	36	5	6	9	18	11	3	58.1	14.4	5.8
MONT-1	Fair	54.3	31	4	5	7	16	7	1	67.8	5.8	2.7
MONT-2	Good	65.8	35	4	6	7	16	8	1	51.0	11.7	4.6
MONT-3	Very Poor	7.9	15	1	1	1	3	2	0	74.9	1.6	18.4
MONT-4	Very Poor	19.7	21	1	3	0	4	3	0	66.1	2.7	7.8
MONT-5	Poor	39.2	32	3	4	9	12	6	0	45.4	3.0	22.9
TOSH-1	Fair	41.4	25	3	3	4	11	7	0	47.3	4.1	12.0
TOSH-2	Poor	35.0	23	3	3	6	9	5	0	56.5	9.3	31.1
TOSH-3	Poor	39.5	27	2	4	4	9	6	0	42.2	12.3	35.1
TOSH-4	Poor	22.2	25	2	2	4	7	4	0	65.4	6.8	41.5
COLIN-1	Poor	27.9	22	3	4	3	4	3	1	76.6	3.6	0.0
SIDL-1	Fair	56.0	30	6	4	5	16	9	3	58.7	13.0	37.3
SIDL-2	Good	77.1	34	5	6	8	17	10	3	49.5	20.4	11.4
SIDL-3	Fair	57.6	31	3	6	8	13	11	2	58.1	9.5	27.8
CTRY-1	Very Poor	9.0	12	1	2	0	3	2	0	74.3	0.0	19.0
CTRY-2	Fair	46.4	31	4	3	5	9	5	1	52.4	12.6	17.2
TYL-1	Poor	25.9	22	3	2	4	8	3	0	67.8	1.4	8.3
TYL-2	Very Poor	7.0	12	1	1	0	2	1	0	66.9	0.0	30.2

REFERENCES

DeGasperi, C.L., H.B. Berge, K.R. Whiting, J.J. Burkey, J.L. Cassin, and R.R. Fuerstenberg. 2009. Linking Hydrologic Alteration to Biological Impairment in Urbanizing Streams of the Puget Lowland, Washington, USA. *Journal of the American Water Resources Association* 45(2):512–533.

Ecology. 2011. Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol – Ecology (TAPE). Washington State Department of Ecology. Accessed July 13, 2015.
<<https://fortress.wa.gov/ecy/publications/summarypages/1110061.html>>.

Helsel, D.R. and R.M. Hirsch, 2002. *Statistical Methods in Water Resources Techniques of Water Resources Investigations, Book 4, chapter A3*. US Geological Survey.

Herrera. 2004. Year 2003 Water Quality Data Report, Green-Duwamish Watershed Water Quality Assessment. Prepared for King County Department of Natural Resources and Parks, by Herrera Environmental Consultants, Inc., Seattle, Washington.

Herrera. 2011. Toxics in Surface Runoff to Puget Sound: Phase 3 Data and Load Estimates. Publication No. 11-03-010. Prepared for the Washington State Department of Ecology by Herrera Environmental Consultants, Inc., Seattle, Washington. April.

Herrera. 2013. City of Redmond, Washington Citywide Watershed Management Plan. Prepared for the City of Redmond by Herrera Environmental Consultants, Inc., Seattle, Washington. November 25.

Herrera. 2015a. Redmond Paired Watershed Study Experimental Design Report. Prepared for the City of Redmond by Herrera Environmental Consultants, Inc., Seattle, Washington. July 14.

Herrera. 2015b. Redmond Paired Watershed Study: Monitoring Literature Review Summary Report. Prepared for the City of Redmond by Herrera Environmental Consultants, Inc., Seattle, Washington. April 23.

Herrera. 2015c. Quality Assurance Project Plan: Redmond Paired Watershed Study. Prepared for the City of Redmond by Herrera Environmental Consultants, Inc., Seattle, Washington. December 31.

APPENDIX A

Line Plots Showing Continuous Flow Data by Watershed

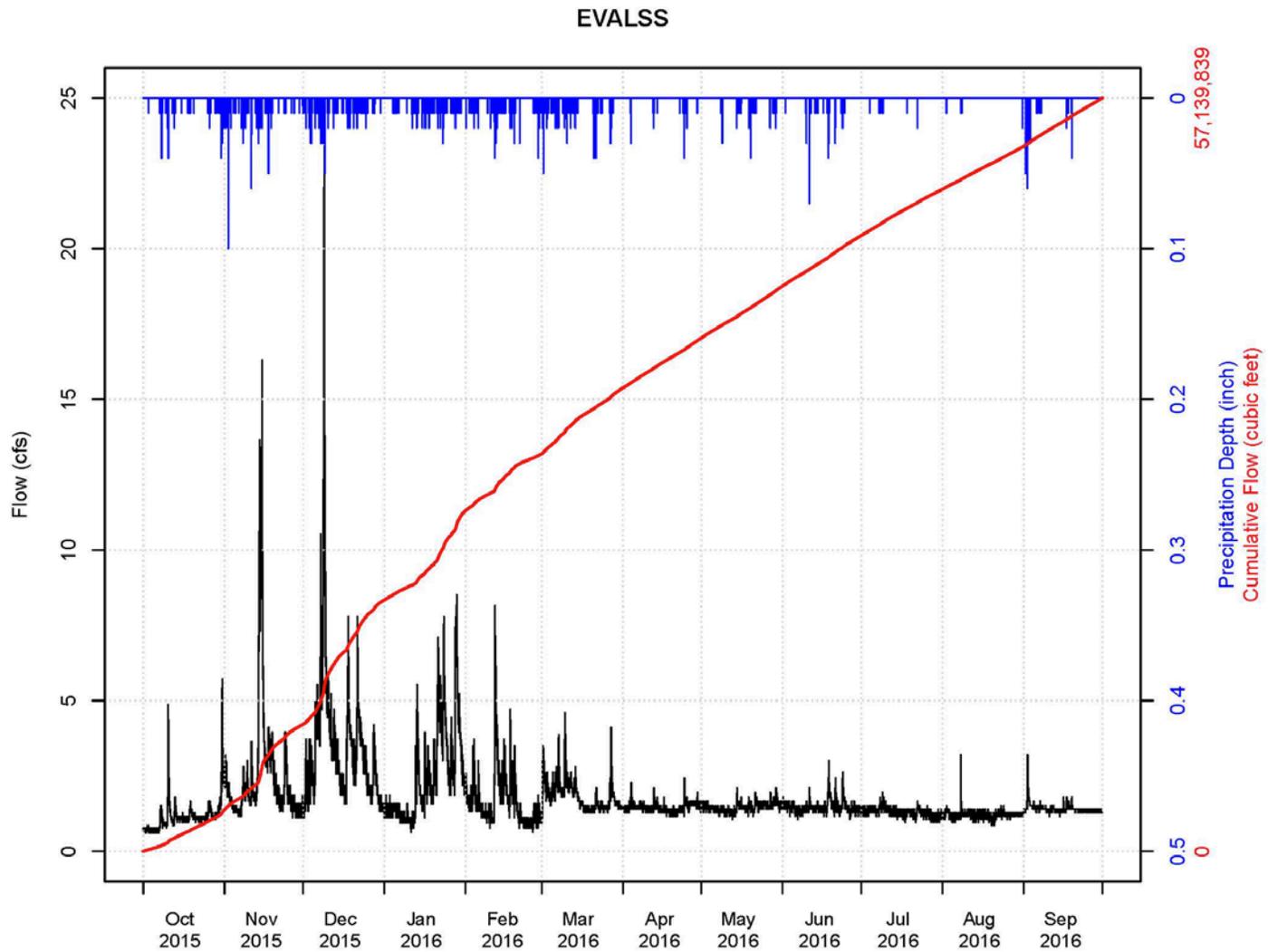


Figure A-1. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the EVALSS Station.

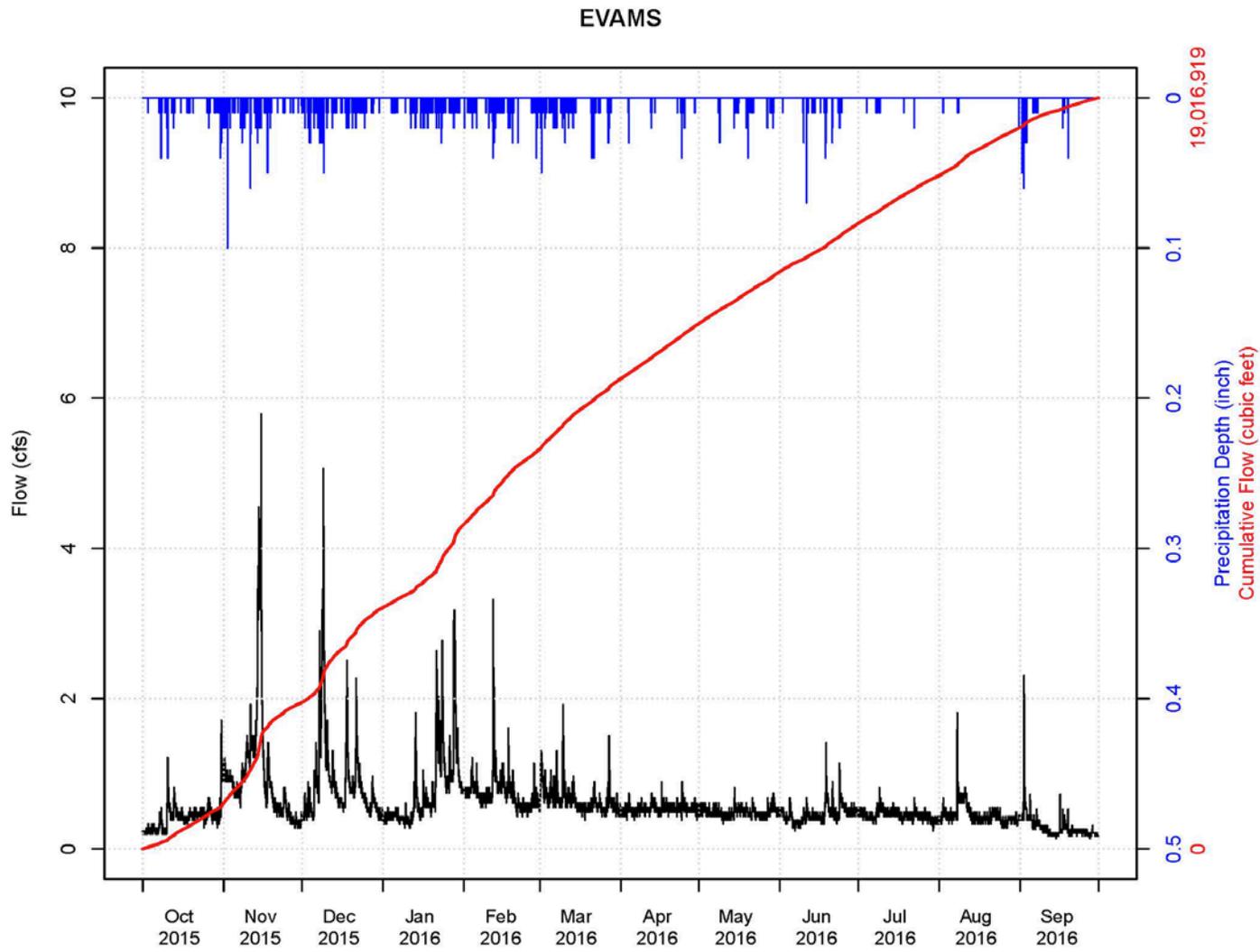


Figure A-2. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the EVAMS Station.

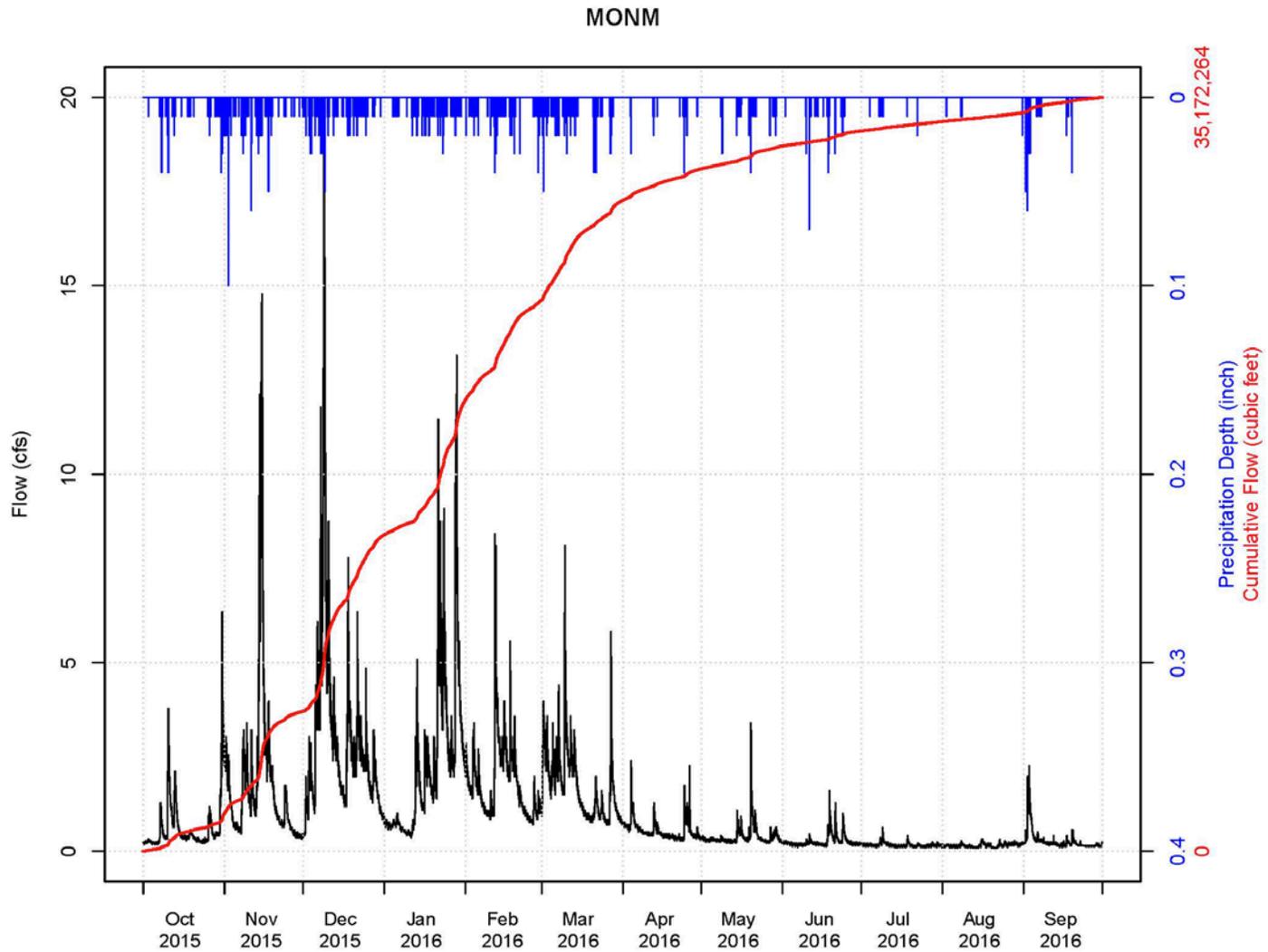


Figure A-3. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the MONM Station.

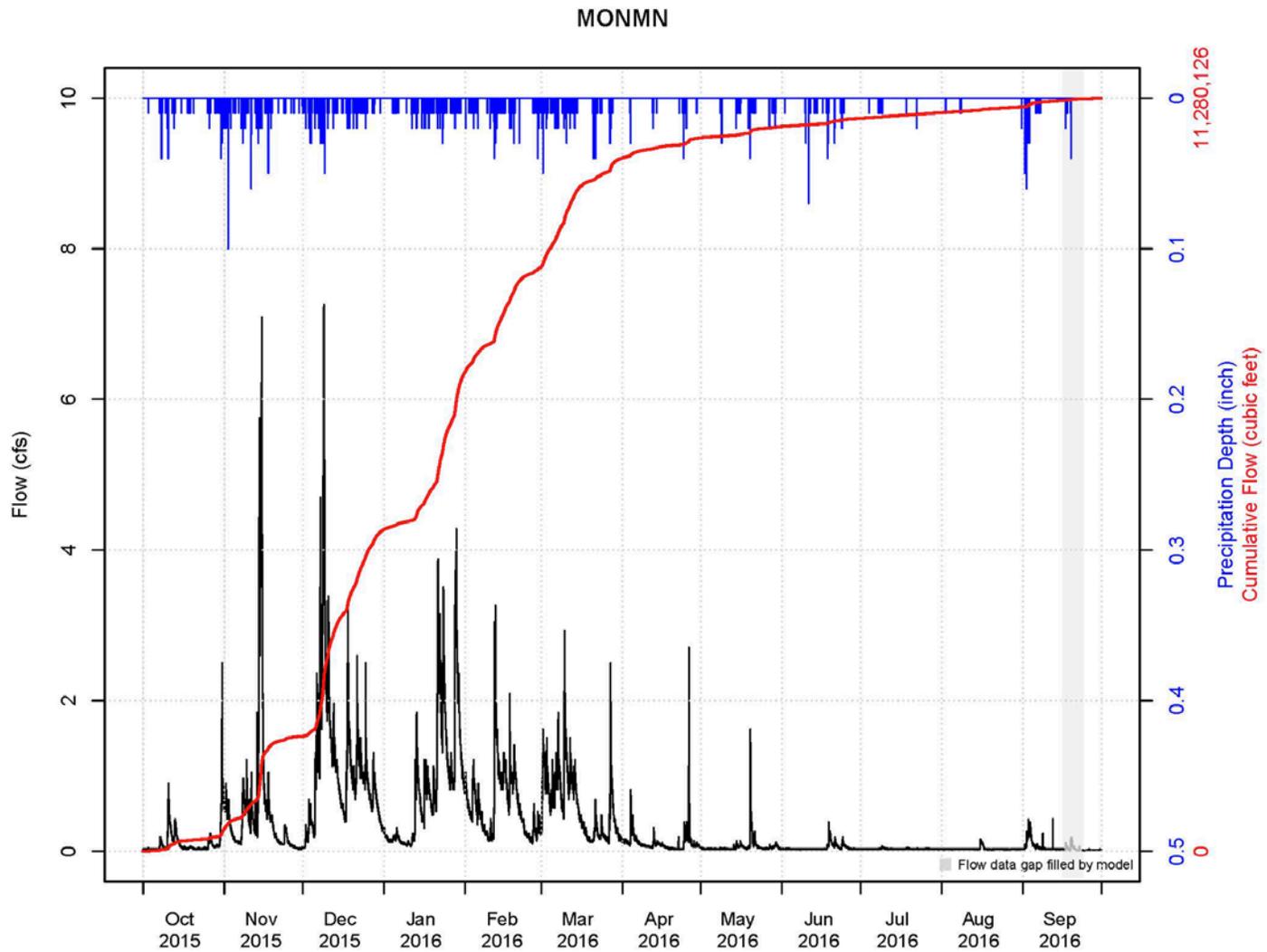


Figure A-4. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the MONMN Station.

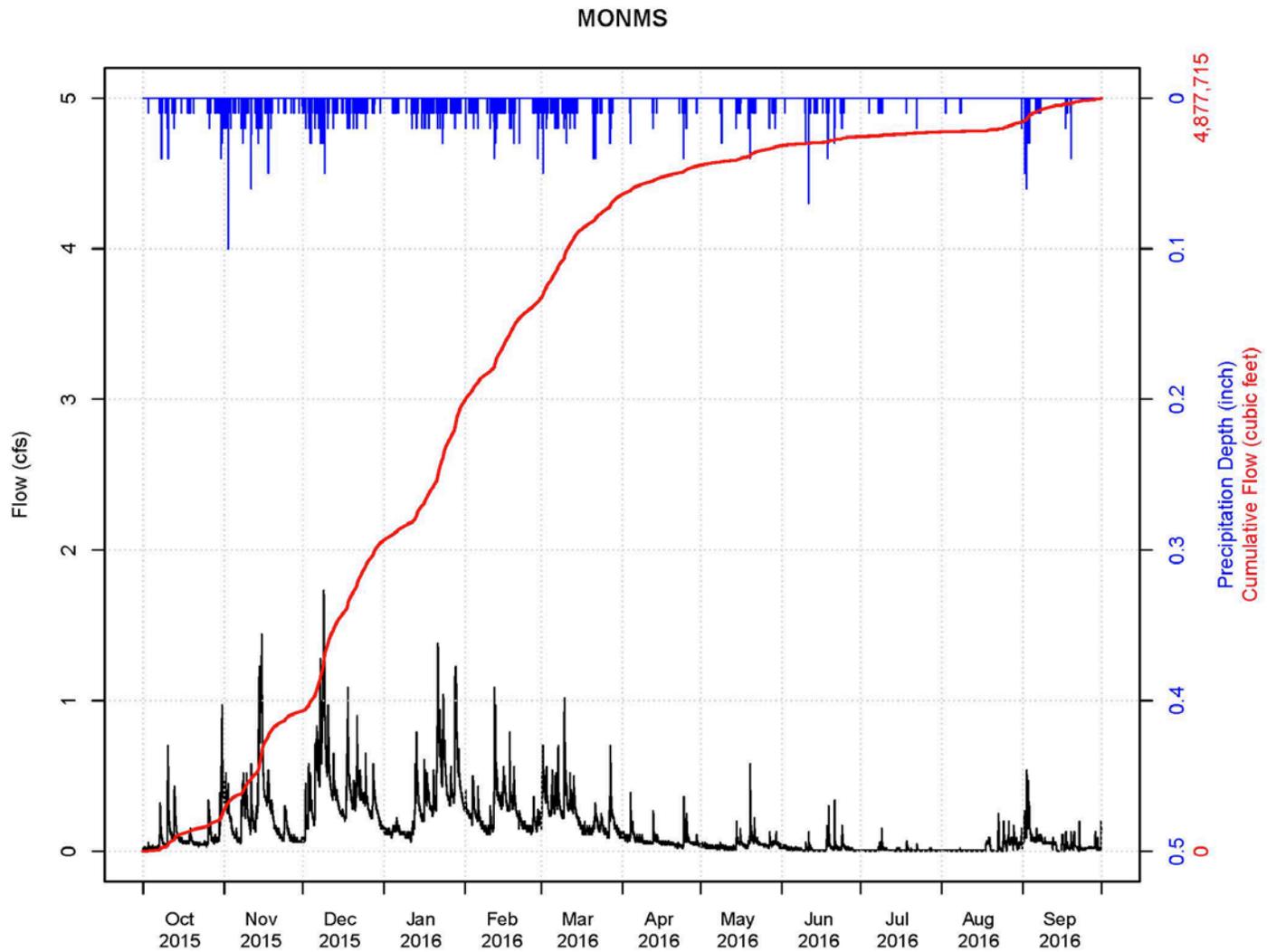


Figure A-5. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the MONMS Station.

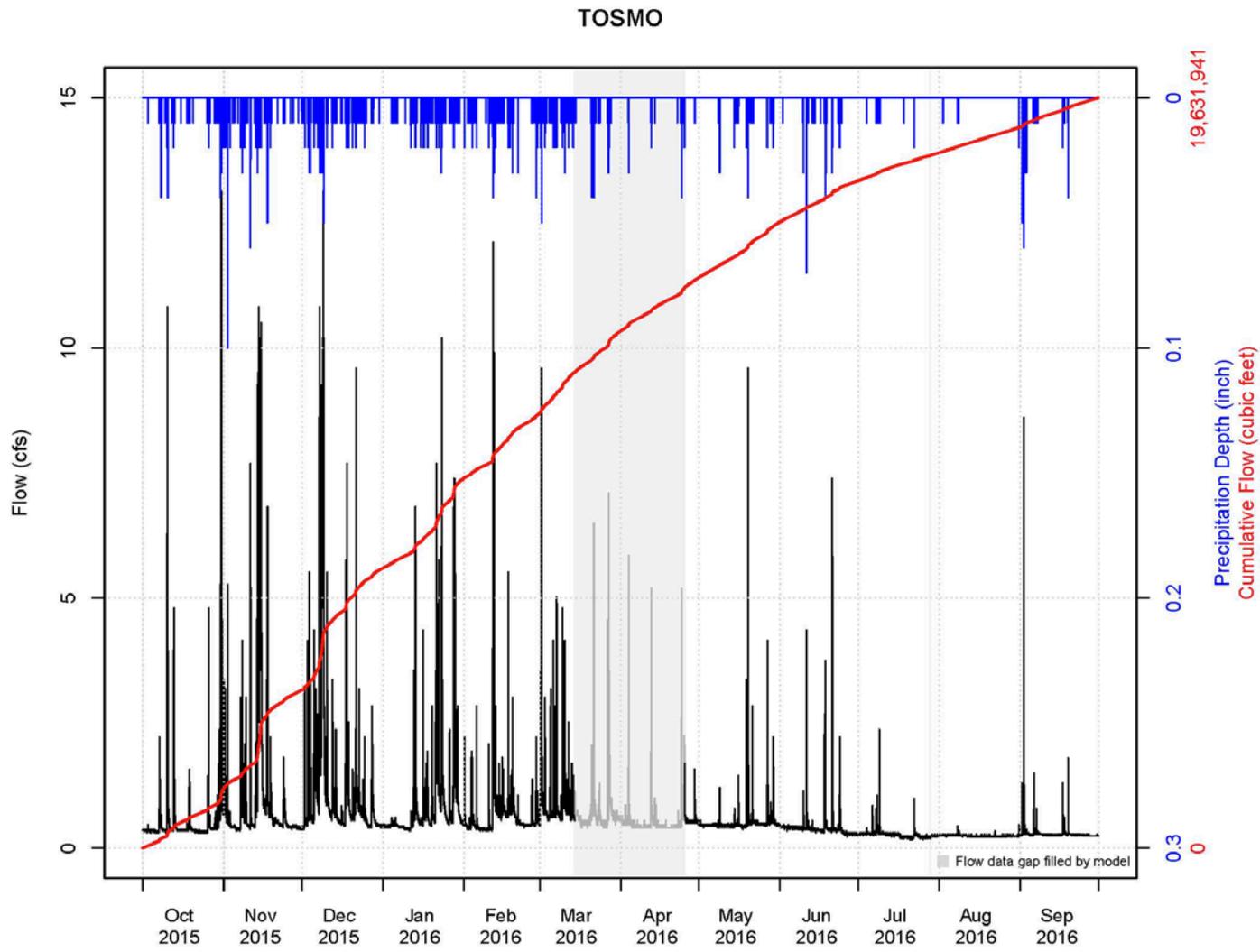


Figure A-6. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the TOSMO Station.

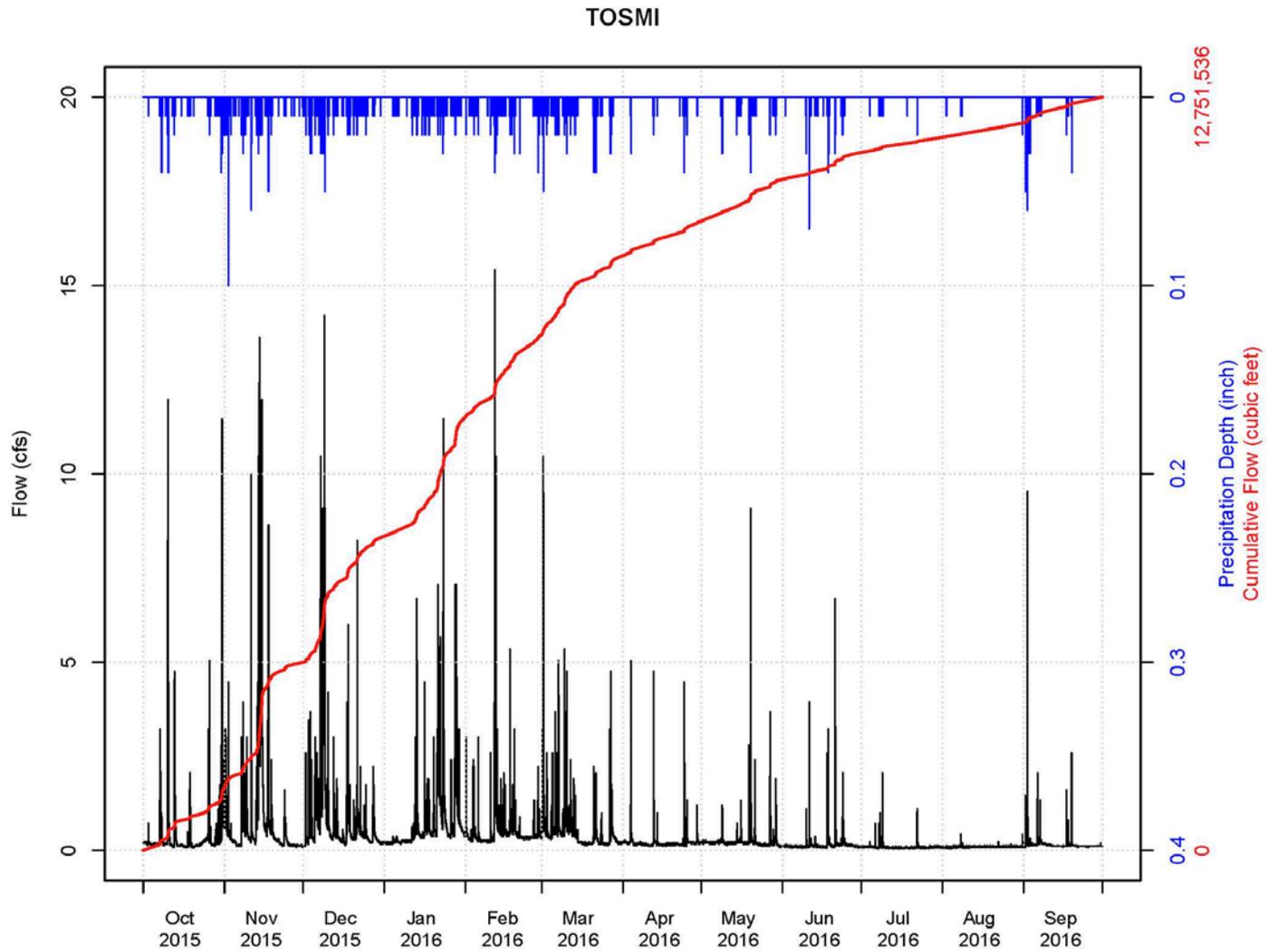


Figure A-7. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the TOSMI Station.

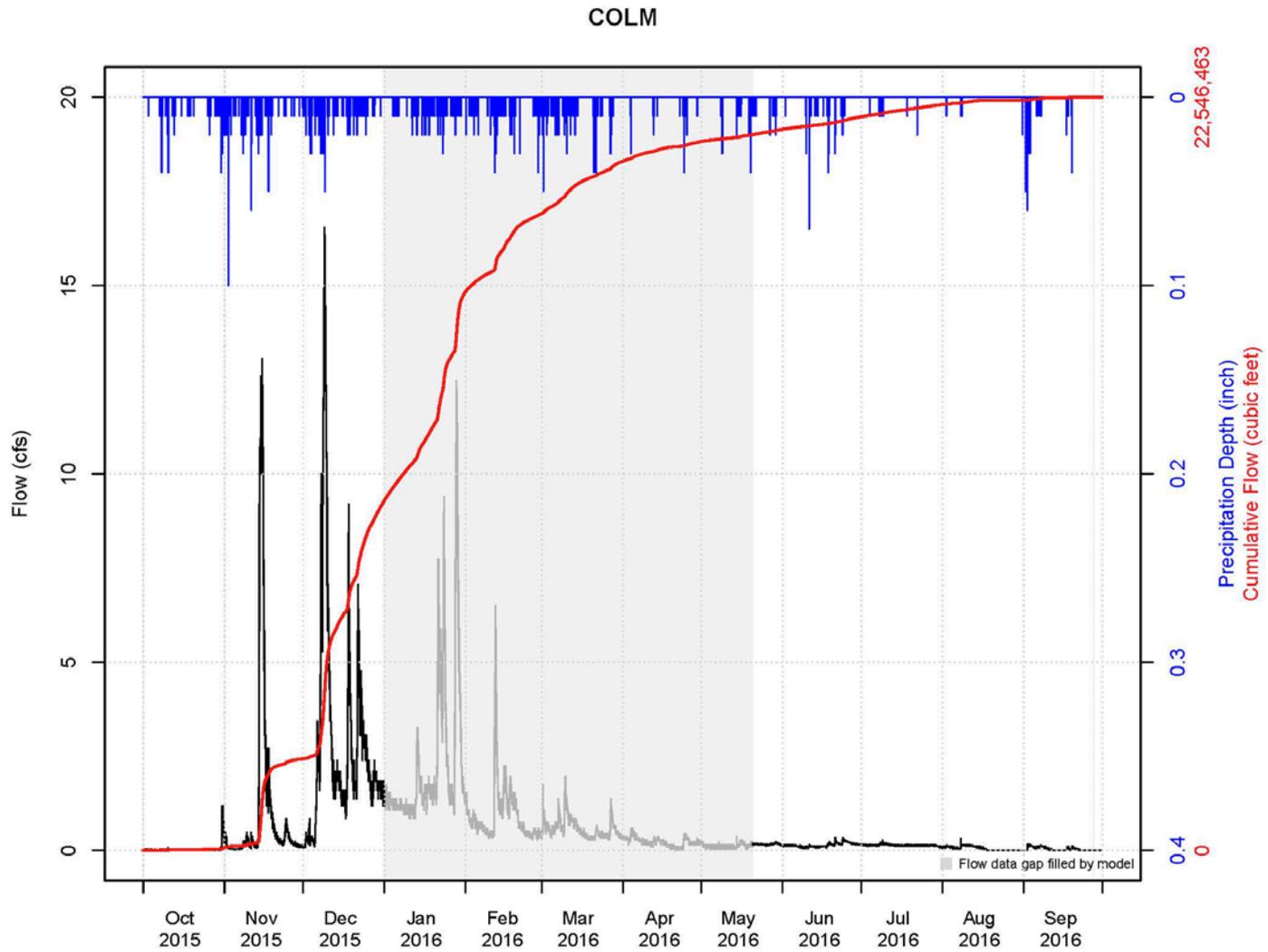


Figure A-8. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the COLM Station.

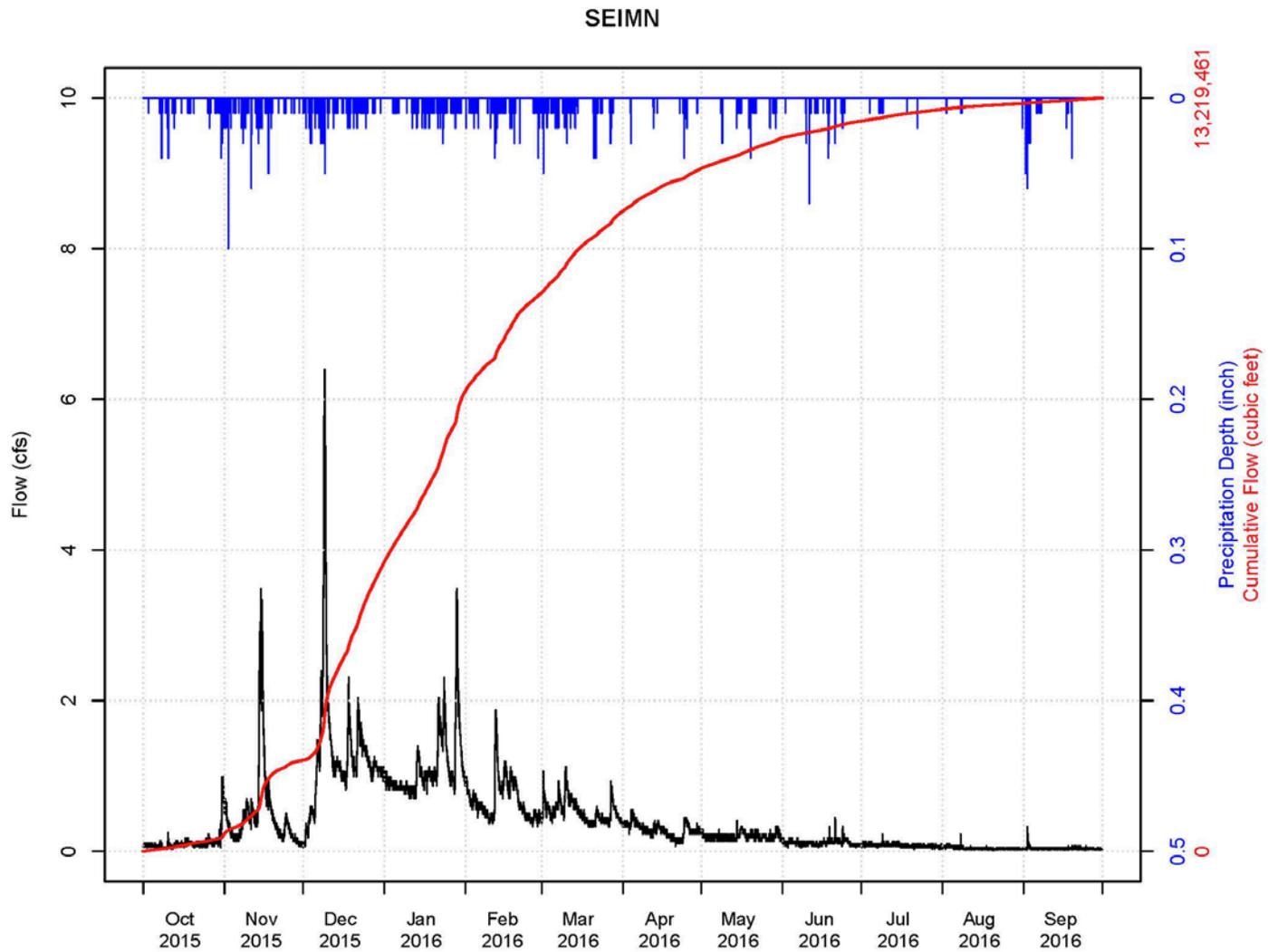


Figure A-9. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the SEIMN Station.

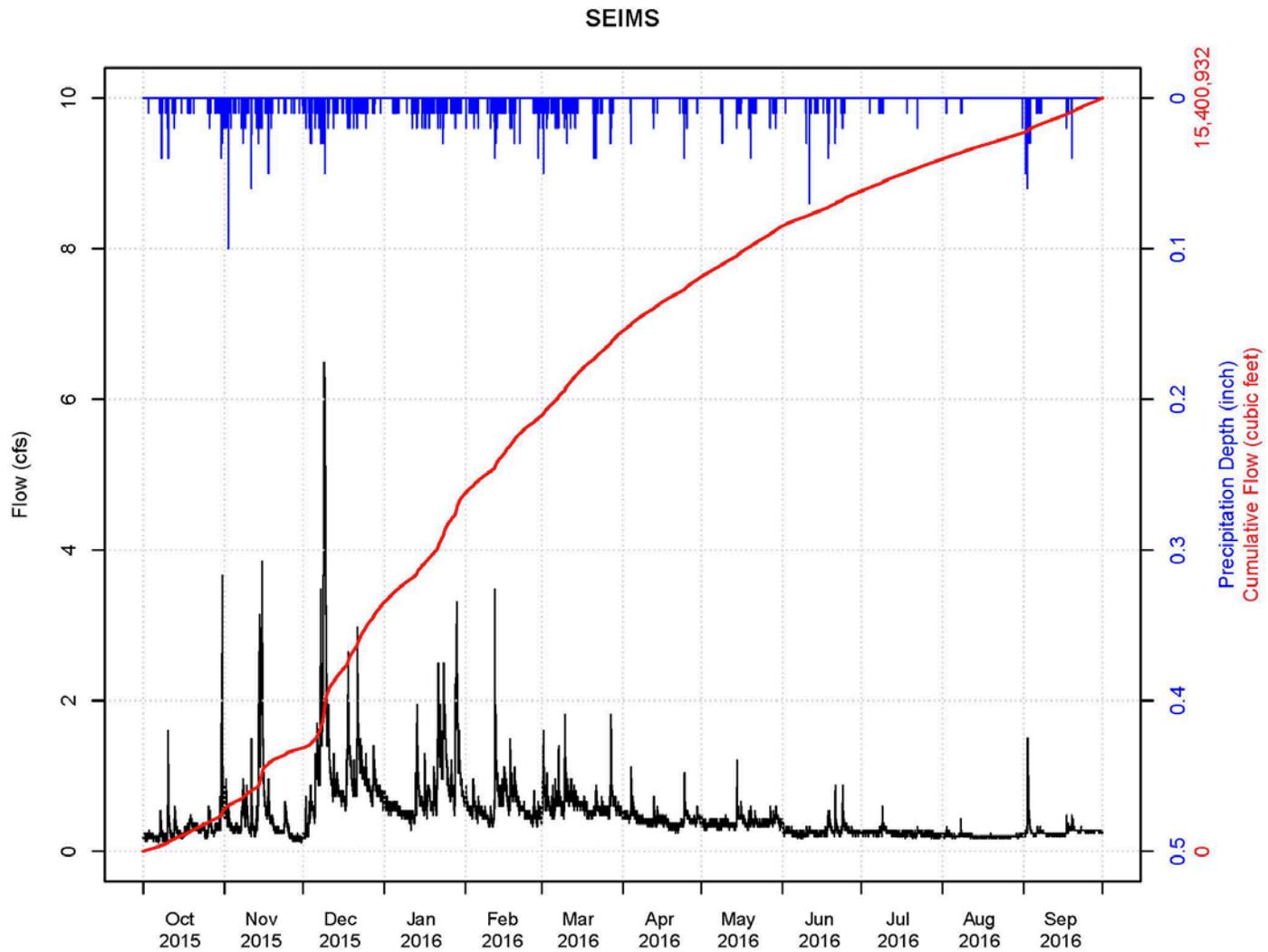


Figure A-10. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the SEIMS Station.

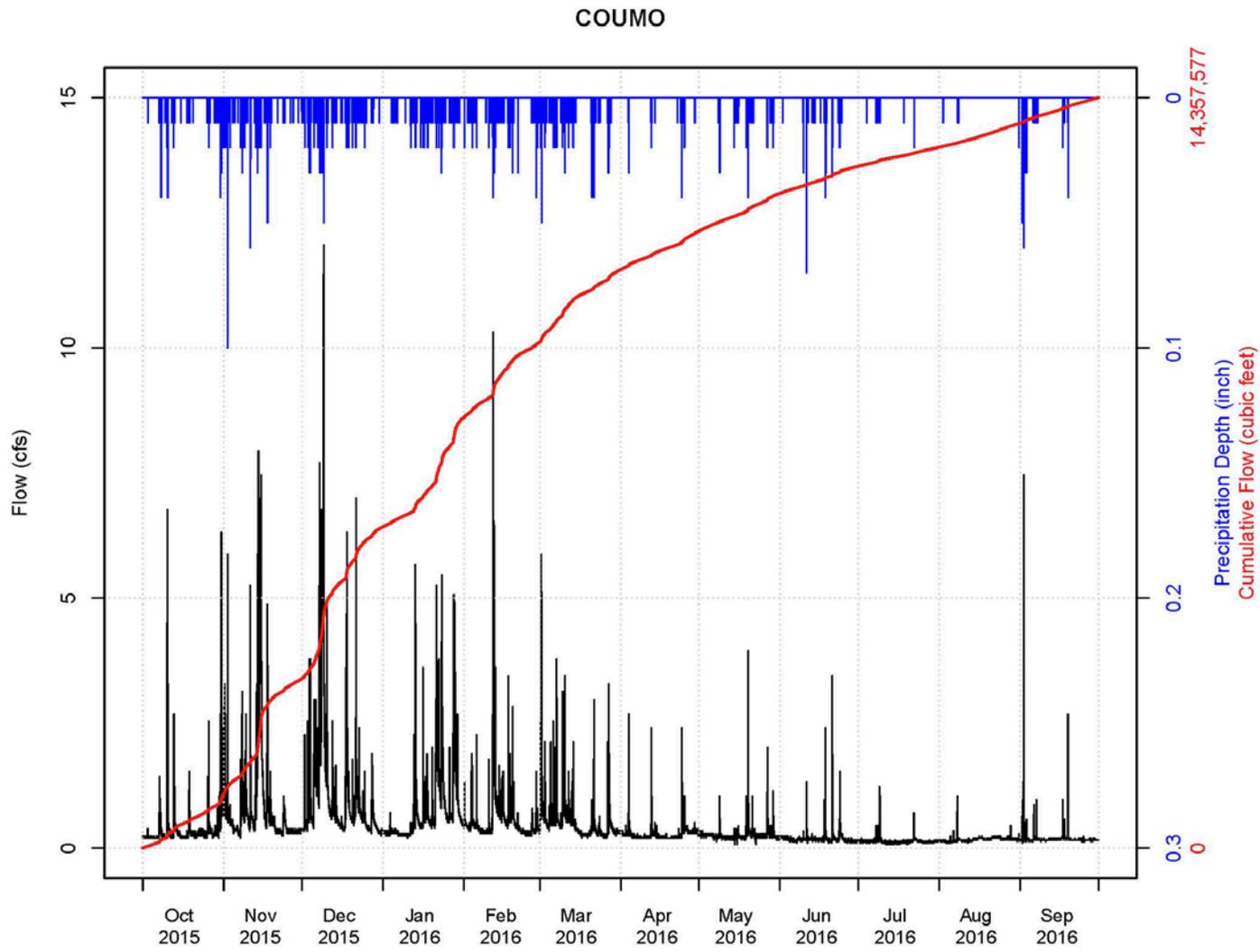


Figure A-11. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the COUMO Station.

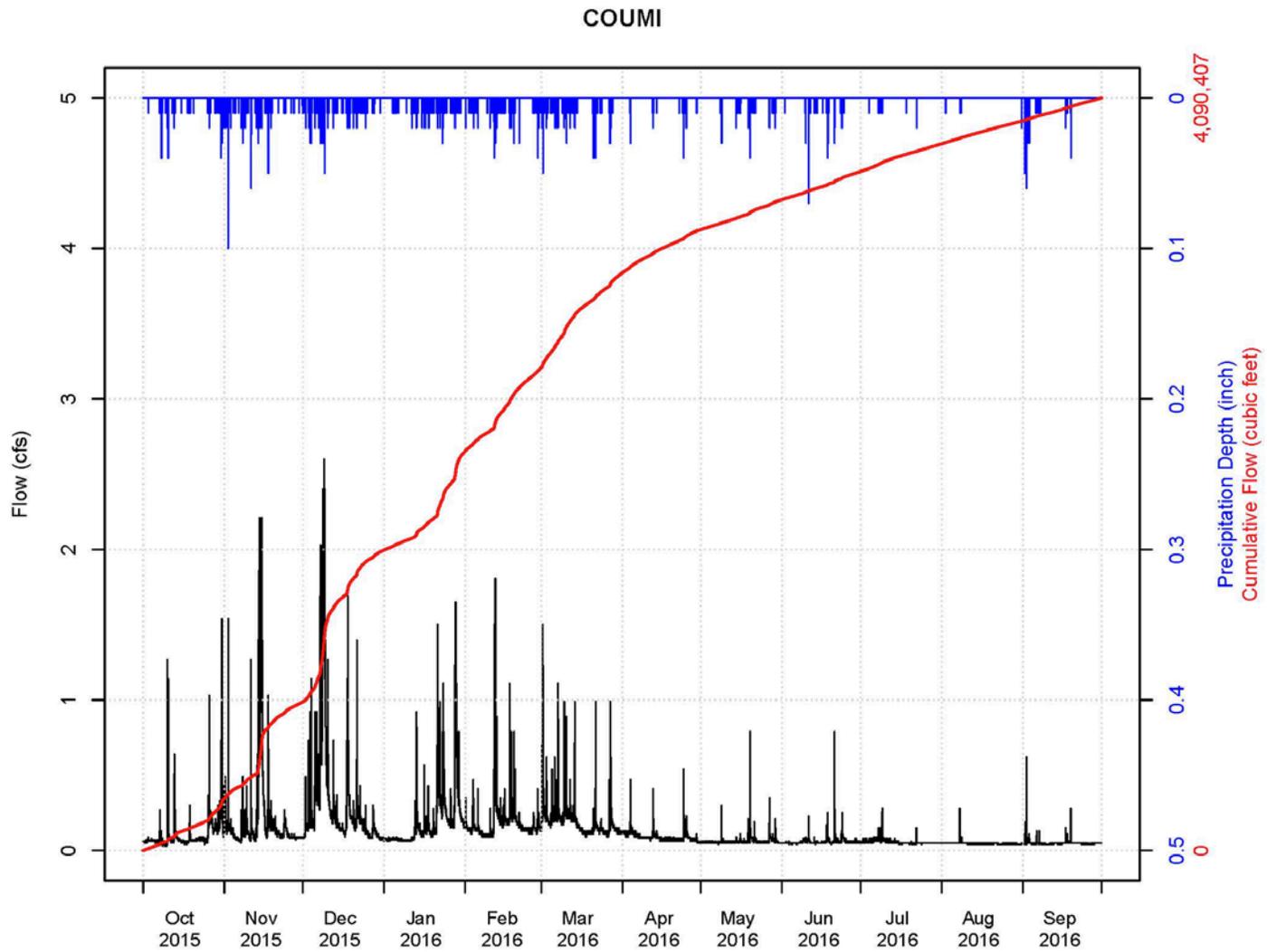


Figure A-12. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the COUMI Station.

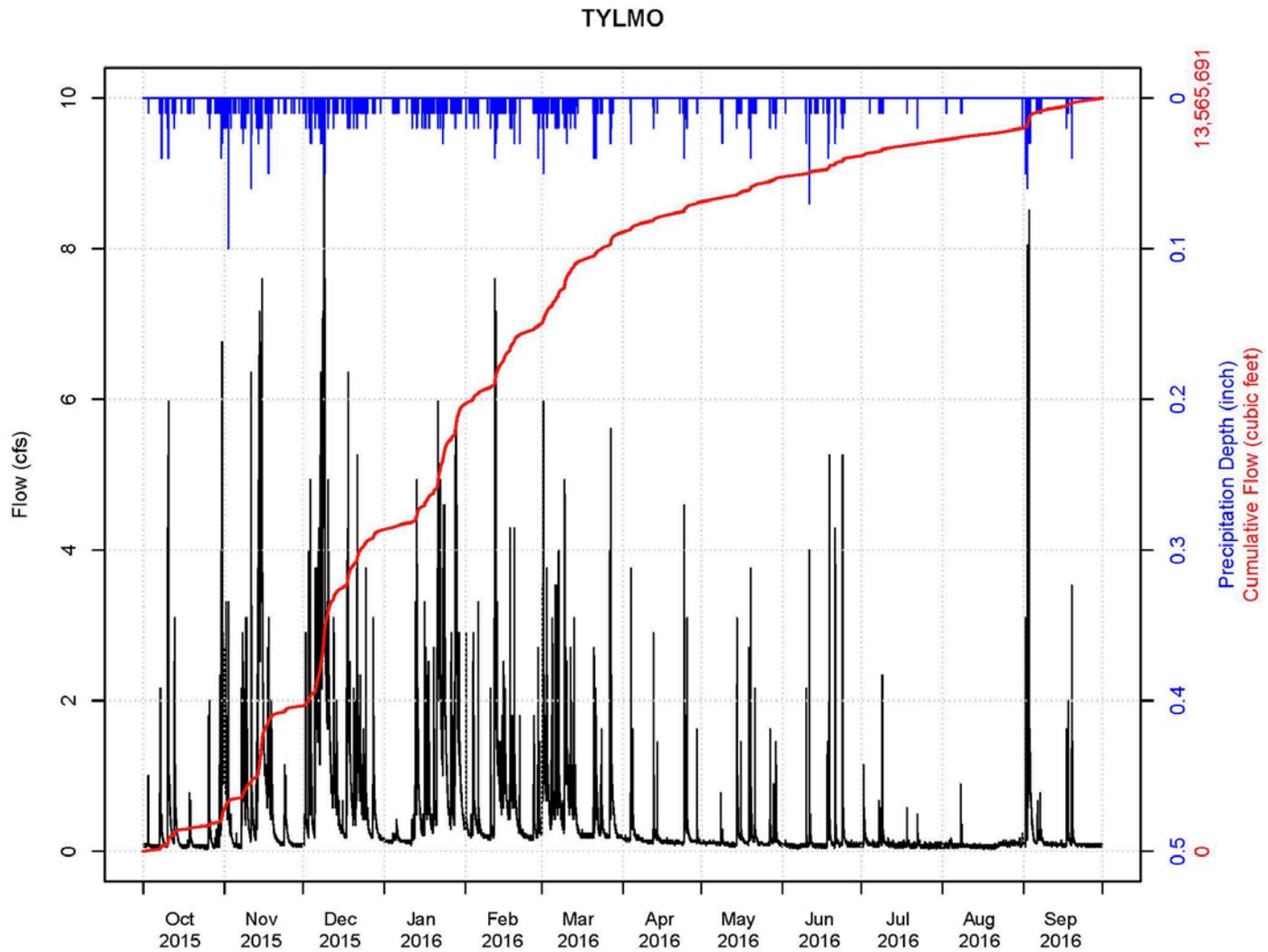


Figure A-13. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the TYLMO Station.

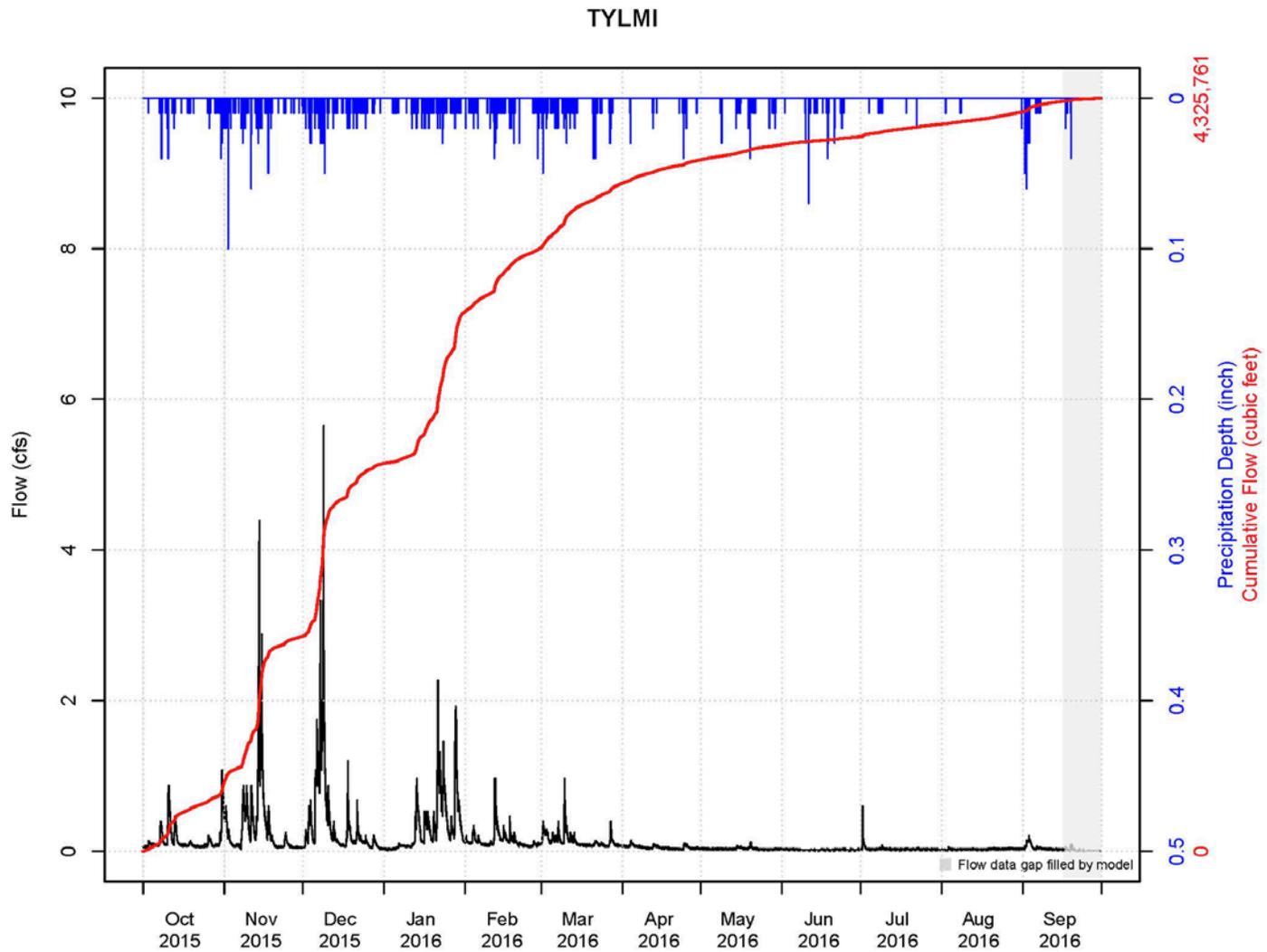


Figure A-14. Continuous Flow, Cumulative Flow, and Precipitation Depth Measured at the TYLMI station.

APPENDIX B

Data Quality Assurance Review Memorandum for Hydrologic Monitoring



King County

Water and Land Resources Division

Department of Natural Resources and Parks
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TECHNICAL MEMORANDUM

February 17, 2017

TO: Dylan Ahern, Associate Scientist, Herrera

FM: David Funke, Science and Technical Support Section, Water and Land Resources Division, Department of Natural Resources and Parks

RE: RPWS Hydrologic Data QA Memo

Introduction

This memo summarizes the results of the Quality Assurance review of hydrologic data collected by King County Department of Natural Resources (KCDNRP), Water and Land Resources Division (WLRD), Hydrologic Monitoring Program for the Redmond Paired Watershed Study for the period ending September 30, 2016. Streamflow is determined at 14 sites for the study. Water temperature is recorded at all 14 sites and conductivity loggers were deployed at seven sites for the 2016 water year.

Activities since project start

- In 2014 and 2015 KC staff assisted in scope development, monitoring site selection and QAPP preparation.
- Once the scope and QAPP were effectively approved in 2015, we purchased the initial monitoring equipment and logged it into our asset management system.
- Summer 2015, performed calibration checks on water level, temperature and conductivity loggers.
- In summer 2015, began installations so that data collection was active by October 1, 2015. The initial installations used Onset U20 sealed water level loggers.
- Fall 2015, began ongoing gauge maintenance and rating curve development.

- Fall 2015 – spring 2016, prepared the equipment specifications for the long term gauge installations.
- January 2016, sent preliminary flow data set to Ecology for first three months of program.
- Summer 2016 acquired new equipment and logged it into the asset management system.
- Summer 2016, performed calibration tests on the new water level equipment, activated cellular modems and data logging setup.
- July – October 2016, installed telemetered stream gage equipment, initiated five minute log rate.
- November 2016 – January 2017, workup of Water Year 2016 data and QC review

Quality Assurance Review of 2016 Data

QA Review Methods

While all 14 project stream gages are updated via telemetry, ultimately the final continuous hydrologic data is input into the King County Hydrologic database with a supervised process using a desktop computer application. The technician works from a plot (printed chart created in a spreadsheet) of the continuous values for a set period, usually four to eight weeks and bracketed by field observations. For discharge data, the water level corrections, rating table and shifts used are noted on the plot, along with explanatory notes. The plot is stored in the project file for the gage along with field notes and other materials. Rating curve development and gage problem solving occurs in a collegial environment with the team staff. Recorded data and field measurements are reviewed throughout the year to identify problems and target necessary measurements.

Annual review of the water year is performed after the final supervised workup. Data are reviewed by a different team member than who performed the initial workup. A spreadsheet template is used with daily mean, max and min values, rainfall, comparison gages, field observations, and a QC checklist to structure the review. Guidance for the review is given in the attached document [KC STREAM GAGE DATA WORKUP REVIEW 2017.docx](#).

RPWS WY 2016

Rainfall totals were above average for October through December 2015. Three inches in 48 hours were recorded December 8-9 in the Redmond area, producing the peak flow for the water year. A three inch 48 hour storm in mid-November also generated significant stormflows. Rainfall was average January through the end of the year, with enough summer rain to alleviate drought concerns.

COLM Colin Creek Mid Site

Station was located at the site of former gage 02D, although the flume that was used previously was no longer functional. Good stormflow measurements were made for the December 2015 storm. The installation was vandalized early in January. The logger was found and some data retrieved but we were only confident of the quality through the end of December. A new gage was installed upstream of the bridge in May. There is a data gap Jan 1 – May 20, 2016. The October – December record is poor, with good confidence in the magnitude of the storm peaks. The May through September record is fair, with the stream going dry at times.

COUMO Country Creek at Mouth

Record fair. Frequent scour and fill at this site necessitates rating shifts. Peak recorded discharge 12 cfs, highest discharge measurement 6 cfs.

COUMI Country Creek Mid Site

Record fair. Scour and fill at this site necessitates rating shifts. Peak recorded discharge 2.6 cfs, highest discharge measurement 1.6 cfs. Mean annual flow 28% of downstream gage.

EVALSS Evans Lower Stream Site

Record fair. Winter baseflow lower than in spring. . Peak recorded discharge 23 cfs, highest discharge measurement 9.3 cfs.

EVAMSS Evans Mid Stream Site

Record fair. Scour and fill at this site necessitates rating shifts. Peak recorded discharge 5.8 cfs, highest discharge measurement 3.5 cfs. Mean annual flow 34% of downstream gage.

MONMO Monticello Mouth Site

Record good. Water level measured behind a metal weir, but flow is very turbulent during stormflow. Peak recorded discharge 19 cfs, highest discharge measurement 13 cfs. Data gap 9/15 – 9/30.

MONMN Monticello Mid North Site

Record poor. Channel not conducive to stable rating. Peak recorded discharge 7.3 cfs, highest discharge measurement 3.8 cfs. Mean annual flow 33% of downstream gage. Data gap 9/17 – 9/22.

MONMS Monticello Mid South Site

Record fair. Flow goes to 0 at times. Difficult to measure low flows. Peak recorded discharge 1.7cfs, highest discharge measurement 1.5 cfs. Mean annual flow 14% of downstream gage.

SEIMN Seidel Mid North Site (formerly 02o)

Record fair. Stream gage operated at this site since 2008. Water level measured behind an old existing concrete weir. Peak recorded discharge 6.4 cfs, highest discharge measurement 1.5

cfs. There is some evidence that the sediment load is increasing in the channel making the weir rating less stable. We installed the Onset water level logger at a cross section upstream to see if that might be more stable.

SEIMS Seidel Mid South Site (formerly 02p)

Record fair. Stream gage operated at this site since 2008. Water level measured behind an old existing concrete flume structure. Peak recorded discharge 6.5 cfs, highest discharge measurement from previous years 1.5 cfs.

TOSMO Tosh Mouth Site

Record good except for peak flows. Water level measured behind a concrete weir, but flow is not contained in the notch during high stormflows. Peak recorded discharge 13 cfs, highest discharge measurement 8.6 cfs. Data will be reworked when a discharge measurement is made with flow out of the notch. Data gap 3/15 – 4/24 due to instrument malfunction.

TOSMO Tosh Mouth Site

Record fair. The channel here gives a low resolution rating. Peak recorded discharge 15 cfs, highest discharge measurement 6.3 cfs. Mean daily discharge slightly exceeded that of the downstream gage, which may be due to a poorly defined rating at the mouth site (likely) or intermittent debris buildup and flushing at this site. Access to the site is difficult.

TYLMO Tyler Mouth Site

Record fair. Water level measured behind a metal weir, but the channel is silted in such that there is not a level pool. Very flashy response to rainfall. Peak recorded discharge 10 cfs, highest discharge measurement 8.5 cfs.

TYLMI Tyler Mid Site

Record fair. Water level measured at outlet to 4.5' diameter culver, behind a rock control. Stream reacts quickly to rainfall with nearby street runoff getting to the channel quickly. Peak recorded discharge 5.6 cfs, highest discharge measurement 1.4 cfs. Rating curves are not very stable here.

STREAM GAGE DATA WORKUP QA/QC

A streamflow data workup should be checked by another technician before approving the data for publication. This is not a rote process or simple checklist. It requires an understanding of the basic elements of a data workup as well as a questioning attitude. The check can go pretty quickly if the person doing the original workup has taken good notes, kept the file in good order, made the necessary graphs and reports, and did not make any mistakes. The QA/QC check should be performed by someone other than the person who did the original workup. This ensures that we get a realistic assessment of the coherence and legibility of the workup and documentation. We want to be able to return to the file at a later date and figure out how the flow data were derived from the primary data. We also want to make sure that the data make sense and contain no errors. Of course we will never know if our flow data are accurate, but we can know that they are the best numbers possible if rating tables are well developed and the rating properly applied to a carefully corrected stage record. The following steps are outlined in the order they should occur.

Three Objectives

1. Well documented work, so in the future we can figure out what was done and why. If the file and notes are a mess and don't make sense, you give it back and tell them to get it together.
2. Careful work, i.e. no stupid or gross mistakes. No gaps, no big jumps in discharge when there shouldn't be, flow in data table matches the discharge measurement made at that time, sensor garbage is cleaned up. Stupid mistake example: the flow record changes 15% in one log between sessions because the initial sensor correction was set incorrectly.
3. Technically defensible work, no errors in judgment. Rating curves make sense, stage corrections are reasonable, rating shifts applied appropriately, estimated periods make sense.

QA/QC steps to checking flow records

Documentation There may be some minor problems with the file organization that did not affect the workup quality. These the checker can fix. Make sure that:

- The paper file is organized correctly
- There is a workup cover sheet with session by session notes
- Workup charts are all there and gaps noted, workup detail is written on the chart
- Discharge Measurement Summary form is up to date
- Flows are correctly plotted on rating curve
- Data input files are stored correctly

- Water year QA spreadsheet is complete (use StreamGage_WaterYear_Report.xlsx template). Charts titles should be correct, rain gage and comparison gage data included, also any continuous water temperature or other water quality data if applicable.

DRAFT

Look for mistakes.

- Is water year complete? Complete 15 minute years have 35,040 records, leap years 35,136 (5 minute have 105,120). Missing data will reduce that number. The logs for the year are displayed on the workup screen. Also, missing data will be held with asterisks in the 15 minute report. Dump the report into excel and sort by value.
- Compare the graph of the daily mean and max flow to that of an equivalent gage. You're looking at the timing and relative magnitude of peaks and low flow periods.
- Examine daily mean and min flows chart. You're looking for periods where the flow drops unrealistically, usually due to sensor problems, a negative value, or a mistaken filled value.
- Check the data table at date and time of discharge measurements. The record should match the flow or there should be a good reason why in the notes.
- Check the plotting of each flow measurement on the rating curve. Sometimes the offset is incorrectly added or just it's just put in the wrong place. It can look right and be wrong, so check.
- Give flow measurements a once over to make sure they are sensible, $V \cdot A = Q$, the calculated width seems right given the start and end of the cross section. Pay special attention to high flow measurements or any flow that shifts off the normal rating.
- Does the flow record connect well? No unjustified jumps in the discharge between sessions, stage corrections or other events.
- Are estimate periods flagged correctly

Technical quality

- Can you understand what rating curves were used, and what they are based on? What defines the high end?
- If the high end depends on a curve extension, are there indirect discharge calculations made to justify the peak flow estimate? Do you agree? This is a highly subjective area that bears careful examination. We expect, of course, that consultation was done during the initial workup, so there will be no big surprises.
- Are base flows accurate? It may be more accurate to estimate low flow periods or fill the stage record than use stage record with known error.
- Check how daily flow estimates to fill gaps were made.
- Compare mean daily discharge with an appropriate nearby station for timing and magnitude of peaks, baseflow etc.

Final approval

If everything is in order, or after corrections have been made, complete QC checklist sheet in the Water Year spreadsheet. Printout checklist for the paper file. Include name and date.

APPENDIX C

Manual Flow Measurements Used to Develop Discharge Rating Curves

Table C-1. Manual Flow Measurements Used to Develop Discharge Rating Curves at SIEMN.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water		Notes
				Temperature (Celsius)	Conductivity (uS/cm)	
9/4/2008 10:30	1	1.19	0.06	11.3	119	
10/16/2008 13:42	2	1.19	0.08	9.6	118	
11/7/2008 12:25	3	1.55	1.94			
12/10/2008 12:56	4	1.27	0.24	7.7	76.9	
1/14/2009 14:45	5	1.32	0.77	5.7	76.9	
2/22/2009 14:49	6	1.26	0.33			
3/2/2009 11:56	7	1.26	0.31	7.1	72.8	
3/16/2009 13:43	8	1.33	0.67	4.9	54.8	
3/25/2009 12:33	9	1.54	2.13			
5/6/2009 11:26	10	1.32	0.54	9.4	60.7	
6/30/2009 12:00	11	1.20	0.10	11.3	113	
7/1/2009 10:46	12	1.20	0.13			
9/15/2009 10:36	13	1.20	0.10	12.4	116	
11/17/2009 11:22	14	1.43	1.24	7.2	55.9	
12/15/2009 13:55	15	1.25	0.18	4.3	88.4	
1/12/2010 13:50	16	1.44	1.21			
1/25/2010 11:27	17	1.32	0.46	6.1	62	
2/8/2010 13:34	18	1.27	0.27	6.6	74.8	
3/9/2010 11:26	19	1.24	0.19	4.4	87.3	
4/21/2010 12:05	20	1.40	0.82	9.1	48.4	
5/18/2010 12:46	21	1.24	0.16	10.7	93.3	
6/16/2010 12:33	22	1.34	0.61	10.6	59.2	
7/13/2010 11:13	23	1.23	0.13	11.5	107	
8/3/2010 10:19	24	1.22	0.12	12.1	109	
10/20/2010 11:54	25	1.21	0.12	9.0	112	
12/7/2010 13:39	26	1.24	0.23	7.1	83.4	
2/9/2011 14:25	27	1.30	0.53	5.0	61.1	
4/5/2011 11:20	28	1.46	1.38	7.0	44.8	
5/26/2011 11:27	29	1.32	0.54	9.8	61.7	
7/7/2011 12:38	30	1.24	0.18	11.5	104	
8/31/2011 13:16	31	1.20	0.10	11.8	117	
10/13/2011 11:50	32	1.20	0.10	9.4	119	
12/14/2011 14:24	33	1.22	0.11	4.8	100	
3/2/2012 12:39	34	1.34	0.58	5.2	55.7	
4/5/2012 12:46	35	1.38	0.77	5.9	54.2	
5/30/2012 12:40	36	1.24	0.19	10.5	90.1	
8/13/2012 14:06	37	1.21	0.12	13.9	113	
10/12/2012 13:50	38	1.20	0.11			
2/7/2013 11:42	39	1.34	0.73			
7/8/2014 12:59		1.21		14.1	100	
9/9/2014 11:53	40	1.19	0.09	12.5	114	
10/30/2014 13:10		1.26		11.5	74.3	
12/17/2014 12:56				7.2	93.8	
12/19/2014 12:59	42	1.32	0.64			
2/3/2015 13:40	43	1.28	0.43	7.7	61.8	
3/25/2015 11:55	44	1.35	0.75	8.6	40.8	
5/11/2015 12:48	45	1.22	0.18			
7/1/2015 13:17	46	1.21	0.14	15.0	119	
8/26/2015 12:52	47	1.21	0.09	13.0	124	
10/15/2015 13:11	48	1.20	0.08	10.8	95.4	
10/16/2015 13:40		1.19		11.8	119	
12/3/2015 14:11	49	1.29	0.48	6.6	57.0	
1/27/2016 13:58	50	1.36	0.91	7.9	46.3	
2/1/2016 13:42		1.35		6.6	37.8	
3/16/2016 10:59	51	1.28	0.44	7.2	57.8	
6/1/2016 12:12	52	1.21	0.12	12.0	111	
7/15/2016 11:53	53	1.20	0.09	12.6	120	
10/21/2016 14:30	54	1.30	0.54	11.2	63.0	
10/31/2016 12:59	55	1.36	0.85			
11/15/2016 13:43	56	1.46	1.51	10.7	41.6	
11/28/2016 13:49	57	1.40	0.86	8.7	49.5	
11/29/2016 14:01	58	1.39	0.81	9.5	178	
1/12/2017 12:18	59	1.29	0.34	2.3	69.0	
1/18/2017 12:52	60	1.62	2.78			
2/15/2017 12:35	61	1.51	1.59			
2/28/2017 13:15	62	1.45	0.87	4.8	46.3	
3/15/2017 14:58	63	1.57	2.04	8.3	37.8	
4/21/2017 12:59	64	1.35	0.68	10.0	54.1	
4/25/2017 13:26	65	1.34	0.67	10.1	55.1	
6/22/2017 12:00	68	1.30	0.20	11.5	99.7	
Average		1.30	0.57	9.1	82.3	
Minimum		1.19	0.06	2.3	37.8	
Maximum		1.62	2.78	15.0	178	

Table C-2. Manual Flow Measurements Used to Develop Discharge Rating Curves at SEIMS.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water		Notes
				Temperature (Celsius)	Conductivity (uS/cm)	
9/17/2008 13:09	1	0.69	0.23			
10/16/2008 12:29	2	0.71	0.31			
11/12/2008 12:08	3	0.87	1.13			
12/10/2008 14:05	4	0.72	0.33			
1/14/2009 12:47	5	0.78	0.73			
3/2/2009 13:18	6	0.75	0.42			
3/25/2009 13:12	7	0.91	1.52			
5/6/2009 12:40	8	0.84	0.95			
6/30/2009 11:00	9	0.74	0.27			
7/30/2009 12:42	10	0.74	0.19			
9/25/2009 11:26	11	0.70	0.19			
1/12/2010 14:31	12	0.87	1.25			
3/9/2010 10:11	13	0.74	0.31			
4/21/2010 11:06	14	0.90	1.46			
6/16/2010 11:25	15	0.82	0.80			
8/27/2010 10:16	16	0.72	0.30			
8/25/2014 11:27	17	0.71	0.30	14.6	120	
10/30/2014 11:25		0.72		11.4	101	
12/17/2014 13:53		0.76		7.2	93.8	
12/19/2014 11:17	18	0.80	0.72			
2/3/2015 12:23		0.77		7.6	91.3	
3/26/2015 11:32		0.80		10.4	71.2	
5/18/2015 12:05		0.73		14.3	111	
7/17/2015 11:12	19	0.71	0.18	14.1	120	
8/26/2015 11:55		0.71		14.2	118	
12/3/2015 13:12	20	0.77	0.45	7.0	86.0	
1/27/2016 12:26		0.80		8.4	70.0	
4/20/2016 12:48		0.75		14.8	114	
6/1/2016 10:39		0.75		14.2	108	
8/3/2016 16:00	21	0.70	0.23	14.3	87.3	
8/4/2016 11:40		0.71				
10/13/2016 17:40	22	0.86	0.95	10.7	89.0	
1/12/2017 15:37	23	0.74	0.36	1.8	96.0	
1/18/2017 12:01	24	1.00	2.41			
2/9/2017 12:21	25	1.30	8.63			
3/7/2017 14:20	26	0.85	0.99	5.0	62.2	
4/18/2017 14:15	27	0.81	0.75	10.7	89.0	
6/19/2017 14:15	28	0.76	0.42	13.0	112	
Average		0.79	0.96	10.8	96.7	
Minimum		0.69	0.18	1.8	62.2	
Maximum		1.30	8.63	14.8	120	

Table C-3. Manual Flow Measurements Used to Develop Discharge Rating Curves at COLM.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water		Notes
				Temperature (Celsius)	Conductivity (uS/cm)	
9/25/2015 13:35	1	0.44	0.01	12.9	61.0	
12/8/2015 15:55	3	0.38	10.33			
12/9/2015 14:55	4	0.53	16.16	8.3	29.0	
5/4/2016 13:00	4.5	5.41	0.25	12.5	27.7	gage relocated
5/20/2016 13:30	4.6	5.42	0.15	11.8	60.0	
9/27/2016 13:30		0.00	0.00			
10/14/2016 13:25	5	5.65	0.58			
10/24/2016 14:00	6	5.64	0.83	11.7	40.0	
10/27/2016 13:15	7	5.90	3.15	11.2	39.0	
10/31/2016 13:40	8	5.89	2.56			
11/28/2016 14:39	9	5.94	3.67	7.8	28.9	
1/12/2017 13:18	10	5.61	0.66	1.1	36.6	
1/18/2017 13:30	11	6.09	5.58	2.4	32.00	
2/10/2017 13:10	12	6.33	13.47	3.7	25.00	
3/15/2017 13:20	13	6.13	7.59	8.8	28.1	
4/27/2017 12:15	14	5.97	3.79			
6/19/2017 17:15	15	5.43	0.08	14.6	36.2	
Average		4.52	4.05	8.9	37.0	
Minimum		0.00	0.00	1.1	25.0	
Maximum		6.33	16.16	14.6	61.0	

Table C-4. Manual Flow Measurements Used to Develop Discharge Rating Curves at COUMI.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/22/2015 11:30	1	0.65	0.05			
11/9/2015 12:19	2	0.76	0.13	10.8	158	
11/20/2015 11:53	3	0.77	0.18	7.0	210	
12/8/2015 15:02	4	0.92	1.52			
1/19/2016 13:30	5	0.71	0.1	7.5	242	
1/21/2016 14:11	6	0.85	0.71			
3/14/2016 11:37	7	0.72	0.16	8.0	201	
4/29/2016 14:09	8	0.67	0.09			
7/14/2016 14:27	9	0.65	0.04	14.6	336	
7/20/2016 11:20	10	0.65	0.04			
10/13/2016 12:18	11	0.77	0.18	11.8	206	
11/2/2016 9:25	12	0.79	0.31	11.5	121	
11/23/2016 16:45	13	0.71	0.09	9.9	214	
11/30/2016 12:10	14	0.71	0.08	9.4	204	
1/13/2017 11:10	15	0.67	0.07	1.9	289	
1/18/2017 12:25	16	0.87	0.88	5.6	127	
1/18/2017 16:20	17	0.86	0.83			
2/9/2017 10:10	18	1.09	5.7	5.8	53.0	
3/8/2017 16:15	21	0.72	0.16	6.3	214	
4/13/2017 10:30	22	0.76	0.25	9.2	148	
4/18/2017 11:35	23	0.71	0.14	10.2	230	
5/18/2017 10:45	24	0.69	0.15	10.7	137	
6/28/2017 11:15	25	0.66	0.04	13.5	332	
Average		0.75	0.52	9.0	201	
Minimum		0.65	0.04	1.9	53.0	
Maximum		1.09	5.70	14.6	336	

Table C-5. Manual Flow Measurements Used to Develop Discharge Rating Curves at COUMO.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/21/2015 13:06		1.27				
11/9/2015 13:37	1	1.11	0.72	11.2	189	
11/14/2015 13:45	2	1.27	2.58	11.1	161	
11/20/2015 13:08	3	1.04	0.42	7.6	232	
12/2/2015 13:55	4	1.04	0.36	7.8	248	
12/8/2015 14:09	5	1.46	5.98			
1/19/2016 13:09	6	1.04	0.39	7.7	207	
3/14/2016 11:04	7	1.05	0.43	8.2	205	
4/25/2016 13:00	8	1.06	0.77			
7/20/2016 16:45	9	0.98	0.14	16.9	304	
10/13/2016 12:45	10	1.08	0.66	12.6	168	
10/27/2016 14:05	11	1.05	0.83	13.0	190	
11/2/2016 10:00	12	1.16	1.35	11.9	126	
11/30/2016 13:00	13	1.00	0.41	9.9	214	
1/13/2017 11:55	14	0.97	0.28	2.8	247	
1/18/2017 13:00	15	1.22	2.56	5.9	134	
2/8/2017 16:30	16	1.18	1.85	4.5	247	
2/9/2017 9:40	17	1.74	15.41	5.4	37.3	
2/9/2017 15:25	16	1.92	6.32	4.3	33.0	
2/15/2017 12:30	18	1.17	2.07	7.2	148	
3/8/2017 16:50	19	1.01	0.51	6.7	204	
4/18/2017 11:10	20	1.04	0.65	10.7	206	
5/18/2017 11:25	21	1.03	0.45	11.4	236	
6/28/2017 11:25	22	1.00	0.21	11.4	236	
Average		1.16	1.97	9.0	189	
Minimum		0.97	0.14	2.8	33.0	
Maximum		1.92	15.41	16.9	304	

Table C-6. Manual Flow Measurements Used to Develop Discharge Rating Curves at EVALSS.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
10/2/2015 14:09		2.22				
10/21/2015 15:15		2.26		11.6	207	
11/10/2015 12:35	1	2.31	1.80	9.2	134	
11/14/2015 16:53	2	2.60	9.33	9.8	97.0	
11/18/2015 14:58	3	2.43	2.81	8.9	162	
12/2/2015 14:50	4	2.40	1.71	7.0	174	
12/11/2015 14:45	5	2.41	3.56	8.4	151	
1/20/2016 13:47	6	2.38	2.12	7.8	160	
3/1/2016 14:05	7	2.41	3.27	8.7	151	
4/26/2016 12:37	8	2.33	1.67	9.9	195	
6/15/2016 12:42	9	2.31	1.37	11.4	199	
8/24/2016 14:45	10	2.27	1.22	15.1	210	
10/13/2016 15:55	11	2.39	3.58	11.2	170	
11/2/2016 12:25	12	2.39	3.31	11.4	158	
11/29/2016 14:26	13	2.37	2.60	9.5	164	
1/12/2017 14:28	14	2.33	1.66	2.9	186	
1/13/2017 14:30	15	2.34	1.69	2.9	187	
1/18/2017 13:56	16	2.54	6.62			
2/9/2017 15:15	17	2.32	16.16	6.3	69.0	
2/14/2017 13:59	18	2.36	2.19	6.8	163	
2/15/2017 11:31	19	2.45	4.95			
2/28/2017 14:08	20	2.37	3.23	5.9	150	
3/15/2017 11:31	21	2.50	6.93	9.0	115	
4/13/2017 15:20	22	2.37	3.22	10.2	147	
4/26/2017 13:30	23	2.33	1.89	11.1	170	
5/18/2017 13:48	24	2.32	2.12	11.6	176	
6/28/2017 15:30	25	2.27	1.29	13.4	204	
7/13/2017 12:56	26	2.26	1.04	14.4		
Average		2.37	3.51	9.4	162	
Minimum		2.22	1.04	2.9	69.0	
Maximum		2.60	16.16	15.1	210	

Table C-7. Manual Flow Measurements Used to Develop Discharge Rating Curves at EVAMS.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/24/2015 14:05		0.80				
10/21/2015 15:30	1	0.85	0.43	11.9	235	
11/9/2015 15:04	2	0.94	1.12	10.0	154	
11/14/2015 16:33	3	1.05	3.46	9.9	130	
11/18/2015 14:17	4	0.90	0.85	8.9	120	
12/2/2015 14:31	5	0.85	0.61	6.9	179	
12/10/2015 14:29	6	0.90	1.61			
12/11/2015 14:05	6.1	0.82	1.24	8.4	163	
1/20/2016 14:10	7	0.79	0.70	7.8	186	
1/21/2016 13:44	8	0.96	2.31			
3/1/2016 15:03	9	0.86	0.96	8.9	175	
4/26/2016 12:01	10	0.78	0.53	10.0	212	
6/14/2016 13:28	11	0.78	0.41	11.7	229	
8/30/2016 16:30	12	0.82	0.30	14.4	232	
10/13/2016 15:20	13	0.95	1.07	11.4	172	
11/2/2016 15:20	14	0.90	1.10	11.3	170	
11/29/2016 14:01	15	0.89	0.81	9.5	178	
1/12/2017 13:46	16	0.85	0.48	3.2	32.0	
1/13/2017 13:50	17	0.85	0.53	2.6	206	
1/18/2017 13:36	18	1.01	2.83			
2/9/2017 13:17	19	1.22	7.09			
2/9/2017 14:34	20	1.16	5.08	5.7	95.9	
2/15/2017 11:54	21	1.02	1.86			
3/15/2017 12:13	22	1.08	2.52	8.8	127	
4/13/2017 15:50	23	0.97	1.11			
4/26/2017 13:06	24	0.94	0.67	11.6	190	
5/24/2017 13:10	25	0.91	0.48	12.4	206	
6/6/2017 12:07		0.91		13.2	219	
6/28/2017 14:20	26	0.90	0.37	13.4	225	
7/13/2017 12:30	27	0.90	0.38	14.2		
Average		0.92	1.46	9.8	174	
Minimum		0.78	0.30	2.6	32.0	
Maximum		1.22	7.09	14.4	235	

Table C-8. Manual Flow Measurements Used to Develop Discharge Rating Curves at MONMN.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/22/2015 12:36		0.91				
10/16/2015 13:10	1	0.93	0.04	12.5	173	
11/14/2015 15:03	2	1.33	2.29	10.3	93	
12/9/2015 16:25	3	1.34	2.57	9.6	160	
2/3/2016 13:30	4	1.09	0.42	7.1	104	
9/23/2016 18:35	5	0.96	0.02	13.8	213	
10/13/2016 13:40	6	1.27	0.71	11.8	102	
10/14/2016 12:25	7	1.55	3.78			
11/2/2016 13:55	8	1.31	1.23	11.6	104	
11/30/2016 16:45	9	1.23	0.70	9.0	109	
1/13/2017 17:20	10	1.04	0.11	2.9	150	
1/18/2017 9:25	11	1.50	4.45			
2/8/2017 15:25	12	1.25	0.81			
2/9/2017 12:00	13	1.76	16.20	5.5	65.5	
2/9/2017 16:20	14	1.62	8.18			
2/15/2017 15:10	15	1.32	2.73	7.0	74.0	
3/6/2017 17:25	16	1.10	0.41	6.6	114	
4/13/2017 11:30	17	1.21	1.16	10.2	94.0	
5/18/2017 14:30	18	1.09	0.40	13.0	130	
6/13/2017 14:30	19	0.95	0.06	13.0	130	
7/20/2017 11:30	20	0.94	0.03	15.1	212	
8/16/2017 14:05	22	0.96	0.05	15.1	204	
Average		1.21	2.21	10.2	131	
Minimum		0.91	0.02	2.9	65.5	
Maximum		1.76	16.20	15.1	213	

Table C-9. Manual Flow Measurements Used to Develop Discharge Rating Curves at MONMO.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water		Notes
				Temperature (Celsius)	Conductivity (uS/cm)	
6/10/2014 15:15	1	1.15	0.25	12.8	225	
6/18/2014 14:15	2	1.19	0.39	13.1	210	
7/24/2014 11:15	3	1.33	1.06	15.6	162	
9/10/2014 15:15	4	1.14	0.19	14.5	233	
9/24/2014 12:35	5	1.40	2.13	16.2	144	
10/29/2014 13:50		1.37		13.1	147	
10/31/2014 12:00	6	1.83	13.34	12.5	94	
12/4/2014 14:30	7	1.28	0.88	6.2	165	
1/30/2015 13:25		1.24		6.2	187	
4/24/2015 14:00		1.25		10.8	187	
7/30/2015 15:20		1.12	0.10	16.5	251	
9/28/2015 15:45	8	1.14	0.12	11.3	237	
9/29/2015 15:00	9	1.14	0.14			
9/29/2015 15:20	9.1	1.14	0.14			
10/5/2015 15:20		1.13		11.7	237	
1/21/2016 14:10	10	1.74	10.35			
1/27/2016 14:59	11	1.41	2.09	8.8	139	
7/27/2016 13:00	12	1.13	0.15	15.2	232	
9/16/2016 15:30		1.14				
9/16/2016 15:30		1.14				
10/14/2016 11:20		1.60		12.0	101	
10/14/2016 11:20	13	1.60	7.09	12.0	101	
11/2/2016 12:00	14	1.45	3.17	11.6	134	
1/13/2017 17:45	15	1.24	0.54	3.1	212	
2/9/2017 13:45	16	2.14	25.25	5.8	68.5	
3/7/2017 13:00	17	1.39	1.98	6.0	158	
3/15/2017 16:10				9.8	112	
4/18/2017 15:10	18	1.32	1.24	12.1	165	
5/18/2017 16:00	19	1.32	1.22			
6/13/2017 16:00	20	1.19	0.33	12.8	236	
8/16/2017 15:50	21	1.12	0.13	15.0	241	
Average		1.33	3.14	11.4	175	
Minimum		1.12	0.10	3.1	68.5	
Maximum		2.14	25.25	16.5	251	

Table C-10. Manual Flow Measurements Used to Develop Discharge Rating Curves at MONMS.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water		Notes
				Temperature (Celsius)	Conductivity (uS/cm)	
9/29/2015 13:30	1	1.07	0.01	11.4	430	
10/5/2015 14:34		1.08		12.3	423	
11/14/2015 14:24	2	1.44	1.00	10.5	195	
12/9/2015 16:00	3	1.44	0.67	9.6	160	
2/3/2016 14:00	4	1.20	0.19	7.4	238	
9/8/2016 14:15	5	1.16	0.06	15.7	312	
10/13/2016 14:10	6	1.28	0.34	12.1	174	
10/14/2016 12:50	7	1.76	1.53			
11/2/2016 14:15	8	1.34	0.32	11.8	195	
11/30/2016 17:20	9	1.23	0.12	9.2	243	
12/16/2016 15:00	10	1.15	0.04	3.4	291	
1/13/2017 15:50	11	1.23	0.12			
1/18/2017 15:50	12	1.63	1.07			
2/9/2017 12:35	13	1.97	2.89			
3/6/2017 16:30	14	1.21	0.11	8.4	262	
4/13/2017 12:30	15	1.31	0.20	10.7	229	
5/18/2017 15:40	16	1.23	0.13	13.9	273	
6/13/2017 13:00	17	1.19	0.06	12.6	311	
8/16/2017 14:35	18	1.10	0.00	17.4	413	
Average		1.32	0.49	11.1	277	
Minimum		1.07	0.00	3.4	160	
Maximum		1.97	2.89	17.4	430	

Table C_11. Manual Flow Measurements Used to Develop Discharge Rating Curves at TOSMI.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/25/2015 13:44		0.74				
10/21/2015 13:45		0.74				
10/27/2015 12:57	1	0.73	0.12			
11/9/2015 14:26	2	0.85	0.69	11.2	150	
11/20/2015 14:11	3	0.79	0.32	7.6	217	
12/2/2015 13:32	4	0.80	0.22			
12/8/2015 14:37	5	1.12	6.33			
1/20/2016 12:58	6	0.84	0.40	8.0	178	
3/14/2016 12:02	7	0.79	0.34	8.3	198	
4/25/2016 13:33	8	0.84	0.80	12.1	106	
6/29/2016 11:18	9	0.72	0.12	14.4	291	
8/11/2016 14:25	10	0.75	0.09	16.1	277	
10/13/2016 13:40	11	0.93	1.85	13.1	94.1	
11/2/2016 10:40	12	0.94	1.72	12.1	83.7	
11/30/2016 14:20	13	0.77	0.24	9.9	232	
1/13/2017 12:50	14	0.76	0.19	2.9	250	
1/18/2017 11:35	15	1.01	3.49			
2/9/2017 10:50	16	1.40	13.82	5.9	54.0	
2/15/2017 14:00	17	0.98	4.20	8.6	78.5	
3/8/2017 14:15	18	0.75	0.34	7.0	198	
4/18/2017 12:30	19	0.80	0.54	11.5	170	
5/19/2017 10:30	20	0.78	0.22	11.3	275	
6/28/2017 12:10	21	0.79	0.15	14.5	275	
Average		0.85	1.72	10.3	184	
Minimum		0.72	0.09	2.9	54.0	
Maximum		1.40	13.82	16.1	291	

Table C-12. Manual Flow Measurements Used to Develop Discharge Rating Curves at TOSMO.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water Temperature (Celsius)	Conductivity (uS/cm)	Notes
9/21/2015 13:54		0.52				
10/21/2015 13:40	1	0.52	0.33	11.4	271	
11/9/2015 13:01	2	0.64	0.91	10.6	145	
11/14/2015 13:15	3	0.84	4.24	10.5	127	
11/20/2015 13:33	4	0.58	0.54	6.6	211	
12/8/2015 13:49	5	1.05	8.56			
1/19/2016 14:00	6	0.58	0.45	7.6	233	
3/14/2016 12:32	7	0.59	0.55	8.2	191	
4/25/2016 12:13	8	0.64	1.08	10.6	146	
7/28/2016 15:22	9	0.50	0.21	16.3	262	
10/13/2016 11:50	10	0.82	3.41	12.4	83.8	
11/2/2016 11:25	11	0.73	1.75	11.8	107	
1/13/2017 10:20	12	0.53	0.38	1.8	236	
1/18/2017 13:40	13	0.84	3.36	6.1	125	
2/9/2017 9:05	14	1.24	13.95	5.3	58.3	
3/8/2017 17:30	15	0.59	0.59	6.6	217	
4/18/2017 10:30	16	0.66	1.10	10.3	111	
5/2/2017 13:15	17	0.58	0.39	10.9	241	
5/2/2017 13:30	18	0.58	0.42	10.9	241	
5/19/2017 12:00	19	0.55	0.39	11.3	246	
6/28/2017 9:40	20	0.53	0.31	13.0	260	
Average		0.67	2.15	9.6	185	
Minimum		0.50	0.21	1.8	58.3	
Maximum		1.24	13.95	16.3	271	

Table C-13. Manual Flow Measurements Used to Develop Discharge Rating Curves at TYLMI.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water		Notes
				Temperature (Celsius)	Conductivity (uS/cm)	
9/25/2015 14:45	1	1.08	0.05	14.7	209	
10/30/2015 14:30	2	1.15	0.17	14.1	133	
11/14/2015 15:50	3	1.30	1.38	10.3	97.0	
2/3/2016 16:30	4	1.05	0.10	7.7	152	
10/4/2016 16:10	5	1.02	0.06	14.3	263	
10/13/2016 15:10	6	1.14	0.59	12.9	95.0	
10/27/2016 12:00	7	1.17	0.74	12.5	96.0	
10/27/2016 12:30	8	1.17	0.69			
11/2/2016 15:30	9	1.15	0.50	11.9	100	
11/30/2016 15:30	10	1.08	0.16	9.4		
1/12/2017 17:30	11	1.02	0.05	3.4	212	
1/18/2017 10:30	12	1.36	1.94	2.9	75.0	
2/8/2017 15:50	13	1.11	0.29			
2/9/2017 13:10	14	1.45	2.91	3.1	63.0	
2/9/2017 15:50	15	1.32	1.93			
3/6/2017 15:30	16	1.08	0.11	7.2	148	
4/13/2017 13:45	17	1.17	0.56	10.8	105	
5/19/2017 14:30	18	1.02	0.05	13.7	175	
6/19/2017 16:15	19	1.00	0.03	15.2	185	
Average		1.15	0.65	10.3	141	
Minimum		1.00	0.03	2.9	63.0	
Maximum		1.45	2.91	15.2	263	

Table C-14. Manual Flow Measurements Used to Develop Discharge Rating Curves at TYLMO.

DateTime	Measurement Number	Stage (feet)	Discharge (cfs)	Water		Notes
				Temperature (Celsius)	Conductivity (uS/cm)	
9/21/2015 15:15	1	1.08	0.10	14.7	146	
10/30/2015 13:30		1.15		13.7	141	
11/14/2015 15:25	2	1.39	3.52	10.7	97.0	
12/11/2015 15:15	3	1.24	1.12	8.8	116	
2/3/2016 15:45	4	1.16	0.24	7.8	159	
7/19/2016 14:30	5	1.08	0.05	15.7	213	
9/13/2016 14:00		1.10				
9/15/2016 16:10		1.09				
10/13/2016 14:45	6	1.35	3.46	13.1	60.0	
10/14/2016 11:50	7	1.52	8.48	12.0	60.0	
10/25/2016 13:00	8	1.17	0.20	12.0	146	
11/2/2016 14:55	9	1.29	1.06	12.2	95.0	
1/12/2017 14:55	10	1.17	0.12	12.2	95.0	
1/18/2017 10:00	11	1.52	6.51			
2/9/2017 12:40	12	1.68	10.91	6.1	67.0	
2/10/2017 15:40	13	1.34	1.59	6.6	107	
3/6/2017 14:30	14	1.21	0.33	7.2	155	
4/13/2017 14:45	15	1.28	0.93	11.5	115	
5/19/2017 13:45	16	1.18	0.18	13.7	177	
6/19/2017 15:30	17	1.15	0.10	14.9	192	
Average		1.26	2.29	11.3	126	
Minimum		1.08	0.05	6.1	60.0	
Maximum		1.68	10.91	15.7	213	

APPENDIX D

Summary Statistics for Individual Storm Events by Monitoring Station

Table D-1. Summary Statistics for Individual Storm Events at the EVALSS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.71	0.86	34011.01
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	1.04	1.52	155709.00
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	2.36	4.87	210168.00
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	1.42	1.80	115974.00
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	1.05	1.16	49193.98
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	1.32	1.66	131894.90
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	1.37	1.66	197342.90
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	1.23	1.28	112986.00
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	2.37	5.71	739197.40
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	1.96	2.27	140940.00
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	1.62	1.80	91853.99
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	2.06	3.01	567214.80
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:15	16.75	2.53	3.64	152460.00
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	6.55	16.31	1751140.00
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	3.20	4.11	555255.10
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	3.41	3.95	282393.00
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	3.10	3.95	334422.10
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	2.40	3.72	172502.90
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	2.82	3.72	430964.70
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	6.88	23.40	2607039.00
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	4.50	5.82	517977.20
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	3.70	4.70	409140.10
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:15	25.00	3.11	3.72	280133.70
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 19:00	12/16/2015 19:15	24.50	2.07	2.58	182933.80
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	4.32	7.79	867186.00
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	3.13	3.72	205352.90
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:15	39.00	4.56	7.79	640710.40
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	3.21	4.44	741952.50
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	3.10	4.20	354348.00
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	1.40	1.58	153621.20
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	1.37	1.58	111096.10
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	2.30	5.53	575694.40
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	1.63	1.87	86805.05
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	2.49	3.95	275283.00
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	2.49	3.50	311715.20
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	2.73	3.72	231273.00
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	4.61	7.09	867024.30
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	5.17	7.79	599724.40
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 7:00	1/29/2016 0:15	65.50	4.56	8.52	1074231.00
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:30	1/29/2016 23:00	15.75	4.26	5.24	241641.00
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 0:45	2/1/2016 14:30	14.00	2.00	2.58	100971.00
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	1.62	2.20	78795.05
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	2.51	3.72	217268.90
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	1.78	2.20	83295.03
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	1.94	3.01	150075.00
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	1.12	1.58	94878.04
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	4.15	8.15	481320.30

Table D-1. Summary Statistics for Individual Storm Events at the EVALSS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	3.10	4.20	144963.00
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	2.33	3.72	638766.60
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 12:45	22.25	2.80	4.70	224369.90
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 12:45	2/20/2016 11:15	46.75	2.20	3.50	370934.60
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	1.27	1.58	59607.03
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	1.15	1.58	120555.10
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	1.14	1.87	155808.00
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:15	41.75	2.25	3.50	337958.60
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	2.13	2.62	187605.00
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	2.05	2.62	199602.00
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 21:00	3/7/2016 23:00	50.25	2.45	3.87	444032.80
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	2.72	4.61	372087.10
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	2.27	2.62	120699.00
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	2.20	2.62	255483.20
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	2.17	2.81	261539.90
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:30	3/22/2016 21:30	56.25	1.56	2.11	314945.70
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	1.48	1.66	142901.90
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	2.21	4.11	366461.80
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:45	16.75	1.78	2.27	107298.10
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	1.67	2.11	130536.10
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	1.55	1.80	76625.98
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	1.64	2.44	193347.20
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	1.57	1.80	106110.00
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	1.63	1.95	97065.00
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	1.39	1.52	66456.02
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 11:45	14.25	1.37	1.52	70308.01
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	1.58	2.11	300455.80
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	1.54	1.80	102708.00
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:30	15.00	1.47	1.66	79416.02
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 5:45	5/22/2016 9:00	27.50	1.66	1.95	163980.20
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	1.68	1.95	104625.00
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	1.74	2.11	275175.10
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	1.48	1.66	87749.99
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	1.64	2.11	79640.98
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	1.42	1.52	72792.02
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	1.94	3.01	231975.00
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	1.92	2.44	103608.00
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	1.71	2.62	277577.90
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:45	7/8/2016 17:45	23.25	1.52	1.80	127044.00
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	1.63	1.95	132075.00
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:15	7/22/2016 21:45	14.75	1.50	1.66	79506.00
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:15	8/2/2016 23:15	13.25	1.36	1.52	64835.99
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:30	8/8/2016 11:15	14.00	1.61	3.21	81306.03
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 12:55	9/1/2016 1:55	39.25	1.29	1.40	181619.80
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 14:50	9/3/2016 22:20	166.75	1.70	3.21	1019988.00
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:20	9/6/2016 18:45	58.50	1.46	1.52	306827.90
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 4:50	80.50	1.51	1.66	436156.80

Table D-1. Summary Statistics for Individual Storm Events at the EVALSS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 4:55	9/17/2016 22:30	53.00	1.53	1.80	292608.10
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:30	9/18/2016 11:30	39.25	1.54	1.66	217062.20
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 5:55	9/19/2016 19:20	40.50	1.51	1.80	220625.90

Table D-2. Summary Statistics for Individual Storm Events at the EVAMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.27	0.33	12978.00
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.35	0.55	52380.05
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	0.73	1.22	65439.01
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:15	23.00	0.62	0.82	51282.00
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.38	0.43	17874.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.45	0.55	44577.03
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.55	0.68	78921.07
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:45	25.75	0.41	0.49	38079.00
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:15	87.00	0.82	1.71	256275.40
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:15	11/2/2015 22:45	19.75	0.93	1.05	66159.02
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.92	1.05	52118.98
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	1.06	1.51	292059.10
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:30	17.00	1.52	1.92	92727.07
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	2.77	5.79	741681.10
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	0.92	1.41	160299.00
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.81	0.89	67041.00
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.68	0.82	73935.04
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.56	0.74	40221.02
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.62	0.89	94329.09
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	1.69	5.06	640674.10
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	1.21	1.71	139932.00
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	0.96	1.31	106812.00
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:45	12/14/2015 16:15	24.75	0.77	0.89	68229.03
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	0.61	0.68	53937.01
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	1.18	2.51	236583.30
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	0.82	0.97	53873.99
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:30	39.25	1.25	2.27	176589.00
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	0.77	1.14	177677.70
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	0.70	0.97	80469.02
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.44	0.49	48798.03
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.48	0.55	39051.01
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	0.67	1.81	168165.20
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.49	0.55	26072.99
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.67	1.05	74583.05
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.65	0.82	81099.06
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.69	0.89	58626.02
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	1.44	2.64	271125.10
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	1.67	2.77	193599.00
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 6:45	1/29/2016 0:15	65.75	1.58	3.18	374580.20
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:15	1/29/2016 23:00	16.00	1.21	1.61	69723.04
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 0:45	2/1/2016 14:30	14.00	0.76	0.82	38196.01
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.77	0.82	37350.00
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.93	1.22	80576.99
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.80	0.89	37476.00
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.84	1.14	65258.97
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.70	0.82	59175.02
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	1.48	3.32	172341.00

Table D-2. Summary Statistics for Individual Storm Events at the EVAMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	0.99	1.31	46358.99
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	0.88	1.14	242235.30
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 12:45	22.25	1.00	1.61	79901.99
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 12:45	2/20/2016 11:15	46.75	0.79	1.05	132488.90
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.62	0.74	29232.01
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.65	1.14	68040.02
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.63	0.82	85626.09
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:15	41.75	0.90	1.31	135999.20
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	0.79	1.05	69938.98
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.75	1.05	72863.98
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 21:00	3/7/2016 23:00	50.25	0.79	1.31	143037.10
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	0.96	1.92	131175.10
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	0.67	0.89	35361.00
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	0.69	0.82	79542.04
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.74	0.97	88884.01
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:30	3/22/2016 21:30	56.25	0.64	0.89	130518.00
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	0.58	0.74	55917.00
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	0.78	1.51	129789.00
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:30	16.50	0.60	0.74	35757.00
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	0.64	0.74	49734.02
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	0.58	0.68	28754.99
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	0.62	0.89	72540.04
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	0.59	0.68	39987.01
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.56	0.68	33399.01
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.52	0.61	24939.00
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 11:45	14.25	0.47	0.49	23949.00
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.54	0.82	102447.10
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.53	0.61	35550.00
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:45	15.25	0.47	0.49	25605.00
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 5:45	5/22/2016 9:00	27.50	0.56	0.68	55341.02
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	0.53	0.68	33120.00
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.58	0.74	91782.02
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.44	0.55	25848.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.54	0.68	26144.99
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.43	0.55	22292.99
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:15	6/19/2016 8:00	33.00	0.70	1.41	83618.99
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.62	0.89	33696.00
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.61	1.14	99279.06
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.51	0.61	43038.01
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.61	0.82	49680.02
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:15	7/22/2016 21:45	14.75	0.54	0.68	28898.98
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:30	8/2/2016 23:15	13.00	0.53	0.68	24615.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:30	8/8/2016 11:15	14.00	0.89	1.81	44721.01
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 12:55	9/1/2016 1:55	39.25	0.38	0.45	53820.04
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 14:50	9/3/2016 22:25	167.00	0.61	2.31	365373.30
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:05	9/6/2016 18:40	59.00	0.35	0.45	73818.03
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:10	9/8/2016 5:00	80.75	0.37	0.53	106928.70

Table D-2. Summary Statistics for Individual Storm Events at the EVAMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 5:00	9/17/2016 22:30	52.75	0.34	0.53	65340.07
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:30	9/18/2016 11:25	39.00	0.35	0.45	49068.05
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 5:55	9/19/2016 19:15	40.25	0.29	0.53	41840.94

Table D-3. Summary Statistics for Individual Storm Events at the MONM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.9	0.07	0.076	0.12	0.0	10/2/2015 21:15	10/3/2015 10:15	13.3	0.30	0.32	14,148.0
10/7/2015 4:40	10/8/2015 9:50	29.2	0.50	0.017	0.48	103.1	10/7/2015 4:30	10/8/2015 21:45	41.5	0.69	1.28	103,679.9
10/10/2015 3:00	10/10/2015 15:25	12.4	0.80	0.064	0.48	51.2	10/10/2015 2:45	10/11/2015 3:15	24.8	2.16	3.78	192,743.9
10/12/2015 18:40	10/13/2015 5:15	10.6	0.56	0.053	0.24	51.9	10/12/2015 18:30	10/13/2015 17:15	23.0	1.56	2.12	128,925.0
10/17/2015 20:10	10/17/2015 20:50	0.7	0.04	0.060	0.12	112.4	10/17/2015 20:00	10/18/2015 8:45	13.0	0.36	0.41	16,875.0
10/18/2015 8:45	10/19/2015 0:20	15.6	0.26	0.017	0.12	12.6	10/18/2015 8:45	10/19/2015 12:15	27.8	0.47	0.57	46,827.0
10/25/2015 14:45	10/26/2015 18:35	27.8	0.47	0.017	0.24	160.7	10/25/2015 14:45	10/27/2015 6:30	40.0	0.76	1.18	108,827.9
10/28/2015 8:25	10/28/2015 21:45	13.3	0.10	0.008	0.12	44.1	10/28/2015 8:15	10/29/2015 9:30	25.5	0.45	0.51	41,148.0
10/29/2015 13:35	11/1/2015 15:20	73.8	1.97	0.027	0.48	23.3	10/29/2015 13:30	11/2/2015 3:00	86.8	2.18	6.35	679,797.0
11/2/2015 3:15	11/2/2015 10:55	7.7	0.31	0.040	1.20	12.6	11/2/2015 3:00	11/2/2015 22:45	20.0	1.92	2.55	138,528.0
11/3/2015 5:15	11/3/2015 8:40	3.4	0.07	0.021	0.24	18.5	11/3/2015 5:00	11/3/2015 20:30	15.8	1.17	1.28	66,330.0
11/7/2015 8:20	11/10/2015 0:45	64.4	1.31	0.020	0.36	96.7	11/7/2015 8:15	11/10/2015 12:30	76.5	2.01	3.40	553,473.0
11/10/2015 23:45	11/11/2015 4:30	4.8	0.48	0.101	0.72	34.8	11/10/2015 23:45	11/11/2015 16:15	16.8	2.09	3.22	125,982.1
11/12/2015 17:30	11/15/2015 7:15	61.8	3.65	0.059	0.36	37.3	11/12/2015 17:15	11/15/2015 19:15	74.3	6.17	14.78	1,650,221.0
11/16/2015 10:25	11/17/2015 22:15	35.8	0.64	0.018	0.60	27.8	11/16/2015 10:15	11/18/2015 10:15	48.3	2.77	3.98	480,851.8
11/18/2015 16:55	11/19/2015 3:45	10.8	0.22	0.020	0.24	23.5	11/18/2015 16:45	11/19/2015 15:30	23.0	1.94	2.26	160,749.0
11/23/2015 15:55	11/24/2015 9:35	17.7	0.40	0.023	0.12	110.5	11/23/2015 15:45	11/24/2015 21:30	30.0	1.34	1.73	145,178.9
12/1/2015 18:55	12/2/2015 2:40	7.8	0.43	0.056	0.24	179.7	12/1/2015 18:45	12/2/2015 14:30	20.0	1.23	1.98	88,587.0
12/2/2015 23:50	12/4/2015 6:10	30.3	0.71	0.023	0.36	24.4	12/2/2015 23:45	12/4/2015 18:00	42.5	1.98	3.04	302,184.0
12/5/2015 9:50	12/9/2015 6:50	93.0	4.25	0.046	0.60	28.7	12/5/2015 9:45	12/9/2015 18:45	105.3	7.10	19.34	2,690,181.0
12/10/2015 3:45	12/10/2015 23:25	19.7	0.44	0.022	0.24	21.1	12/10/2015 3:30	12/11/2015 11:15	32.0	5.34	8.75	614,763.3
12/12/2015 8:55	12/13/2015 3:20	18.4	0.43	0.023	0.24	44.1	12/12/2015 8:45	12/13/2015 15:15	30.8	3.23	4.62	357,488.7
12/13/2015 15:45	12/14/2015 4:30	12.8	0.22	0.017	0.12	17.5	12/13/2015 15:30	12/14/2015 16:15	25.0	2.50	3.04	224,612.8
12/15/2015 19:00	12/16/2015 7:20	12.3	0.06	0.005	0.12	42.8	12/15/2015 19:00	12/16/2015 19:15	24.5	1.52	1.73	133,758.0
12/17/2015 7:55	12/19/2015 3:20	43.4	1.30	0.030	0.24	32.2	12/17/2015 7:45	12/19/2015 15:15	55.8	3.64	7.79	730,539.6
12/20/2015 2:15	12/20/2015 8:10	5.9	0.17	0.029	0.24	30.2	12/20/2015 2:00	12/20/2015 20:00	18.3	2.45	3.04	160,784.9
12/20/2015 23:35	12/22/2015 2:30	26.9	0.78	0.029	0.24	16.0	12/20/2015 23:30	12/22/2015 14:15	39.0	3.43	6.35	481,041.0
12/22/2015 18:20	12/24/2015 22:25	52.1	0.61	0.012	0.24	21.6	12/22/2015 18:15	12/25/2015 10:15	64.3	2.72	4.85	628,046.8
12/27/2015 10:30	12/28/2015 5:45	19.3	0.55	0.029	0.12	61.2	12/27/2015 10:15	12/28/2015 17:45	31.8	2.34	3.22	267,300.0
1/4/2016 1:40	1/4/2016 22:10	20.5	0.11	0.005	0.12	167.0	1/4/2016 1:30	1/5/2016 7:45	30.5	0.74	0.84	81,647.9
1/5/2016 7:55	1/5/2016 18:05	10.2	0.09	0.009	0.12	21.8	1/5/2016 7:45	1/6/2016 6:00	22.5	0.85	1.00	68,732.9
1/11/2016 10:45	1/13/2016 19:55	57.2	1.15	0.020	0.24	139.5	1/11/2016 10:30	1/14/2016 7:45	69.5	1.82	5.08	455,507.8
1/15/2016 9:55	1/15/2016 12:25	2.5	0.05	0.020	0.24	39.9	1/15/2016 9:45	1/16/2016 0:15	14.8	1.20	1.28	63,603.0
1/16/2016 0:30	1/16/2016 20:50	20.3	0.42	0.021	0.24	14.6	1/16/2016 0:30	1/17/2016 7:00	30.8	2.17	3.22	240,164.9
1/17/2016 7:05	1/18/2016 5:35	22.5	0.33	0.015	0.24	13.9	1/17/2016 7:00	1/18/2016 17:30	34.8	2.20	3.04	275,472.0
1/19/2016 13:20	1/20/2016 0:40	11.3	0.37	0.033	0.12	35.1	1/19/2016 13:15	1/20/2016 12:30	23.5	2.13	3.04	179,865.0
1/20/2016 21:10	1/22/2016 13:05	39.9	1.55	0.039	0.24	23.4	1/20/2016 21:00	1/23/2016 1:00	52.3	5.37	11.45	1,010,700.0
1/23/2016 5:05	1/24/2016 1:05	20.0	0.87	0.044	0.36	21.7	1/23/2016 5:00	1/24/2016 13:00	32.3	5.61	9.09	651,501.3
1/26/2016 7:00	1/28/2016 12:20	53.3	1.59	0.030	0.24	63.0	1/26/2016 6:45	1/29/2016 0:15	65.8	5.08	13.15	1,202,742.0
1/29/2016 7:30	1/29/2016 11:15	3.8	0.17	0.045	0.12	19.8	1/29/2016 7:15	1/29/2016 23:00	16.0	4.52	5.57	260,100.0
2/1/2016 1:00	2/1/2016 2:40	1.7	0.13	0.078	0.24	62.2	2/1/2016 0:45	2/1/2016 14:30	14.0	2.41	2.87	121,329.0
2/3/2016 0:20	2/3/2016 1:35	1.3	0.04	0.032	0.12	46.4	2/3/2016 0:15	2/3/2016 13:30	13.5	1.55	1.73	75,330.0
2/3/2016 13:40	2/4/2016 1:25	11.8	0.44	0.037	0.24	13.3	2/3/2016 13:30	2/4/2016 13:15	24.0	2.51	3.40	216,485.9
2/4/2016 15:25	2/4/2016 16:10	0.8	0.03	0.040	0.12	13.2	2/4/2016 15:15	2/5/2016 4:00	13.0	1.94	2.12	90,756.0
2/5/2016 9:20	2/5/2016 18:35	9.3	0.18	0.020	0.24	31.9	2/5/2016 9:15	2/6/2016 6:30	21.5	1.95	2.71	151,056.1

Table D-3. Summary Statistics for Individual Storm Events at the MONM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/10/2016 10:35	2/10/2016 21:55	11.3	0.19	0.017	0.24	112.6	2/10/2016 10:30	2/11/2016 9:45	23.5	1.23	1.61	104,264.9
2/11/2016 15:10	2/12/2016 11:00	19.8	1.17	0.059	0.48	27.1	2/11/2016 15:00	2/12/2016 23:00	32.3	4.24	8.42	492,093.2
2/13/2016 0:55	2/13/2016 2:00	1.1	0.12	0.111	0.24	14.4	2/13/2016 0:45	2/13/2016 13:30	13.0	3.45	4.19	161,270.9
2/13/2016 13:40	2/16/2016 5:35	63.9	0.66	0.010	0.12	12.3	2/13/2016 13:30	2/16/2016 17:30	76.3	2.77	3.98	759,599.8
2/17/2016 14:55	2/18/2016 6:40	15.8	0.43	0.027	0.24	40.1	2/17/2016 14:45	2/18/2016 12:45	22.3	3.10	5.57	248,165.9
2/18/2016 13:00	2/19/2016 23:30	34.5	0.47	0.014	0.36	14.8	2/18/2016 12:45	2/20/2016 11:15	46.8	2.47	3.59	416,430.0
2/21/2016 13:25	2/21/2016 14:00	0.6	0.06	0.103	0.36	42.1	2/21/2016 13:15	2/22/2016 2:00	13.0	1.50	1.73	70,326.0
2/26/2016 16:55	2/27/2016 9:35	16.7	0.27	0.016	0.12	124.4	2/26/2016 16:45	2/27/2016 21:30	29.0	1.28	1.98	134,063.9
2/28/2016 5:20	2/29/2016 7:10	25.8	0.36	0.014	0.48	27.4	2/28/2016 5:15	2/29/2016 19:00	38.0	1.20	1.61	163,880.8
2/29/2016 22:50	3/2/2016 4:30	29.7	0.81	0.027	0.60	19.8	2/29/2016 22:45	3/2/2016 16:15	41.8	2.64	3.98	397,430.8
3/2/2016 18:10	3/3/2016 6:25	12.3	0.23	0.019	0.24	17.4	3/2/2016 18:00	3/3/2016 18:15	24.5	2.51	3.59	220,949.8
3/4/2016 14:30	3/5/2016 5:05	14.6	0.38	0.026	0.12	38.7	3/4/2016 14:15	3/5/2016 17:00	27.0	2.28	3.40	221,345.9
3/5/2016 21:00	3/7/2016 11:05	38.1	0.79	0.021	0.24	17.6	3/5/2016 20:45	3/7/2016 23:00	50.5	2.47	4.40	449,558.9
3/9/2016 0:20	3/10/2016 2:15	25.9	0.76	0.029	0.24	38.2	3/9/2016 0:15	3/10/2016 14:00	38.0	3.38	8.11	462,033.1
3/10/2016 14:35	3/10/2016 17:05	2.5	0.17	0.068	0.36	13.4	3/10/2016 14:30	3/11/2016 5:00	14.8	2.66	3.22	141,264.0
3/11/2016 13:45	3/12/2016 9:45	20.0	0.34	0.017	0.24	22.6	3/11/2016 13:30	3/12/2016 21:30	32.3	2.49	3.59	289,098.1
3/12/2016 21:30	3/13/2016 19:55	22.4	0.35	0.016	0.24	14.1	3/12/2016 21:30	3/14/2016 7:45	33.5	2.32	3.22	279,981.0
3/20/2016 13:30	3/22/2016 9:45	44.3	0.58	0.013	0.48	161.7	3/20/2016 13:15	3/22/2016 21:30	56.5	1.23	1.98	250,919.9
3/23/2016 10:05	3/24/2016 0:35	14.5	0.19	0.013	0.12	24.9	3/23/2016 10:00	3/24/2016 12:30	26.8	1.16	1.61	111,887.9
3/26/2016 23:05	3/28/2016 8:45	33.7	0.76	0.023	0.36	71.8	3/26/2016 23:00	3/28/2016 20:45	46.0	2.20	5.82	364,995.0
4/3/2016 23:20	4/4/2016 3:45	4.4	0.33	0.075	0.36	173.7	4/3/2016 23:15	4/4/2016 15:45	16.8	1.43	2.40	86,463.0
4/12/2016 14:50	4/13/2016 0:20	9.5	0.42	0.044	0.24	203.3	4/12/2016 14:45	4/13/2016 12:15	21.8	0.87	1.28	68,409.0
4/14/2016 1:15	4/14/2016 2:50	1.6	0.09	0.057	0.12	28.7	4/14/2016 1:15	4/14/2016 14:45	13.8	0.64	0.77	31,635.0
4/23/2016 22:00	4/24/2016 18:25	20.4	0.55	0.027	0.48	235.8	4/23/2016 21:45	4/25/2016 6:15	32.8	0.82	1.73	96,731.9
4/25/2016 6:20	4/25/2016 12:55	6.6	0.25	0.038	0.24	12.5	4/25/2016 6:15	4/26/2016 0:45	18.8	0.96	1.28	64,971.0
4/29/2016 6:55	4/29/2016 11:05	4.2	0.09	0.022	0.12	90.7	4/29/2016 6:45	4/29/2016 23:00	16.5	0.50	0.63	29,448.0
5/8/2016 7:05	5/8/2016 8:00	0.9	0.04	0.044	0.12	214.8	5/8/2016 7:00	5/8/2016 20:00	13.3	0.34	0.41	16,281.0
5/8/2016 21:55	5/9/2016 0:00	2.1	0.10	0.048	0.36	14.8	5/8/2016 21:45	5/9/2016 11:45	14.3	0.31	0.36	16,020.0
5/14/2016 11:20	5/16/2016 3:50	40.5	0.31	0.008	0.24	132.8	5/14/2016 11:15	5/16/2016 15:45	52.8	0.60	1.09	114,326.9
5/18/2016 23:55	5/19/2016 6:05	6.2	0.21	0.034	0.24	70.1	5/18/2016 23:45	5/19/2016 18:00	18.5	0.47	0.63	31,266.0
5/19/2016 18:55	5/19/2016 21:45	2.8	0.50	0.177	0.48	16.1	5/19/2016 18:45	5/20/2016 9:30	15.0	1.86	3.40	100,404.0
5/21/2016 6:00	5/21/2016 21:05	15.1	0.22	0.015	0.12	32.8	5/21/2016 5:45	5/22/2016 9:00	27.5	0.67	1.09	66,654.0
5/27/2016 2:25	5/27/2016 7:30	5.1	0.43	0.085	0.24	136.0	5/27/2016 2:15	5/27/2016 19:15	17.3	0.42	0.63	26,208.0
5/28/2016 5:20	5/29/2016 13:05	31.8	0.26	0.008	0.24	22.0	5/28/2016 5:15	5/30/2016 1:00	44.0	0.47	0.63	73,737.0
6/9/2016 21:05	6/10/2016 1:30	4.4	0.09	0.020	0.36	274.2	6/9/2016 21:00	6/10/2016 13:15	16.5	0.24	0.32	14,328.0
6/11/2016 3:25	6/11/2016 4:35	1.2	0.25	0.214	0.84	26.1	6/11/2016 3:15	6/11/2016 16:30	13.5	0.29	0.46	14,184.0
6/13/2016 8:50	6/13/2016 10:55	2.1	0.03	0.014	0.12	52.7	6/13/2016 8:45	6/13/2016 22:45	14.3	0.20	0.24	10,206.0
6/17/2016 23:15	6/18/2016 20:00	20.8	0.48	0.023	0.48	163.1	6/17/2016 23:00	6/19/2016 8:00	33.3	0.70	1.61	83,672.9
6/20/2016 23:25	6/21/2016 2:10	2.8	0.40	0.146	0.36	54.0	6/20/2016 23:15	6/21/2016 14:00	15.0	0.70	1.28	37,575.0
6/23/2016 6:25	6/24/2016 15:15	32.8	0.33	0.010	0.24	52.7	6/23/2016 6:15	6/25/2016 3:00	45.0	0.49	1.00	79,461.0
7/7/2016 18:45	7/8/2016 5:45	11.0	0.20	0.018	0.12	329.9	7/7/2016 18:30	7/8/2016 17:45	23.5	0.24	0.36	20,637.0
7/8/2016 22:55	7/9/2016 9:15	10.3	0.17	0.017	0.12	18.2	7/8/2016 22:45	7/9/2016 21:00	22.5	0.35	0.63	28,134.0
7/22/2016 7:30	7/22/2016 10:00	2.5	0.21	0.084	0.24	317.6	7/22/2016 7:15	7/22/2016 21:45	14.8	0.17	0.21	9,288.0
8/2/2016 10:30	8/2/2016 11:20	0.8	0.03	0.036	0.12	265.2	8/2/2016 10:15	8/2/2016 23:15	13.3	0.17	0.18	8,019.0
8/7/2016 21:30	8/7/2016 23:30	2.0	0.03	0.015	0.12	396.2	8/7/2016 21:30	8/8/2016 11:15	14.0	0.21	0.28	10,512.0

Table D-3. Summary Statistics for Individual Storm Events at the MONM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
8/31/2016 13:10	8/31/2016 14:05	0.9	0.06	0.066	0.24	567.7	8/31/2016 13:00	9/1/2016 2:00	13.3	0.20	0.24	9,612.0
9/1/2016 15:05	9/3/2016 10:30	43.4	0.91	0.021	0.72	25.8	9/1/2016 15:00	9/3/2016 22:15	55.5	0.96	2.26	192,581.8
9/5/2016 23:20	9/6/2016 6:45	7.4	0.18	0.024	0.12	61.2	9/5/2016 23:15	9/6/2016 18:30	19.5	0.37	0.51	26,145.0
9/7/2016 2:10	9/7/2016 17:00	14.8	0.08	0.005	0.12	20.1	9/7/2016 2:00	9/8/2016 5:00	27.3	0.28	0.32	27,792.0
9/17/2016 5:05	9/17/2016 20:00	14.9	0.22	0.015	0.24	239.4	9/17/2016 4:50	9/17/2016 22:15	52.5	0.27	0.41	51,768.0
9/17/2016 22:30	9/17/2016 23:40	1.2	0.07	0.060	0.12	13.3	9/17/2016 22:15	9/18/2016 11:35	40.3	0.24	0.28	34,929.0
9/19/2016 6:10	9/19/2016 7:30	1.3	0.14	0.105	0.48	31.2	9/19/2016 6:05	9/19/2016 19:15	39.8	0.39	0.57	55,431.0

Table D-4. Summary Statistics for Individual Storm Events at the MONMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.03	0.05	1521.00
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.10	0.19	15264.00
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	0.44	0.90	38978.99
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	0.30	0.43	24408.00
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.04	0.05	1791.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.05	0.07	5256.00
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.13	0.24	19422.00
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.07	0.09	6111.00
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	0.56	2.50	173790.20
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.55	0.69	39492.00
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:15	11/3/2015 20:30	15.50	0.29	0.35	16245.01
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	0.60	1.22	166193.80
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:15	16.75	0.58	1.05	34865.99
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	2.49	7.09	666243.20
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	0.61	1.05	105399.10
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.40	0.48	33164.98
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.24	0.35	25731.01
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.20	0.35	14318.99
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.42	0.69	64133.93
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	2.54	7.26	961641.20
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	2.15	3.39	247265.90
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	1.38	1.96	152217.10
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:15	25.00	1.04	1.22	93312.05
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	0.56	0.63	49697.96
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	1.47	3.27	295037.80
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:15	12/20/2015 20:00	18.00	0.92	1.13	59823.00
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:15	39.00	1.33	2.60	187236.00
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	1.16	2.50	267363.10
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	0.91	1.31	103779.00
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.17	0.21	18611.99
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.22	0.31	18216.00
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	0.67	1.84	167211.10
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.42	0.48	22518.00
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.82	1.22	90783.03
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.86	1.13	107406.10
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.76	1.13	64295.98
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	2.17	3.88	407826.00
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	2.28	3.51	264204.10
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 6:45	1/29/2016 0:15	65.75	1.87	4.28	442395.20
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:15	1/29/2016 23:15	16.25	1.90	2.36	111141.00
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 0:45	2/1/2016 14:30	14.00	0.84	1.05	42461.97
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.48	0.53	23282.99
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.85	1.22	73422.02
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.68	0.82	31959.01
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.61	0.90	47339.97
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.28	0.43	23768.99
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	1.50	3.27	174140.90

Table D-4. Summary Statistics for Individual Storm Events at the MONMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	1.33	1.62	62415.01
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	1.04	1.31	285642.10
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 13:00	22.50	1.07	2.09	86787.02
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 13:00	2/20/2016 11:30	46.75	1.01	1.41	169380.10
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.55	0.63	25884.01
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.35	0.63	36360.03
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.33	0.53	44820.02
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:15	41.75	0.97	1.62	145638.00
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	1.01	1.51	88893.04
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.78	1.22	75771.05
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 20:45	3/7/2016 23:00	50.50	0.99	1.84	180648.10
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	1.27	2.93	174320.90
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	1.14	1.41	60525.01
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	1.04	1.51	120510.10
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.93	1.22	112725.00
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:15	3/22/2016 21:30	56.50	0.29	0.69	58905.01
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	0.29	0.48	27945.00
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	0.82	2.50	136269.00
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:30	16.50	0.41	0.82	24318.00
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	0.16	0.31	12492.00
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	0.11	0.14	5301.00
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	0.15	0.39	17163.00
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	0.24	0.39	16326.00
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.09	0.12	5229.00
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.04	0.05	1746.00
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 11:45	14.25	0.03	0.04	1665.00
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.08	0.14	15642.01
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.06	0.19	3987.00
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:30	15.00	0.65	1.62	34830.00
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 6:00	5/22/2016 9:00	27.25	0.13	0.27	12591.00
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	0.06	0.09	3438.00
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.06	0.12	10224.00
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.03	0.03	1782.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.03	0.03	1458.00
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.03	0.03	1539.00
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.12	0.39	14877.00
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.13	0.19	6921.00
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.08	0.19	13230.00
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.03	0.04	2655.00
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.05	0.07	4104.00
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:15	7/22/2016 21:45	14.75	0.03	0.04	1665.00
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:30	8/2/2016 23:15	13.00	0.03	0.03	1404.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:30	8/8/2016 11:15	14.00	0.03	0.03	1512.00
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 13:00	9/1/2016 2:00	13.25	0.03	0.03	1431.00
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 15:00	9/3/2016 22:30	55.75	0.19	0.43	37799.98
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:15	9/6/2016 18:30	19.50	0.07	0.10	5076.00
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 5:00	27.25	0.04	0.06	4113.00

Table D-4. Summary Statistics for Individual Storm Events at the MONMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 4:50	9/17/2016 22:15	52.50	0.06	0.12	11607.78
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:15	9/18/2016 11:25	39.75	0.05	0.06	6916.04
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 5:55	9/19/2016 19:25	40.75	0.11	0.18	15544.74

Table D-5. Summary Statistics for Individual Storm Events at the MONMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.03	0.06	1494.00
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.11	0.32	16685.98
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 3:00	10/11/2015 3:15	24.50	0.31	0.70	27153.00
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	0.26	0.43	21699.00
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.06	0.07	2799.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.09	0.15	9360.00
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.15	0.34	21816.00
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:45	25.75	0.08	0.11	7515.01
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	0.35	0.97	108009.00
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.29	0.45	21168.00
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.19	0.23	11024.99
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	0.31	0.52	85445.98
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:15	16.75	0.33	0.58	19836.00
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:30	11/15/2015 19:15	74.00	0.69	1.44	184518.00
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	0.37	0.54	64620.03
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.28	0.34	23076.00
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.23	0.30	24525.02
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.23	0.45	16632.00
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.34	0.58	52370.98
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	0.80	1.73	304866.10
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	0.61	0.97	70407.00
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	0.44	0.65	48581.99
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:30	25.25	0.35	0.41	31463.99
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 19:00	12/16/2015 19:15	24.50	0.25	0.28	21725.99
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	0.51	1.09	102294.00
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	0.35	0.47	23013.00
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:30	39.25	0.49	0.90	69354.10
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	0.39	0.65	90252.05
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	0.40	0.58	45909.00
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.14	0.17	15695.99
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.17	0.22	14012.99
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	0.33	0.79	82782.03
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.22	0.25	11790.00
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.38	0.61	42219.01
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.37	0.52	45908.97
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.37	0.54	31014.00
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	0.72	1.38	135909.00
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	0.71	1.04	82781.98
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 6:45	1/29/2016 0:15	65.75	0.62	1.23	146807.90
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:15	1/29/2016 23:15	16.25	0.53	0.68	31086.01
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 0:45	2/1/2016 14:30	14.00	0.31	0.41	15480.00
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.23	0.25	11232.00
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.34	0.50	29421.01
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.25	0.28	11691.00
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.27	0.43	21069.00
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.19	0.30	15794.99
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	0.56	1.09	64647.02

Table D-5. Summary Statistics for Individual Storm Events at the MONMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	0.41	0.54	18954.01
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	0.37	0.56	101862.00
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 12:45	22.25	0.43	0.79	34317.00
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 12:45	2/20/2016 11:15	46.75	0.34	0.56	58049.98
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.23	0.27	10836.00
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.22	0.36	22896.01
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.21	0.28	29016.01
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:15	41.75	0.41	0.70	61794.01
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	0.36	0.56	31796.99
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.35	0.54	33615.00
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 20:45	3/7/2016 23:00	50.50	0.37	0.70	67670.98
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	0.47	1.02	64386.05
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	0.34	0.45	18107.99
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	0.34	0.52	39383.99
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.32	0.50	38726.99
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:15	3/22/2016 21:45	56.75	0.20	0.32	40230.00
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	0.18	0.25	17658.00
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	0.29	0.70	47889.02
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:30	16.50	0.20	0.39	11664.00
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	0.13	0.27	9819.00
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	0.09	0.11	4572.00
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	0.11	0.36	13409.99
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	0.14	0.25	9630.00
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.07	0.11	4212.00
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.04	0.06	2043.00
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 11:45	14.25	0.03	0.04	1512.00
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.07	0.20	13815.02
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.06	0.11	3942.00
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:30	15.00	0.25	0.58	13410.00
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 5:45	5/22/2016 9:00	27.50	0.10	0.22	9423.01
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	0.07	0.13	4185.00
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.06	0.13	9909.01
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.02	0.06	1404.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.04	0.13	1926.00
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	13.25	0.01	0.01	477.00
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.09	0.30	10251.01
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.10	0.34	5427.00
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:15	45.25	0.05	0.17	7830.00
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.03	0.06	2385.00
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.04	0.15	3429.00
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:15	7/22/2016 21:45	14.75	0.02	0.05	1161.00
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:30	8/2/2016 23:15	13.00	0.01	0.01	468.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 22:15	8/8/2016 11:15	13.00	0.01	0.02	495.00
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 13:00	9/1/2016 2:00	13.25	0.05	0.09	2376.00
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 15:00	9/3/2016 22:15	55.50	0.21	0.54	42561.02
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:15	9/6/2016 18:30	19.50	0.10	0.15	7245.01
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 5:00	27.25	0.09	0.11	8901.01

Table D-5. Summary Statistics for Individual Storm Events at the MONMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 5:05	9/17/2016 22:15	51.75	0.05	0.13	9765.01
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:15	9/18/2016 11:25	39.50	0.03	0.06	4959.00
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 5:55	9/19/2016 19:30	41.00	0.06	0.13	8757.02

Table D-6. Summary Statistics for Individual Storm Events at the TOSMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.37	0.47	17469.00
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.57	2.22	85221.16
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	1.61	10.82	143630.90
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:15	23.00	1.30	4.80	107721.00
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.37	0.50	17361.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.58	1.57	57816.02
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.63	4.80	90927.10
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.44	0.73	40707.01
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	1.57	13.13	490095.00
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.80	5.27	57393.00
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:15	11/3/2015 20:30	15.50	0.48	0.73	26757.00
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	0.88	4.15	241335.10
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:15	16.75	1.01	7.69	60965.99
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	4.11	10.82	1097406.00
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	1.13	6.82	197135.90
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.84	2.22	69453.01
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.82	1.81	89001.04
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.96	3.19	68796.02
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	1.06	5.51	161604.00
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	3.32	13.13	1257264.00
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	1.25	5.51	143810.80
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	1.01	3.37	111753.00
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:30	25.25	0.80	2.37	72855.01
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	0.54	0.85	48555.00
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	1.59	7.69	318411.60
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	0.75	1.57	49563.00
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:30	39.25	1.35	9.60	191412.00
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	0.79	3.19	183195.00
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	0.95	2.84	108360.00
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.48	0.61	52595.98
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.49	0.61	39626.98
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	1.02	6.82	256077.30
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.51	0.61	27134.99
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.91	4.36	100539.00
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.76	1.94	95175.04
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.89	2.84	75132.03
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	1.93	7.69	363582.30
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	2.09	10.20	242496.00
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 7:00	1/29/2016 0:15	65.50	1.78	7.39	418949.90
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:15	1/29/2016 23:15	16.25	1.03	2.84	60038.97
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 0:45	2/1/2016 14:30	14.00	0.69	2.22	34533.00
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.42	0.61	20204.99
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.80	1.94	69516.02
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.50	0.67	23256.00
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.57	2.84	44460.00
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.50	2.08	42281.96
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	2.06	12.11	239004.10

Table D-6. Summary Statistics for Individual Storm Events at the TOSMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	0.92	2.84	43056.00
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	0.82	1.81	226214.70
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 12:45	22.25	1.23	5.51	98648.95
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 12:45	2/20/2016 11:15	46.75	0.93	3.01	156608.80
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.58	1.06	27144.00
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.64	1.37	66861.02
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.70	2.22	95301.03
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:30	42.00	1.15	9.60	173645.80
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	0.87	3.01	76544.95
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.92	3.19	89558.97
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 21:00	3/7/2016 23:00	50.25	1.03	5.03	185426.80
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	1.26	4.80	173007.00
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	0.98	4.15	51992.99
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	0.87	2.52	100809.00
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.75	1.69	90890.98
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:15	3/22/2016 21:40	169.50	0.89	6.49	544227.40
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 9:50	3/24/2016 12:20	79.75	0.67	1.30	191852.00
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 22:55	3/28/2016 20:40	137.50	1.44	7.10	711471.60
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:05	4/4/2016 15:30	49.50	1.20	5.85	214110.60
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:35	4/13/2016 12:05	64.75	1.02	5.20	237726.20
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:00	4/14/2016 14:35	41.00	0.57	1.00	83795.12
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:10	97.50	1.02	5.20	356309.70
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:10	4/26/2016 0:45	31.50	1.14	2.24	129624.30
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.68	1.57	40518.00
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.46	0.55	21753.01
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 11:45	14.25	0.53	1.21	27413.99
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.53	1.45	101223.10
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.90	3.37	59634.00
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:45	15.25	1.66	9.60	90873.00
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 6:00	5/22/2016 9:00	27.25	0.71	2.84	70091.99
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	1.30	4.15	80613.02
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.63	2.22	100233.00
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.45	1.14	26910.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.71	4.36	34290.00
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.39	0.55	19800.01
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.66	3.75	79065.09
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	1.44	7.39	77751.04
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.51	2.22	83078.91
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.45	1.06	38475.01
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.44	2.37	35945.98
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:15	7/22/2016 22:00	15.00	0.42	0.99	22743.01
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:15	8/2/2016 23:10	39.00	0.25	0.28	35667.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:20	8/8/2016 11:20	42.25	0.28	0.44	42876.01
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 13:10	9/1/2016 1:50	38.25	0.28	0.47	38412.00
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 14:50	9/3/2016 22:30	167.25	0.55	8.60	330110.20
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:05	9/6/2016 18:30	58.50	0.42	1.50	87452.79
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 4:50	80.75	0.33	0.79	94526.84

Table D-6. Summary Statistics for Individual Storm Events at the TOSMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 4:50	9/17/2016 22:15	52.50	0.42	1.30	78992.89
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:15	9/18/2016 11:25	39.75	0.34	0.61	48060.05
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 5:55	9/19/2016 19:25	40.75	0.39	1.80	57644.95

Table D-7. Summary Statistics for Individual Storm Events at the TOSMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.26	0.71	12329.99
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.60	3.22	90108.05
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	1.76	11.97	156645.10
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	1.30	4.75	106353.00
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.14	0.49	6543.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.45	2.06	45387.02
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.66	5.04	94392.00
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.24	0.71	22320.00
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	1.21	11.45	378107.60
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.67	4.47	48168.00
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.34	0.71	19071.00
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	0.85	3.94	235440.10
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:30	17.00	1.04	9.99	63900.04
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	3.97	13.62	1060263.00
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	0.97	8.65	168840.20
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.71	2.41	58878.01
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.57	1.60	62064.02
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.67	2.60	48077.98
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.73	3.69	112212.00
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	2.38	14.20	900359.50
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	0.84	4.20	97181.97
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	0.73	3.01	80604.01
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:15	25.00	0.56	1.90	50273.96
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 19:00	12/16/2015 19:15	24.50	0.27	0.56	23885.99
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	1.09	5.99	217908.20
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	0.47	1.33	30762.00
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:15	39.00	1.00	8.23	141084.10
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	0.52	2.23	119727.10
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:30	12/28/2015 17:45	31.50	0.69	2.23	78660.05
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.24	0.37	26468.99
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.27	0.37	22112.99
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	0.86	6.69	215928.10
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.39	0.49	20475.01
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.83	4.47	91520.88
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.71	1.90	88820.95
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.89	3.01	75464.93
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	1.96	7.05	369512.60
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	2.02	11.45	234306.20
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 7:00	1/29/2016 0:15	65.50	1.68	7.05	396990.10
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:30	1/29/2016 23:00	15.75	1.04	3.22	58733.98
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 1:00	2/1/2016 14:30	13.75	0.74	3.01	36855.00
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.27	0.56	13175.99
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.83	2.41	71334.03
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.38	0.63	17712.00
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.51	3.01	39437.98
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.42	2.60	35837.99

Table D-7. Summary Statistics for Individual Storm Events at the TOSMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	2.10	15.41	243693.00
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	0.78	3.22	36378.01
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	0.66	2.06	180027.20
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 12:45	22.25	1.05	5.35	84356.92
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 12:45	2/20/2016 11:30	47.00	0.74	3.22	125711.80
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.40	0.89	18909.01
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.50	1.33	52676.95
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.57	2.23	77301.08
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:15	41.75	0.96	10.46	144828.00
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	0.61	2.60	54135.00
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.70	2.60	67733.98
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 20:45	3/7/2016 23:00	50.50	0.85	5.04	155223.10
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	1.19	5.35	162126.20
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	0.81	4.75	43218.03
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	0.70	2.41	81693.01
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.61	1.90	73809.02
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:15	3/22/2016 21:30	56.50	0.47	2.23	95219.99
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	0.32	0.99	30789.01
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	0.77	4.75	128033.90
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:30	16.50	0.78	5.04	46088.98
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	0.64	4.75	50489.97
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	0.26	0.99	12690.00
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	0.50	4.47	58832.98
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	0.42	1.33	28548.00
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.34	1.21	19908.00
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.23	0.32	11069.99
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 12:00	14.50	0.31	1.21	16190.99
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.30	1.33	57365.97
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.63	2.80	41732.98
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:45	15.25	1.47	9.08	80460.01
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 5:45	5/22/2016 9:00	27.50	0.40	2.41	39402.02
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:30	17.50	0.98	3.69	61470.00
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.29	1.90	46017.02
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.19	1.10	11232.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.47	3.94	23021.99
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.13	0.37	6804.00
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.47	3.22	56160.00
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	1.20	6.69	64872.00
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.35	2.06	57060.00
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.26	0.99	21590.99
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.25	2.06	20241.00
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:15	7/22/2016 21:45	14.75	0.29	1.10	15263.99
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:30	8/2/2016 23:15	13.00	0.08	0.13	3573.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:30	8/8/2016 11:15	14.00	0.14	0.43	6894.00
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 13:05	9/1/2016 1:55	38.75	0.13	0.43	18621.00
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 14:50	9/3/2016 22:15	166.50	0.42	9.52	253963.30

Table D-7. Summary Statistics for Individual Storm Events at the TOSMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:10	9/6/2016 18:45	59.00	0.41	2.06	87731.94
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:05	9/8/2016 4:55	80.75	0.25	1.33	73547.86
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 4:50	9/17/2016 22:15	52.50	0.34	1.60	64673.92
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:15	9/18/2016 11:25	39.75	0.22	0.80	31895.99
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 6:10	9/19/2016 19:15	39.50	0.30	2.60	42642.07

Table D-8. Summary Statistics for Individual Storm Events at the COLM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.02	0.03	900.00
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:15	31.50	0.02	0.04	2457.00
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 3:00	10/11/2015 3:15	22.00	0.03	0.08	2133.00
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	0.03	0.04	2178.00
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.02	0.03	999.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.01	0.02	1332.00
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	39.00	0.02	0.04	2709.00
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.01	0.03	1341.00
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	85.50	0.26	1.18	78713.91
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.07	0.10	5238.00
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.04	0.05	2403.00
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	0.19	0.48	51381.05
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:15	16.75	0.25	0.48	15246.00
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	5.78	13.06	1544850.00
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	1.95	3.44	338336.90
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.86	1.18	71117.96
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.52	0.84	56259.04
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.28	0.48	19827.00
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.37	0.84	56601.13
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	6.57	16.54	2488894.00
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	5.26	8.43	606491.40
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	1.81	2.39	200547.00
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:30	25.25	1.99	2.39	180486.10
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	1.42	1.59	126387.00
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	3.96	9.19	794979.10
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	1.83	2.39	120087.00
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:15	39.00	4.07	7.05	570977.90
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	3.06	4.77	707014.40
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	1.87	2.39	213696.20
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	42373.05903	42374.31944	91.00	1.26	1.37	413512.50
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	42374.31944	42375.24306	66.75	1.19	1.37	286377.20
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	42380.4375	42383.32639	208.25	1.60	3.25	1201537.00
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	42384.40278	42385.00694	43.75	1.36	1.53	213518.70
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	42385.01042	42386.28472	92.00	1.47	1.75	486221.80
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	42386.28472	42387.72222	103.75	1.62	1.96	606428.80
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	42388.54514	42389.51736	70.25	1.62	1.96	410265.40
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	42389.875	42392.03472	155.75	4.51	7.73	2529728.00
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	42392.20139	42393.53472	96.25	6.03	9.39	2088200.00
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	42395.28125	42398.00347	196.25	4.64	12.47	3276656.00
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	42398.30208	42398.95833	47.50	5.47	7.16	935921.30
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	42401.03125	42401.60069	41.25	1.29	1.53	191552.50
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	42403.00694	42403.55556	39.75	0.69	0.85	99030.14
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	42403.55903	42404.55208	71.75	0.84	1.07	217312.60
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200						
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	42405.38194	42406.27083	64.25	0.63	0.75	146487.80
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	42410.43056	42411.40972	70.75	0.46	0.51	118114.70

Table D-8. Summary Statistics for Individual Storm Events at the COLM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	42411.62153	42412.95139	96.00	3.03	6.49	1047488.00
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	42413.03472	42413.56181	38.25	1.95	2.88	268528.00
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	42413.56181	42416.72847	228.25	1.44	2.24	1185973.00
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	42417.61389	42418.54097	67.00	1.47	1.96	353397.80
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	42418.54097	42420.47153	139.25	1.32	1.75	662099.40
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100						
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	42426.69722	42427.89167	86.25	0.51	0.59	157832.00
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	42428.21458	42429.79792	114.25	0.44	0.59	182313.90
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	42429.94375	42431.68681	125.75	0.69	1.75	313713.30
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	42431.74931	42432.75972	73.00	0.65	0.75	169974.60
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	42433.60347	42434.70417	79.50	0.52	0.67	147927.00
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	42434.86736	42436.95417	150.50	0.74	1.37	403426.50
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	42438.00625	42439.58958	114.25	1.03	1.96	421919.60
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	42439.6	42440.20417	43.75	1.13	1.37	178374.70
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	42440.56528	42441.88819	95.50	0.83	0.96	284676.80
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	42441.88819	42443.32917	101.00	0.72	0.85	262656.30
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	42449.55486	42451.89861	169.00	0.44	0.67	268422.00
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	42452.4125	42453.52014	80.00	0.42	0.51	119550.00
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	42455.95417	42457.86042	137.50	0.76	1.37	374156.10
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	42463.96458	42464.64861	49.50	0.42	0.59	74974.08
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	42472.61042	42473.50972	65.00	0.29	0.38	67155.86
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	42474.04444	42474.61042	41.00	0.30	0.38	44866.63
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	42483.91597	42485.25625	96.75	0.29	0.44	100156.40
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	42485.25625	42486.03056	56.00	0.33	0.38	67251.97
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	42489.28056	42489.95764	49.00	0.23	0.33	40235.11
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	42498.29097	42498.82569	38.75	0.09	0.15	12704.95
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	42498.90556	42499.49236	42.50	0.09	0.15	14449.27
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	42504.46458	42506.65208	157.75	0.18	0.38	100232.40
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	42508.98889	42509.74583	54.75	0.12	0.15	23156.22
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	42509.78403	42510.39861	44.50	0.15	0.23	24782.61
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 6:00	5/22/2016 9:00	27.25	0.17	0.18	16343.99
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	0.16	0.18	9926.99
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.19	0.23	29961.03
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.10	0.12	5895.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.12	0.15	5670.00
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.10	0.11	4995.00
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.17	0.23	20007.00
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.26	0.35	14058.00
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:15	45.25	0.23	0.35	38241.01
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.17	0.21	14463.00
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.19	0.27	15786.00
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:15	7/22/2016 22:00	15.00	0.14	0.15	7551.00
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:15	8/2/2016 23:15	13.25	0.12	0.14	5526.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:30	8/8/2016 11:15	14.00	0.15	0.32	7587.00
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700						
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/2/2016 12:15	9/3/2016 22:30	34.50	0.13	0.16	16020.02

Table D-8. Summary Statistics for Individual Storm Events at the COLM Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:15	9/6/2016 18:30	19.50	0.10	0.12	6975.00
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 5:00	27.25	0.11	0.14	10934.99
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 11:00	9/17/2016 22:15	11.50	0.06	0.10	2412.00
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:15	9/18/2016 11:30	13.50	0.06	0.11	3087.00
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 8:15	9/19/2016 19:15	11.25	0.08	0.12	3231.00

Table D-9. Summary Statistics for Individual Storm Events at the SEIMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.08	0.11	3726.00
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.08	0.14	11682.02
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	0.10	0.25	8514.00
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	0.10	0.14	8208.00
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.14	0.18	6489.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.11	0.13	10989.01
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.13	0.23	18891.01
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.11	0.18	10485.01
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	0.46	0.99	142137.10
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.34	0.41	24696.00
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.24	0.29	13877.99
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:45	76.75	0.48	0.70	133533.10
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:30	17.00	0.54	0.70	33191.99
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	1.58	3.49	421244.80
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	0.78	1.06	134783.90
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.50	0.60	41715.01
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.38	0.50	40689.01
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.25	0.37	18342.00
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.49	0.60	74466.02
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	2.38	6.40	900360.90
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	1.78	2.22	204615.20
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	1.12	1.26	123489.00
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:15	25.00	1.16	1.26	104400.10
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	1.01	1.06	89585.98
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	1.52	2.31	305172.10
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	1.12	1.26	73574.98
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:30	39.25	1.55	2.04	218556.00
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	1.40	1.71	323306.40
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:30	12/28/2015 17:45	31.50	1.13	1.26	128241.10
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	42373.0625	42374.32292	30.50	0.89	0.93	97686.08
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	42374.32292	42375.25	22.50	0.86	0.93	69768.03
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	42380.4375	42383.32292	69.50	0.97	1.40	241865.80
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	42384.40625	42385.01042	14.75	0.92	0.99	49113.00
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	42385.02083	42386.29167	30.75	0.96	1.06	106767.00
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	42386.29167	42387.72917	34.75	1.02	1.12	127295.90
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	42388.55208	42389.52083	23.50	1.02	1.12	86093.97
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	42389.875	42392.04167	52.25	1.56	2.04	293787.20
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	42392.20833	42393.54167	32.25	1.80	2.31	209538.00
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	42395.28125	42398.01042	65.75	1.58	3.49	374454.00
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	42398.30208	42398.95833	16.00	1.73	1.96	99675.01
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	42401.03125	42401.60417	14.00	0.90	0.99	45206.99
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	42403.01042	42403.5625	13.50	0.61	0.70	29790.00
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	42403.5625	42404.55208	24.00	0.69	0.81	60020.98
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	42404.63542	42405.16667	13.00	0.65	0.76	30609.00
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	42405.38542	42406.27083	21.50	0.58	0.65	44729.98

Table D-9. Summary Statistics for Individual Storm Events at the SEIMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	42410.4375	42411.40625	23.50	0.47	0.50	39591.02
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	42411.625	42412.95833	32.25	1.21	1.87	139994.90
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	42413.03125	42413.5625	13.00	1.11	1.33	51813.03
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	42413.5625	42416.72917	76.25	0.94	1.19	259010.60
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	42417.61458	42418.53125	22.25	0.95	1.12	76139.98
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	42418.53125	42420.47917	47.00	0.91	1.06	154241.80
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	42421.55208	42422.08333	13.00	0.60	0.65	28035.01
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	42426.69792	42427.89583	29.00	0.50	0.55	51893.98
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	42428.21875	42429.79167	38.00	0.45	0.55	61992.02
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	42429.94792	42431.67708	41.75	0.60	1.06	90899.98
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	42431.75	42432.76042	24.50	0.59	0.65	51659.96
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	42433.59375	42434.70833	27.00	0.50	0.60	48869.98
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	42434.875	42436.95833	50.25	0.64	0.93	115163.90
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	42438.01042	42439.58333	38.00	0.75	1.12	102231.00
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	42439.60417	42440.20833	14.75	0.83	0.93	44207.99
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	42440.5625	42441.89583	32.25	0.69	0.76	80054.93
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	42441.89583	42443.32292	33.50	0.63	0.70	76095.00
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	42449.5625	42451.89583	56.25	0.45	0.60	91143.00
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	42452.41667	42453.52083	26.75	0.43	0.50	41760.03
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	42455.95833	42457.86458	46.00	0.64	0.93	105363.00
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	42463.96875	42464.64583	16.50	0.44	0.55	25911.01
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	42472.61458	42473.51042	21.75	0.34	0.41	26451.02
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	42474.05208	42474.61458	13.75	0.35	0.41	17415.00
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	42483.90625	42485.26042	32.75	0.33	0.45	39339.01
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	42485.26042	42486.03125	18.75	0.37	0.41	25227.01
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	42489.28125	42489.95833	16.50	0.29	0.37	17298.01
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	42498.29167	42498.83333	13.25	0.18	0.23	8406.00
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	42498.90625	42499.48958	14.25	0.18	0.23	9234.00
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	42504.46875	42506.65625	52.75	0.25	0.41	47214.08
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	42508.98958	42509.75	18.50	0.20	0.23	13293.01
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	42509.78125	42510.39583	15.00	0.23	0.29	12455.99
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 5:45	5/22/2016 9:00	27.50	0.22	0.29	21500.99
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	0.18	0.29	11412.01
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.23	0.33	35982.03
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.10	0.13	5913.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.11	0.13	5508.00
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.09	0.13	4590.00
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.14	0.33	17100.00
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.22	0.45	12033.01
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.15	0.33	23562.01
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.08	0.10	7056.00
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.11	0.23	8595.00
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:30	7/22/2016 21:45	14.50	0.07	0.10	3870.00
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:15	8/2/2016 23:15	13.25	0.07	0.10	3483.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:30	8/8/2016 11:30	14.25	0.06	0.23	3330.00

Table D-9. Summary Statistics for Individual Storm Events at the SEIMN Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	42613.54167	42614.08333	13.25	0.03	0.05	1287.00
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 15:00	9/3/2016 22:15	55.50	0.05	0.33	10836.00
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:15	9/6/2016 18:30	19.50	0.03	0.05	2241.00
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 5:00	27.25	0.04	0.05	3501.00
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 5:00	9/17/2016 22:15	17.50	0.03	0.05	1890.00
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:15	9/18/2016 11:30	13.50	0.04	0.07	2025.00
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 6:00	9/19/2016 19:15	13.50	0.05	0.07	2196.00

Table D-10. Summary Statistics for Individual Storm Events at the SEIMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.23	0.28	10763.99
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.28	0.54	41778.05
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	0.60	1.60	53108.99
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	0.40	0.60	32661.01
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.32	0.37	14931.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.38	0.48	38394.00
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.38	0.60	54513.02
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.31	0.37	28629.01
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	0.74	3.66	232631.80
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.43	0.60	31113.01
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.34	0.37	19224.00
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	0.52	0.96	144378.10
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:15	16.75	0.62	1.49	37673.99
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	1.50	3.85	400752.00
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	0.57	0.96	99126.08
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.41	0.48	33831.02
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.46	0.66	50058.02
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.36	0.73	25605.01
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.57	0.88	87362.99
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	2.34	6.49	887111.80
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	1.37	1.95	157338.00
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	0.88	1.30	97893.08
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:15	25.00	0.86	1.04	77211.08
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	0.73	0.80	64917.00
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	1.35	2.65	271188.00
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	0.92	1.21	60246.02
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:15	39.00	1.44	2.97	202167.10
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	1.07	1.49	247833.10
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	1.02	1.40	116037.00
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.60	0.66	65933.95
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.57	0.66	46116.02
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	0.75	1.95	188829.10
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.59	0.66	31104.02
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.72	1.30	79524.06
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.73	0.88	90945.08
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.78	1.12	66015.02
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	1.34	2.50	252549.20
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	1.72	2.50	199530.10
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 6:45	1/29/2016 0:15	65.75	1.37	3.31	323847.30
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:15	1/29/2016 23:00	16.00	1.22	1.60	70155.00
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 1:00	2/1/2016 14:30	13.75	0.69	0.88	33939.00
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.52	0.60	25308.00
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.69	0.96	59930.98
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.55	0.66	25884.01
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.54	0.73	41877.02
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.44	0.60	37485.00

Table D-10. Summary Statistics for Individual Storm Events at the SEIMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	1.23	3.48	142245.00
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	0.86	1.04	40184.98
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	0.81	1.12	221202.40
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 13:00	22.50	0.89	1.49	71721.05
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 13:00	2/20/2016 11:30	46.75	0.82	1.12	138321.00
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.60	0.66	28026.02
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.55	0.80	57563.99
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.50	0.66	68148.05
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:15	41.75	0.77	1.60	116442.10
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	0.70	1.04	62117.97
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.63	0.88	61560.00
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 21:00	3/7/2016 23:00	50.25	0.74	1.40	133704.10
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	0.88	1.82	120303.10
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	0.83	0.96	43829.98
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	0.76	0.96	87966.13
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.70	0.88	84573.10
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:15	3/22/2016 21:30	56.50	0.59	0.88	120096.00
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	0.58	0.73	55898.98
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	0.79	1.82	131625.30
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:30	16.50	0.66	1.12	38988.00
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	0.50	0.73	39438.00
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	0.47	0.60	23256.00
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	0.55	1.04	64440.00
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	0.48	0.54	32345.99
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.48	0.60	28583.99
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.36	0.43	17208.00
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 12:00	14.50	0.39	0.43	20196.01
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.52	1.21	97884.10
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.40	0.54	26892.02
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:30	15.00	0.45	0.60	24192.01
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 5:45	5/22/2016 9:00	27.50	0.42	0.54	41894.99
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:30	17.50	0.45	0.60	28233.02
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.45	0.60	71883.05
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.26	0.33	15444.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.27	0.33	13059.00
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.24	0.28	12059.99
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.38	0.54	45621.02
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.48	0.88	25893.01
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.38	0.88	61434.03
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.29	0.33	24354.01
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.36	0.60	29070.02
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:15	7/22/2016 21:45	14.75	0.27	0.33	14085.00
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:15	8/2/2016 23:15	13.25	0.25	0.33	12033.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:30	8/8/2016 11:15	41.50	0.27	0.43	41067.09
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 13:00	9/1/2016 2:05	39.50	0.21	0.24	29520.04
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 14:50	9/3/2016 22:15	166.50	0.41	1.50	245069.10

Table D-10. Summary Statistics for Individual Storm Events at the SEIMS Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:05	9/6/2016 18:30	58.50	0.28	0.33	59120.94
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 5:00	81.25	0.28	0.33	80918.76
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 4:50	9/17/2016 22:30	53.25	0.29	0.48	55422.09
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:30	9/18/2016 11:40	39.75	0.31	0.37	44946.00
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 5:55	9/19/2016 19:15	40.25	0.37	0.48	54036.08

Table D-11. Summary Statistics for Individual Storm Events at the COUMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.24	0.39	11384.99
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.42	1.43	62729.96
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	1.07	6.76	95300.97
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	0.97	2.68	79127.98
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.24	0.34	11312.99
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.43	1.54	43434.03
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.49	2.54	69884.93
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.30	0.45	27783.02
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	1.04	6.31	325341.20
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.88	5.88	63278.98
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.54	0.87	30762.01
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	0.88	3.13	241191.30
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:15	16.75	1.05	5.26	63071.99
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:30	11/15/2015 19:15	74.00	3.21	7.94	856323.40
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	0.87	4.87	150534.00
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.66	1.54	54332.97
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.62	1.04	66671.93
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.79	2.26	56573.97
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.94	3.78	143253.10
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	2.90	12.06	1099838.00
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	1.42	4.87	163098.00
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	0.96	2.54	106641.00
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:15	25.00	0.74	1.65	67005.01
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	0.43	0.64	38340.00
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	1.50	6.31	300753.00
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	0.70	1.77	46205.97
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:15	39.00	1.41	6.99	197315.80
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	0.72	2.40	166095.00
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	0.79	1.89	90162.02
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.33	0.39	35757.03
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.34	0.39	27360.02
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	0.87	5.67	216675.00
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.44	0.51	23138.99
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.80	3.61	89028.02
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.73	1.89	90998.98
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.73	2.01	61793.97
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	1.89	5.26	355491.00
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	1.89	5.46	219293.90
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 6:45	1/29/2016 0:15	65.75	1.64	5.06	388043.90
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:15	1/29/2016 23:00	16.00	1.08	2.68	62171.99
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 0:45	2/1/2016 14:30	14.00	0.60	1.33	30483.01
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.40	0.51	19314.00
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.73	1.89	62693.96
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.47	0.57	21762.01
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.55	2.26	42660.00
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.43	1.77	36548.99

Table D-11. Summary Statistics for Individual Storm Events at the COUMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	2.04	10.31	236393.80
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	1.07	3.61	50175.00
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	0.77	1.65	212148.10
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 12:45	22.25	0.93	3.44	74114.99
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 12:45	2/20/2016 11:15	46.75	0.71	2.82	119762.90
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.40	0.57	18639.00
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.39	0.79	40734.01
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.46	1.54	62342.94
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:15	41.75	0.96	5.88	143595.20
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	0.64	2.13	56510.96
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.68	2.13	65727.02
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 20:45	3/7/2016 23:00	50.50	0.77	3.78	139374.00
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	1.01	3.13	137898.10
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	0.77	3.44	40760.97
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	0.66	1.54	76635.02
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.65	2.13	78794.98
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:15	3/22/2016 21:30	56.50	0.45	2.97	92177.80
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	0.35	0.64	33660.03
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	0.70	3.28	115919.90
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:30	16.50	0.59	2.68	35226.01
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	0.50	2.40	39528.03
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	0.30	0.51	14688.00
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	0.50	2.40	59120.98
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	0.53	1.04	35631.00
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.36	0.51	21483.01
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.24	0.29	11366.99
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 11:45	14.25	0.31	1.04	15696.00
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.23	0.45	43848.07
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.39	1.04	25857.03
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:30	15.00	0.80	3.95	42948.00
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 6:00	5/22/2016 9:00	27.25	0.35	1.04	34281.04
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	0.69	2.01	43037.99
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.31	1.14	48888.04
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:30	16.75	0.19	0.34	11474.99
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.29	1.33	14058.00
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.19	0.29	9773.99
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.31	2.40	37215.02
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.73	3.44	39672.03
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.29	1.54	47160.09
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.21	0.45	18062.99
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.26	1.23	20880.01
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:30	7/22/2016 21:50	43.25	0.24	0.71	37521.04
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:15	8/2/2016 23:10	39.00	0.15	0.16	21275.98
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:20	8/8/2016 11:20	42.25	0.19	1.04	28745.98
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 12:55	9/1/2016 1:50	39.00	0.18	0.29	25713.00
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 14:50	9/3/2016 22:15	166.50	0.30	7.46	181143.40

Table D-11. Summary Statistics for Individual Storm Events at the COUMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:05	9/6/2016 18:30	58.50	0.26	0.87	54180.09
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 5:00	81.25	0.21	0.96	61830.14
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 4:50	9/17/2016 22:20	52.75	0.28	0.96	53730.12
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:20	9/18/2016 11:25	39.50	0.24	0.57	34677.04
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 6:10	9/19/2016 19:15	39.50	0.27	2.68	38835.04

Table D-12. Summary Statistics for Individual Storm Events at the COUMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.07	0.09	3240.00
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.08	0.27	11403.02
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	0.19	1.27	16830.00
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	0.21	0.64	17145.01
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.06	0.06	2592.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.08	0.30	8469.00
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.22	1.03	31841.96
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.15	0.21	13914.00
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	0.25	1.54	76815.02
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.19	1.54	13644.00
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.13	0.21	7488.01
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	0.15	0.49	41211.06
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:30	17.00	0.18	1.27	11160.00
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	0.83	2.21	221948.90
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	0.19	1.03	32201.99
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.17	0.33	14472.00
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.17	0.27	18557.99
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.21	0.49	14949.00
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.26	1.14	40004.97
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	0.91	2.60	344124.00
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	0.43	1.27	50049.01
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	0.26	0.73	28745.98
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:30	25.25	0.21	0.37	18783.01
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	0.13	0.18	11862.00
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	0.39	1.69	78102.08
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	0.19	0.33	12762.00
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:30	39.25	0.30	1.40	43019.98
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	0.17	0.43	38682.04
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	0.16	0.30	17981.98
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.08	0.09	8514.00
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.08	0.09	6390.00
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	0.17	0.92	41643.04
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.11	0.13	5913.00
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.16	0.57	18062.98
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.15	0.43	18377.99
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.15	0.28	12735.00
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	0.45	1.50	85194.02
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	0.49	1.11	56537.97
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 6:45	1/29/2016 0:15	65.75	0.49	1.65	115614.00
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:15	1/29/2016 23:00	16.00	0.35	0.79	20088.01
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 0:45	2/1/2016 14:30	14.00	0.19	0.35	9405.00
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.13	0.15	6174.00
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.19	0.47	16686.00
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.15	0.17	6804.00
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.15	0.41	11961.00
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.12	0.28	10035.00

Table D-12. Summary Statistics for Individual Storm Events at the COUMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	0.46	1.81	53666.97
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	0.28	0.89	13148.99
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	0.21	0.41	57545.86
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 13:00	22.50	0.33	1.11	26612.99
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 13:00	2/20/2016 11:30	46.75	0.25	0.79	41480.96
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.17	0.19	7920.00
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.16	0.25	16415.98
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.17	0.41	23066.98
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:15	41.75	0.30	1.50	45620.96
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	0.23	0.62	20664.00
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.24	0.54	22859.97
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 21:00	3/7/2016 23:00	50.25	0.27	1.11	48536.95
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	0.35	0.99	47852.98
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	0.27	0.89	14579.99
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	0.24	0.47	27548.97
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.23	0.99	27683.98
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:15	3/22/2016 21:30	56.50	0.16	0.99	33264.03
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	0.14	0.21	13761.00
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	0.22	0.99	36890.95
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:30	16.50	0.17	0.47	10062.00
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	0.14	0.41	10638.00
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	0.09	0.13	4554.00
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	0.12	0.54	14129.99
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	0.13	0.23	8640.00
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.07	0.11	4086.00
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.05	0.06	2502.00
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 11:45	14.25	0.06	0.30	3321.00
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.06	0.11	11880.02
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.09	0.21	6039.00
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:30	15.00	0.16	0.79	8595.01
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 5:45	5/22/2016 9:00	27.50	0.08	0.19	7812.00
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:30	17.50	0.12	0.35	7731.00
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.07	0.21	11619.00
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.07	0.09	3870.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.07	0.23	3546.00
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.05	0.09	2691.00
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.08	0.25	9837.01
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.17	0.79	9045.00
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.08	0.25	13140.01
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.09	0.15	7722.01
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.09	0.28	7371.00
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:30	7/22/2016 22:00	43.75	0.06	0.15	9324.02
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:30	8/2/2016 23:05	38.00	0.05	0.05	6840.01
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:20	8/8/2016 11:15	42.00	0.06	0.28	8631.02
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 12:55	9/1/2016 1:55	39.25	0.04	0.05	5724.00
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 14:55	9/3/2016 22:15	166.25	0.06	0.62	36062.77

Table D-12. Summary Statistics for Individual Storm Events at the COUMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:05	9/6/2016 18:35	58.75	0.05	0.13	11025.02
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:05	9/8/2016 4:50	80.50	0.05	0.13	14571.04
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 5:05	9/17/2016 22:15	51.75	0.06	0.15	10593.02
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:15	9/18/2016 11:35	40.25	0.06	0.11	8631.01
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 5:55	9/19/2016 19:25	40.75	0.06	0.28	8325.02

Table D-13. Summary Statistics for Individual Storm Events at the TYLMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.13	1.01	6408.00
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.44	2.16	65124.05
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	1.55	5.98	138222.00
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:00	22.75	0.96	3.10	78335.96
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.07	0.15	3501.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.20	0.77	19521.00
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.31	2.00	45054.01
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.09	0.29	8532.00
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	1.14	6.76	355257.20
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.63	3.31	45413.99
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.23	0.49	13149.00
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:45	76.75	0.91	3.10	251649.00
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:30	17.00	1.27	6.36	77696.96
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	3.05	7.60	815489.60
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	1.08	3.10	187397.80
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.64	2.00	52838.96
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.53	1.15	57104.98
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.74	2.90	53153.99
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.99	4.93	152154.00
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	3.44	10.00	1304434.00
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	2.08	4.93	240065.90
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	1.13	3.10	125487.00
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:15	25.00	0.63	2.00	57140.99
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	0.28	0.67	24605.98
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	1.73	6.36	347859.40
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	0.72	2.16	47376.02
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:30	39.25	1.52	5.26	214289.90
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	0.74	3.76	170073.00
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:30	12/28/2015 17:45	31.50	0.88	3.10	100088.90
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.18	0.24	19332.00
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.23	0.42	18602.99
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	0.98	4.93	245393.90
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.25	0.49	13050.00
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.89	3.31	98729.94
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.81	2.52	101312.90
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.89	2.70	75311.98
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	2.56	5.98	481940.80
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	2.42	4.60	280440.00
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 6:45	1/29/2016 0:15	65.75	1.84	5.61	436544.80
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:15	1/29/2016 23:00	16.00	1.47	2.90	84411.04
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 0:45	2/1/2016 14:30	14.00	0.44	2.90	22122.02
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.23	0.49	11412.00
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.92	2.90	79622.98
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.42	0.58	19575.01
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.55	3.31	42245.99
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.37	2.16	31230.00

Table D-13. Summary Statistics for Individual Storm Events at the TYLMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	2.15	7.60	249804.10
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	1.31	3.31	61416.03
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	0.97	2.52	267137.90
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 12:45	22.25	1.28	4.29	102762.00
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 12:45	2/20/2016 11:30	47.00	0.89	4.29	151137.10
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.32	0.89	15183.00
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.43	1.80	45126.02
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.40	2.70	55062.04
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:15	41.75	1.23	5.98	184841.90
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	1.03	3.76	90440.91
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.87	3.10	84536.95
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 21:00	3/7/2016 23:00	50.25	1.02	4.00	184400.90
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	1.54	4.93	210203.80
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	1.01	2.52	53441.99
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	0.86	2.70	99746.95
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.71	3.10	86165.93
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:30	3/22/2016 21:30	56.25	0.50	2.70	102122.90
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	0.45	1.62	43487.96
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	1.03	5.61	170280.10
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:30	16.50	0.75	3.76	44288.98
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	0.49	2.90	38592.05
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	0.29	1.45	14157.00
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	0.58	4.60	67932.00
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	0.57	3.10	38546.98
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.29	1.62	16929.00
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.17	0.77	8037.00
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 11:45	14.25	0.12	0.29	6327.00
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.32	3.10	61631.99
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.34	2.70	22311.00
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:30	15.00	0.89	3.76	47799.04
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 5:45	5/22/2016 9:00	27.50	0.30	2.16	29853.00
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	0.40	1.62	24885.00
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.25	1.45	39852.00
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.17	2.16	9918.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.50	0.41	4.00	19737.01
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	14.25	0.08	0.10	3942.00
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	33.25	0.58	5.26	69911.98
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.79	4.29	42867.01
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.35	5.26	56925.02
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.18	0.67	15273.00
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.35	2.34	28548.01
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:30	7/22/2016 21:45	14.50	0.14	0.49	7254.00
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:15	8/2/2016 23:15	13.25	0.08	0.12	3708.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:30	8/8/2016 11:30	14.25	0.11	0.89	5787.00
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 13:00	9/1/2016 2:00	13.25	0.12	0.24	5625.00
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 15:00	9/3/2016 22:15	55.50	1.16	8.51	232487.80

Table D-13. Summary Statistics for Individual Storm Events at the TYLMO Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:15	9/6/2016 18:30	19.50	0.24	0.67	17154.00
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 5:00	27.25	0.20	0.77	19233.00
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 5:00	9/17/2016 22:15	17.50	0.34	1.62	21113.99
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:15	9/18/2016 11:30	13.50	0.30	2.00	14445.00
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 6:00	9/19/2016 19:15	13.50	0.43	3.53	20664.00

Table D-14. Summary Statistics for Individual Storm Events at the TYLMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
10/2/2015 21:20	10/2/2015 22:15	0.917	0.070	0.076	0.120	0.000	10/2/2015 21:15	10/3/2015 10:15	13.25	0.12	0.14	5634.00
10/7/2015 4:40	10/8/2015 9:50	29.167	0.500	0.017	0.480	103.100	10/7/2015 4:30	10/8/2015 21:45	41.50	0.23	0.40	34659.00
10/10/2015 3:00	10/10/2015 15:25	12.417	0.800	0.064	0.480	51.200	10/10/2015 2:45	10/11/2015 3:15	24.75	0.55	0.87	48663.01
10/12/2015 18:40	10/13/2015 5:15	10.583	0.560	0.053	0.240	51.900	10/12/2015 18:30	10/13/2015 17:15	23.00	0.33	0.46	27531.00
10/17/2015 20:10	10/17/2015 20:50	0.667	0.040	0.060	0.120	112.400	10/17/2015 20:00	10/18/2015 8:45	13.00	0.08	0.08	3609.00
10/18/2015 8:45	10/19/2015 0:20	15.583	0.260	0.017	0.120	12.600	10/18/2015 8:45	10/19/2015 12:15	27.75	0.11	0.14	10898.99
10/25/2015 14:45	10/26/2015 18:35	27.833	0.470	0.017	0.240	160.700	10/25/2015 14:45	10/27/2015 6:30	40.00	0.13	0.21	19251.01
10/28/2015 8:25	10/28/2015 21:45	13.333	0.100	0.008	0.120	44.100	10/28/2015 8:15	10/29/2015 9:30	25.50	0.08	0.10	7128.00
10/29/2015 13:35	11/1/2015 15:20	73.750	1.970	0.027	0.480	23.300	10/29/2015 13:30	11/2/2015 3:00	86.75	0.39	1.08	121121.90
11/2/2015 3:15	11/2/2015 10:55	7.667	0.310	0.040	1.200	12.600	11/2/2015 3:00	11/2/2015 22:45	20.00	0.22	0.29	15885.00
11/3/2015 5:15	11/3/2015 8:40	3.417	0.070	0.021	0.240	18.500	11/3/2015 5:00	11/3/2015 20:30	15.75	0.11	0.12	6138.00
11/7/2015 8:20	11/10/2015 0:45	64.417	1.310	0.020	0.360	96.700	11/7/2015 8:15	11/10/2015 12:30	76.50	0.51	0.87	139895.80
11/10/2015 23:45	11/11/2015 4:30	4.750	0.480	0.101	0.720	34.800	11/10/2015 23:45	11/11/2015 16:15	16.75	0.61	0.87	36981.00
11/12/2015 17:30	11/15/2015 7:15	61.750	3.650	0.059	0.360	37.300	11/12/2015 17:15	11/15/2015 19:15	74.25	1.34	4.39	358470.00
11/16/2015 10:25	11/17/2015 22:15	35.833	0.640	0.018	0.600	27.800	11/16/2015 10:15	11/18/2015 10:15	48.25	0.35	0.60	61199.97
11/18/2015 16:55	11/19/2015 3:45	10.833	0.220	0.020	0.240	23.500	11/18/2015 16:45	11/19/2015 15:30	23.00	0.15	0.21	12699.01
11/23/2015 15:55	11/24/2015 9:35	17.667	0.400	0.023	0.120	110.500	11/23/2015 15:45	11/24/2015 21:30	30.00	0.16	0.25	16965.00
12/1/2015 18:55	12/2/2015 2:40	7.750	0.430	0.056	0.240	179.700	12/1/2015 18:45	12/2/2015 14:30	20.00	0.18	0.29	13212.00
12/2/2015 23:50	12/4/2015 6:10	30.333	0.710	0.023	0.360	24.400	12/2/2015 23:45	12/4/2015 18:00	42.50	0.41	0.68	62342.96
12/5/2015 9:50	12/9/2015 6:50	93.000	4.250	0.046	0.600	28.700	12/5/2015 9:45	12/9/2015 18:45	105.25	1.47	5.65	558675.60
12/10/2015 3:45	12/10/2015 23:25	19.667	0.440	0.022	0.240	21.100	12/10/2015 3:30	12/11/2015 11:15	32.00	0.52	0.87	59841.00
12/12/2015 8:55	12/13/2015 3:20	18.417	0.430	0.023	0.240	44.100	12/12/2015 8:45	12/13/2015 15:15	30.75	0.21	0.40	22985.98
12/13/2015 15:45	12/14/2015 4:30	12.750	0.220	0.017	0.120	17.500	12/13/2015 15:30	12/14/2015 16:15	25.00	0.13	0.17	11997.00
12/15/2015 19:00	12/16/2015 7:20	12.333	0.060	0.005	0.120	42.800	12/15/2015 18:45	12/16/2015 19:15	24.75	0.08	0.10	7182.00
12/17/2015 7:55	12/19/2015 3:20	43.417	1.300	0.030	0.240	32.200	12/17/2015 7:45	12/19/2015 15:15	55.75	0.34	1.20	68751.02
12/20/2015 2:15	12/20/2015 8:10	5.917	0.170	0.029	0.240	30.200	12/20/2015 2:00	12/20/2015 20:00	18.25	0.13	0.15	8325.00
12/20/2015 23:35	12/22/2015 2:30	26.917	0.780	0.029	0.240	16.000	12/20/2015 23:30	12/22/2015 14:15	39.00	0.27	0.68	38366.96
12/22/2015 18:20	12/24/2015 22:25	52.083	0.610	0.012	0.240	21.600	12/22/2015 18:15	12/25/2015 10:15	64.25	0.14	0.21	31590.02
12/27/2015 10:30	12/28/2015 5:45	19.250	0.550	0.029	0.120	61.200	12/27/2015 10:15	12/28/2015 17:45	31.75	0.13	0.21	15381.01
1/4/2016 1:40	1/4/2016 22:10	20.500	0.110	0.005	0.120	167.000	1/4/2016 1:30	1/5/2016 7:45	30.50	0.04	0.05	3843.00
1/5/2016 7:55	1/5/2016 18:05	10.167	0.090	0.009	0.120	21.800	1/5/2016 7:45	1/6/2016 6:00	22.50	0.05	0.06	3852.00
1/11/2016 10:45	1/13/2016 19:55	57.167	1.150	0.020	0.240	139.500	1/11/2016 10:30	1/14/2016 7:45	69.50	0.35	0.97	86588.93
1/15/2016 9:55	1/15/2016 12:25	2.500	0.050	0.020	0.240	39.900	1/15/2016 9:45	1/16/2016 0:15	14.75	0.12	0.14	6615.00
1/16/2016 0:30	1/16/2016 20:50	20.333	0.420	0.021	0.240	14.600	1/16/2016 0:30	1/17/2016 7:00	30.75	0.36	0.53	40257.01
1/17/2016 7:05	1/18/2016 5:35	22.500	0.330	0.015	0.240	13.900	1/17/2016 7:00	1/18/2016 17:30	34.75	0.36	0.53	44613.01
1/19/2016 13:20	1/20/2016 0:40	11.333	0.370	0.033	0.120	35.100	1/19/2016 13:15	1/20/2016 12:30	23.50	0.32	0.53	26982.01
1/20/2016 21:10	1/22/2016 13:05	39.917	1.550	0.039	0.240	23.400	1/20/2016 21:00	1/23/2016 1:00	52.25	0.95	2.27	179037.00
1/23/2016 5:05	1/24/2016 1:05	20.000	0.870	0.044	0.360	21.700	1/23/2016 5:00	1/24/2016 13:00	32.25	0.89	1.46	102780.00
1/26/2016 7:00	1/28/2016 12:20	53.333	1.590	0.030	0.240	63.000	1/26/2016 6:45	1/29/2016 0:15	65.75	0.67	1.92	159471.10
1/29/2016 7:30	1/29/2016 11:15	3.750	0.170	0.045	0.120	19.800	1/29/2016 7:15	1/29/2016 23:00	16.00	0.55	0.68	31851.01
2/1/2016 1:00	2/1/2016 2:40	1.667	0.130	0.078	0.240	62.200	2/1/2016 0:45	2/1/2016 14:30	14.00	0.16	0.21	7911.00
2/3/2016 0:20	2/3/2016 1:35	1.250	0.040	0.032	0.120	46.400	2/3/2016 0:15	2/3/2016 13:30	13.50	0.11	0.12	5427.00
2/3/2016 13:40	2/4/2016 1:25	11.750	0.440	0.037	0.240	13.300	2/3/2016 13:30	2/4/2016 13:15	24.00	0.22	0.34	19214.99
2/4/2016 15:25	2/4/2016 16:10	0.750	0.030	0.040	0.120	13.200	2/4/2016 15:15	2/5/2016 4:00	13.00	0.15	0.21	6984.00
2/5/2016 9:20	2/5/2016 18:35	9.250	0.180	0.020	0.240	31.900	2/5/2016 9:15	2/6/2016 6:30	21.50	0.14	0.21	11159.99
2/10/2016 10:35	2/10/2016 21:55	11.333	0.190	0.017	0.240	112.600	2/10/2016 10:30	2/11/2016 9:45	23.50	0.11	0.14	9432.00

Table D-14. Summary Statistics for Individual Storm Events at the TYLMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
2/11/2016 15:10	2/12/2016 11:00	19.833	1.170	0.059	0.480	27.100	2/11/2016 15:00	2/12/2016 23:00	32.25	0.48	0.97	55431.00
2/13/2016 0:55	2/13/2016 2:00	1.083	0.120	0.111	0.240	14.400	2/13/2016 0:45	2/13/2016 13:30	13.00	0.33	0.46	15345.00
2/13/2016 13:40	2/16/2016 5:35	63.917	0.660	0.010	0.120	12.300	2/13/2016 13:30	2/16/2016 17:30	76.25	0.20	0.34	53657.89
2/17/2016 14:55	2/18/2016 6:40	15.750	0.430	0.027	0.240	40.100	2/17/2016 14:45	2/18/2016 12:45	22.25	0.23	0.46	18791.99
2/18/2016 13:00	2/19/2016 23:30	34.500	0.470	0.014	0.360	14.800	2/18/2016 12:45	2/20/2016 11:15	46.75	0.16	0.25	26954.99
2/21/2016 13:25	2/21/2016 14:00	0.583	0.060	0.103	0.360	42.100	2/21/2016 13:15	2/22/2016 2:00	13.00	0.11	0.12	4977.00
2/26/2016 16:55	2/27/2016 9:35	16.667	0.270	0.016	0.120	124.400	2/26/2016 16:45	2/27/2016 21:30	29.00	0.10	0.14	10683.00
2/28/2016 5:20	2/29/2016 7:10	25.833	0.360	0.014	0.480	27.400	2/28/2016 5:15	2/29/2016 19:00	38.00	0.10	0.12	13455.01
2/29/2016 22:50	3/2/2016 4:30	29.667	0.810	0.027	0.600	19.800	2/29/2016 22:45	3/2/2016 16:30	42.00	0.22	0.40	33939.02
3/2/2016 18:10	3/3/2016 6:25	12.250	0.230	0.019	0.240	17.400	3/2/2016 18:00	3/3/2016 18:15	24.50	0.23	0.29	20105.99
3/4/2016 14:30	3/5/2016 5:05	14.583	0.380	0.026	0.120	38.700	3/4/2016 14:15	3/5/2016 17:00	27.00	0.17	0.25	16335.00
3/5/2016 21:00	3/7/2016 11:05	38.083	0.790	0.021	0.240	17.600	3/5/2016 20:45	3/7/2016 23:00	50.50	0.19	0.40	33875.98
3/9/2016 0:20	3/10/2016 2:15	25.917	0.760	0.029	0.240	38.200	3/9/2016 0:15	3/10/2016 14:00	38.00	0.33	0.97	45261.01
3/10/2016 14:35	3/10/2016 17:05	2.500	0.170	0.068	0.360	13.400	3/10/2016 14:30	3/11/2016 5:00	14.75	0.24	0.34	12960.00
3/11/2016 13:45	3/12/2016 9:45	20.000	0.340	0.017	0.240	22.600	3/11/2016 13:30	3/12/2016 21:30	32.25	0.17	0.25	19341.00
3/12/2016 21:30	3/13/2016 19:55	22.417	0.350	0.016	0.240	14.100	3/12/2016 21:30	3/14/2016 7:45	33.50	0.15	0.25	17657.99
3/20/2016 13:30	3/22/2016 9:45	44.250	0.580	0.013	0.480	161.700	3/20/2016 13:15	3/22/2016 21:30	56.50	0.10	0.14	21078.03
3/23/2016 10:05	3/24/2016 0:35	14.500	0.190	0.013	0.120	24.900	3/23/2016 10:00	3/24/2016 12:30	26.75	0.09	0.12	9117.00
3/26/2016 23:05	3/28/2016 8:45	33.667	0.760	0.023	0.360	71.800	3/26/2016 23:00	3/28/2016 20:45	46.00	0.17	0.40	28233.00
4/3/2016 23:20	4/4/2016 3:45	4.417	0.330	0.075	0.360	173.700	4/3/2016 23:15	4/4/2016 15:30	16.50	0.11	0.15	6777.00
4/12/2016 14:50	4/13/2016 0:20	9.500	0.420	0.044	0.240	203.300	4/12/2016 14:45	4/13/2016 12:15	21.75	0.07	0.10	5769.00
4/14/2016 1:15	4/14/2016 2:50	1.583	0.090	0.057	0.120	28.700	4/14/2016 1:15	4/14/2016 14:45	13.75	0.07	0.08	3447.00
4/23/2016 22:00	4/24/2016 18:25	20.417	0.550	0.027	0.480	235.800	4/23/2016 21:45	4/25/2016 6:15	32.75	0.07	0.11	7956.00
4/25/2016 6:20	4/25/2016 12:55	6.583	0.250	0.038	0.240	12.500	4/25/2016 6:15	4/26/2016 0:45	18.75	0.07	0.10	4995.00
4/29/2016 6:55	4/29/2016 11:05	4.167	0.090	0.022	0.120	90.700	4/29/2016 6:45	4/29/2016 23:00	16.50	0.05	0.06	2889.00
5/8/2016 7:05	5/8/2016 8:00	0.917	0.040	0.044	0.120	214.800	5/8/2016 7:00	5/8/2016 20:00	13.25	0.03	0.05	1647.00
5/8/2016 21:55	5/9/2016 0:00	2.083	0.100	0.048	0.360	14.800	5/8/2016 21:45	5/9/2016 11:45	14.25	0.03	0.04	1368.00
5/14/2016 11:20	5/16/2016 3:50	40.500	0.310	0.008	0.240	132.800	5/14/2016 11:15	5/16/2016 15:45	52.75	0.05	0.07	10215.02
5/18/2016 23:55	5/19/2016 6:05	6.167	0.210	0.034	0.240	70.100	5/18/2016 23:45	5/19/2016 18:00	18.50	0.05	0.06	3132.00
5/19/2016 18:55	5/19/2016 21:45	2.833	0.500	0.177	0.480	16.100	5/19/2016 18:45	5/20/2016 9:30	15.00	0.09	0.12	4869.00
5/21/2016 6:00	5/21/2016 21:05	15.083	0.220	0.015	0.120	32.800	5/21/2016 5:45	5/22/2016 9:00	27.50	0.04	0.05	3600.00
5/27/2016 2:25	5/27/2016 7:30	5.083	0.430	0.085	0.240	136.000	5/27/2016 2:15	5/27/2016 19:15	17.25	0.02	0.03	1404.00
5/28/2016 5:20	5/29/2016 13:05	31.750	0.260	0.008	0.240	22.000	5/28/2016 5:15	5/30/2016 1:00	44.00	0.03	0.04	4608.00
6/9/2016 21:05	6/10/2016 1:30	4.417	0.090	0.020	0.360	274.200	6/9/2016 21:00	6/10/2016 13:15	16.50	0.02	0.02	963.00
6/11/2016 3:25	6/11/2016 4:35	1.167	0.250	0.214	0.840	26.100	6/11/2016 3:15	6/11/2016 16:30	13.25	0.01	0.02	684.00
6/13/2016 8:50	6/13/2016 10:55	2.083	0.030	0.014	0.120	52.700	6/13/2016 8:45	6/13/2016 22:45	13.75	0.02	0.03	783.00
6/17/2016 23:15	6/18/2016 20:00	20.750	0.480	0.023	0.480	163.100	6/17/2016 23:00	6/19/2016 8:00	32.25	0.02	0.04	1917.00
6/20/2016 23:25	6/21/2016 2:10	2.750	0.400	0.146	0.360	54.000	6/20/2016 23:15	6/21/2016 14:00	15.00	0.02	0.04	1269.00
6/23/2016 6:25	6/24/2016 15:15	32.833	0.330	0.010	0.240	52.700	6/23/2016 6:15	6/25/2016 3:00	45.00	0.02	0.04	3609.00
7/7/2016 18:45	7/8/2016 5:45	11.000	0.200	0.018	0.120	329.900	7/7/2016 18:30	7/8/2016 17:45	23.50	0.03	0.05	2655.00
7/8/2016 22:55	7/9/2016 9:15	10.333	0.170	0.017	0.120	18.200	7/8/2016 22:45	7/9/2016 21:00	22.50	0.05	0.08	4140.00
7/22/2016 7:30	7/22/2016 10:00	2.500	0.210	0.084	0.240	317.600	7/22/2016 7:15	7/22/2016 21:45	14.75	0.03	0.05	1836.00
8/2/2016 10:30	8/2/2016 11:20	0.833	0.030	0.036	0.120	265.200	8/2/2016 10:15	8/2/2016 23:15	13.25	0.01	0.02	702.00
8/7/2016 21:30	8/7/2016 23:30	2.000	0.030	0.015	0.120	396.200	8/7/2016 21:30	8/8/2016 11:15	14.00	0.03	0.04	1359.00
8/31/2016 13:10	8/31/2016 14:05	0.917	0.060	0.066	0.240	567.700	8/31/2016 13:00	9/1/2016 2:00	13.25	0.04	0.04	1701.00
9/1/2016 15:05	9/3/2016 10:30	43.417	0.910	0.021	0.720	25.800	9/1/2016 15:00	9/3/2016 22:30	55.75	0.12	0.21	23291.99

Table D-14. Summary Statistics for Individual Storm Events at the TYLMI Station.

Precipitation Start Time	Precipitation Stop Time	Precipitation Duration (hour)	Precipitation Depth (inch)	Precipitation Average Intensity (inch/hour)	Precipitation Maximum Intensity (inch/hour)	Precipitation Antecedent Dry Period (hour)	Flow Start Time	Flow Stop Time	Flow Duration (hour)	Average Flow Rate (feet ³ /second)	Maximum Flow Rate (feet ³ /second)	Flow Volume (feet ³)
9/5/2016 23:20	9/6/2016 6:45	7.417	0.180	0.024	0.120	61.200	9/5/2016 23:15	9/6/2016 18:45	19.75	0.05	0.07	3438.00
9/7/2016 2:10	9/7/2016 17:00	14.833	0.080	0.005	0.120	20.100	9/7/2016 2:00	9/8/2016 5:00	27.25	0.04	0.06	4302.00
9/17/2016 5:05	9/17/2016 20:00	14.917	0.220	0.015	0.240	239.400	9/17/2016 4:50	9/17/2016 22:15	52.50	0.03	0.06	5803.89
9/17/2016 22:30	9/17/2016 23:40	1.167	0.070	0.060	0.120	13.300	9/17/2016 22:15	9/18/2016 11:35	40.25	0.02	0.03	3490.05
9/19/2016 6:10	9/19/2016 7:30	1.333	0.140	0.105	0.480	31.200	9/19/2016 6:05	9/19/2016 19:15	39.75	0.05	0.09	7620.82

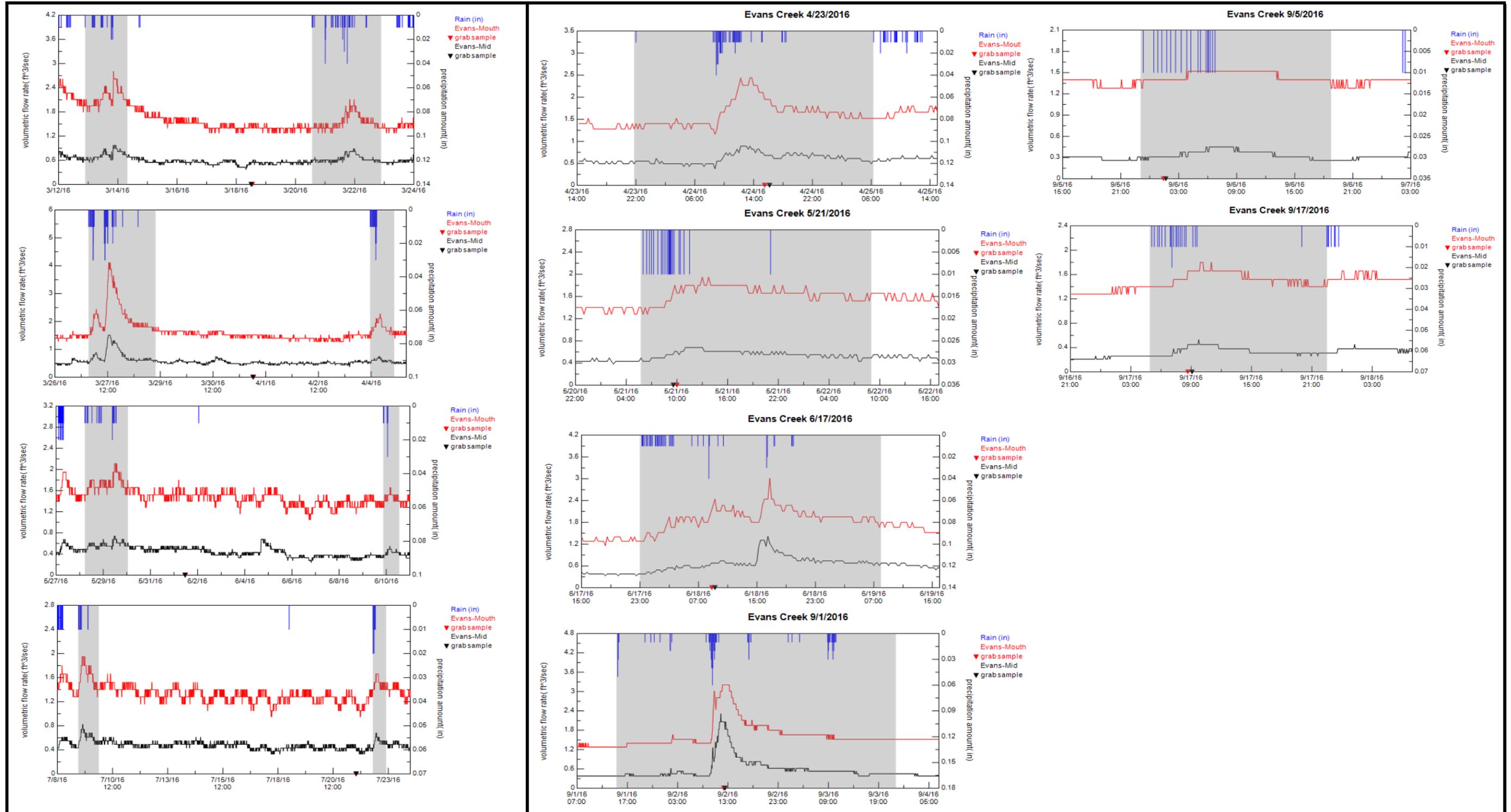
APPENDIX E

Line Plots Showing Sampling Times Relative to the Storm Event Hydrograph

Evans – Application Watershed – Sampled Hydrographs

Base Flow

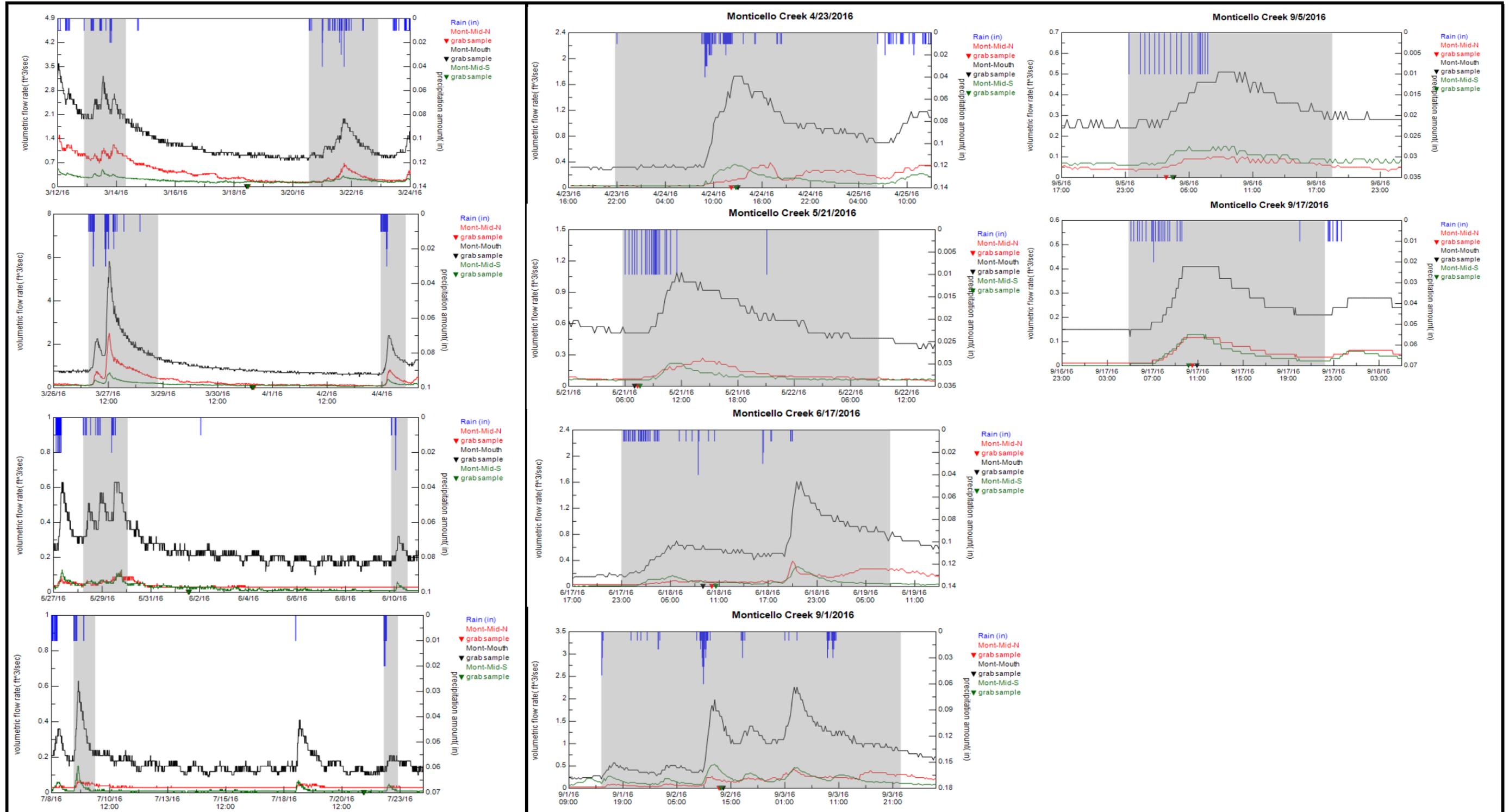
Storm Flow



Monticello – Application Watershed – Sampled Hydrographs

Base Flow

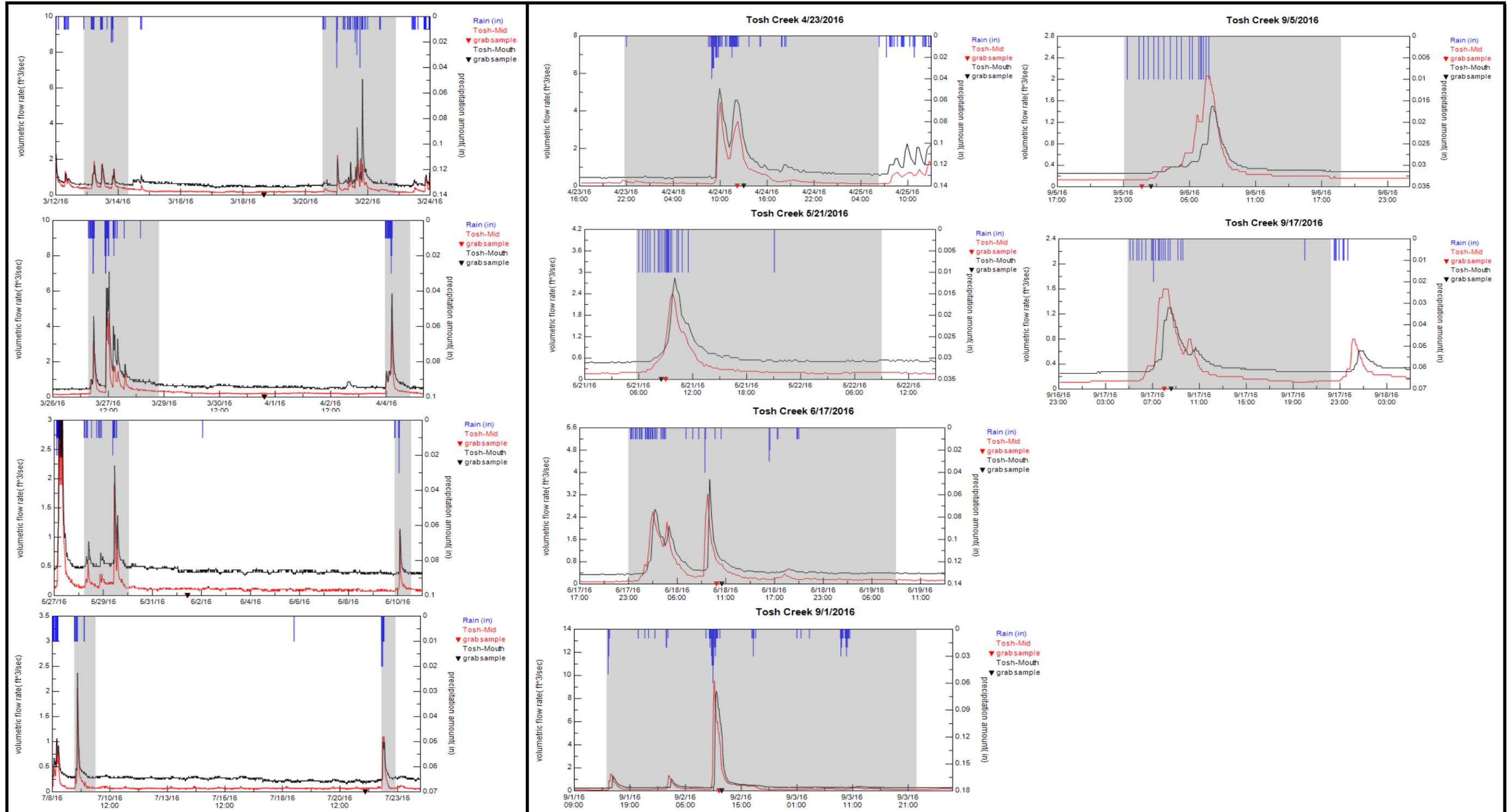
Storm Flow



Tosh – Application Watershed – Sampled Hydrographs

Base Flow

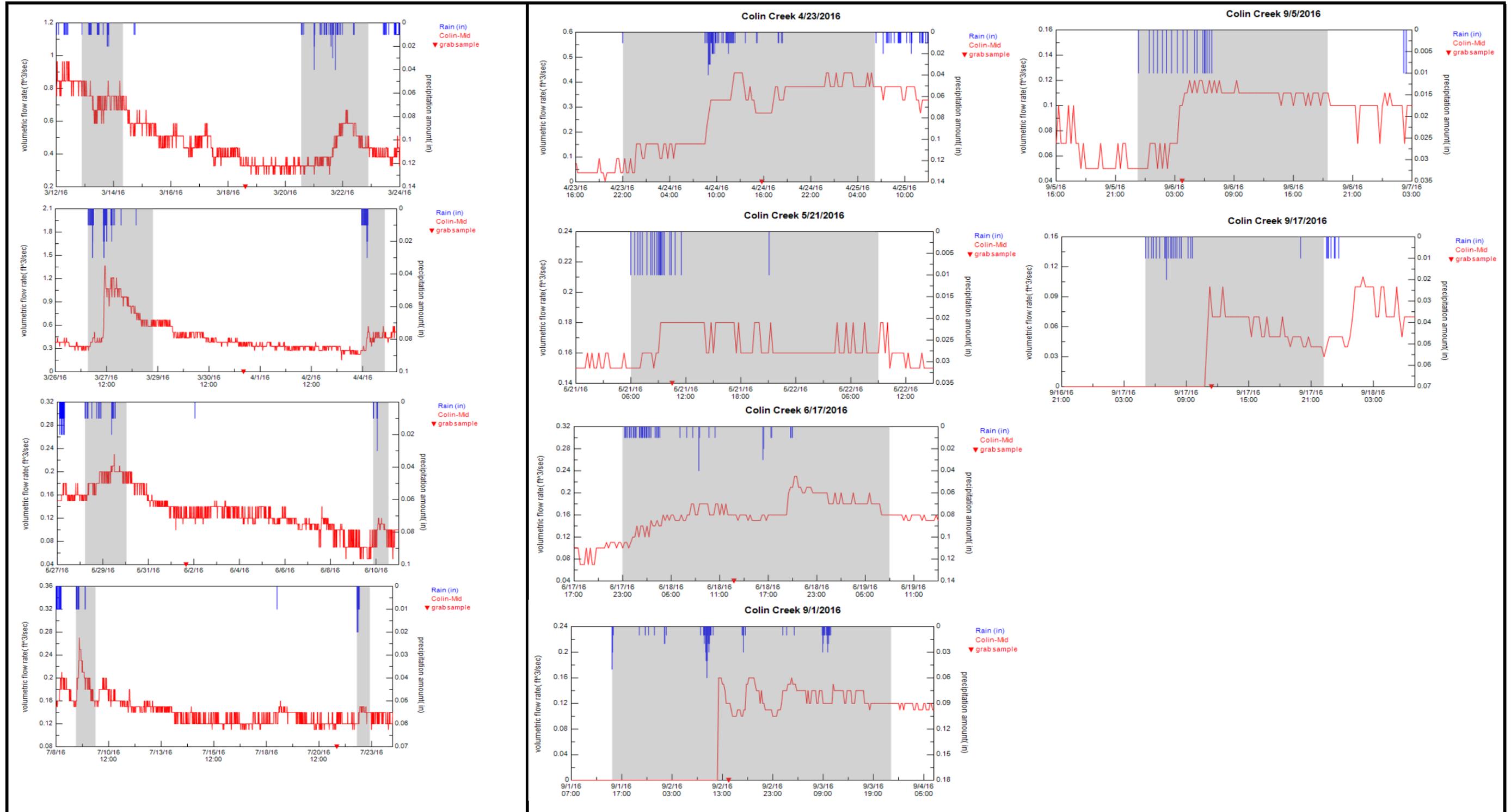
Storm Flow



Colin – Reference Watershed – Sampled Hydrographs

Base Flow

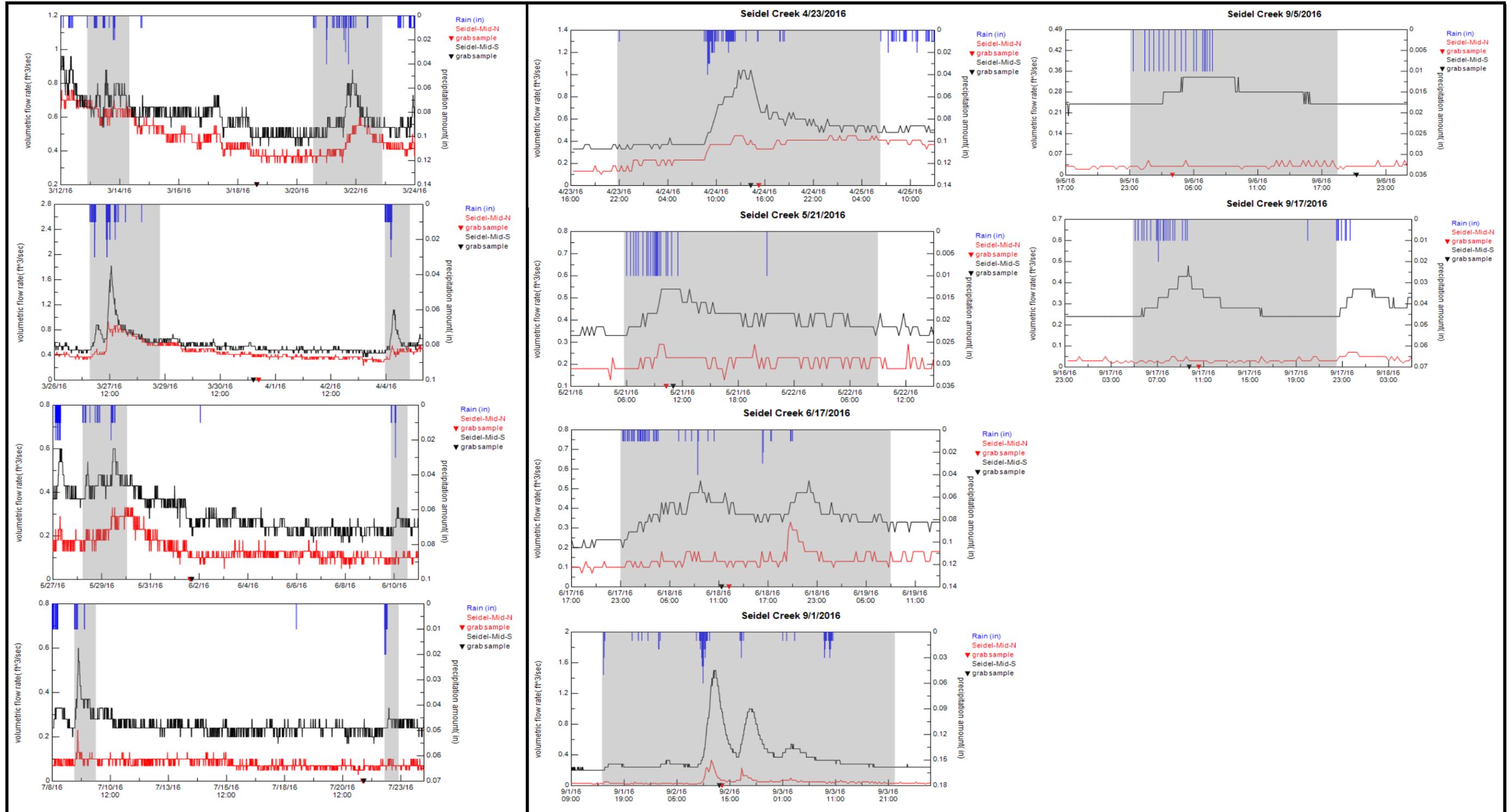
Storm Flow



Seidel – Reference Watershed – Sampled Hydrographs

Base Flow

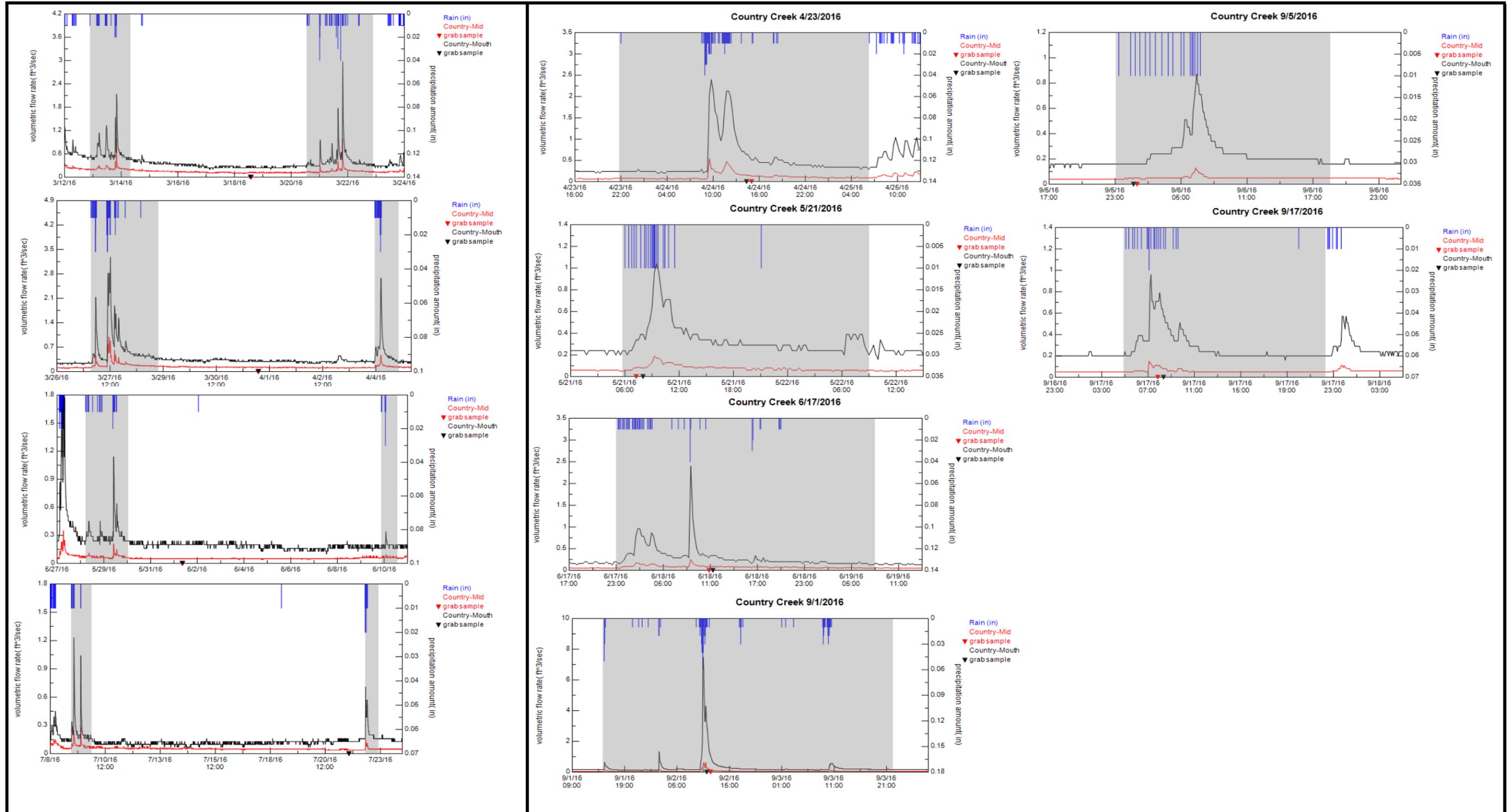
Storm Flow



Country – Control Watershed – Sampled Hydrographs

Base Flow

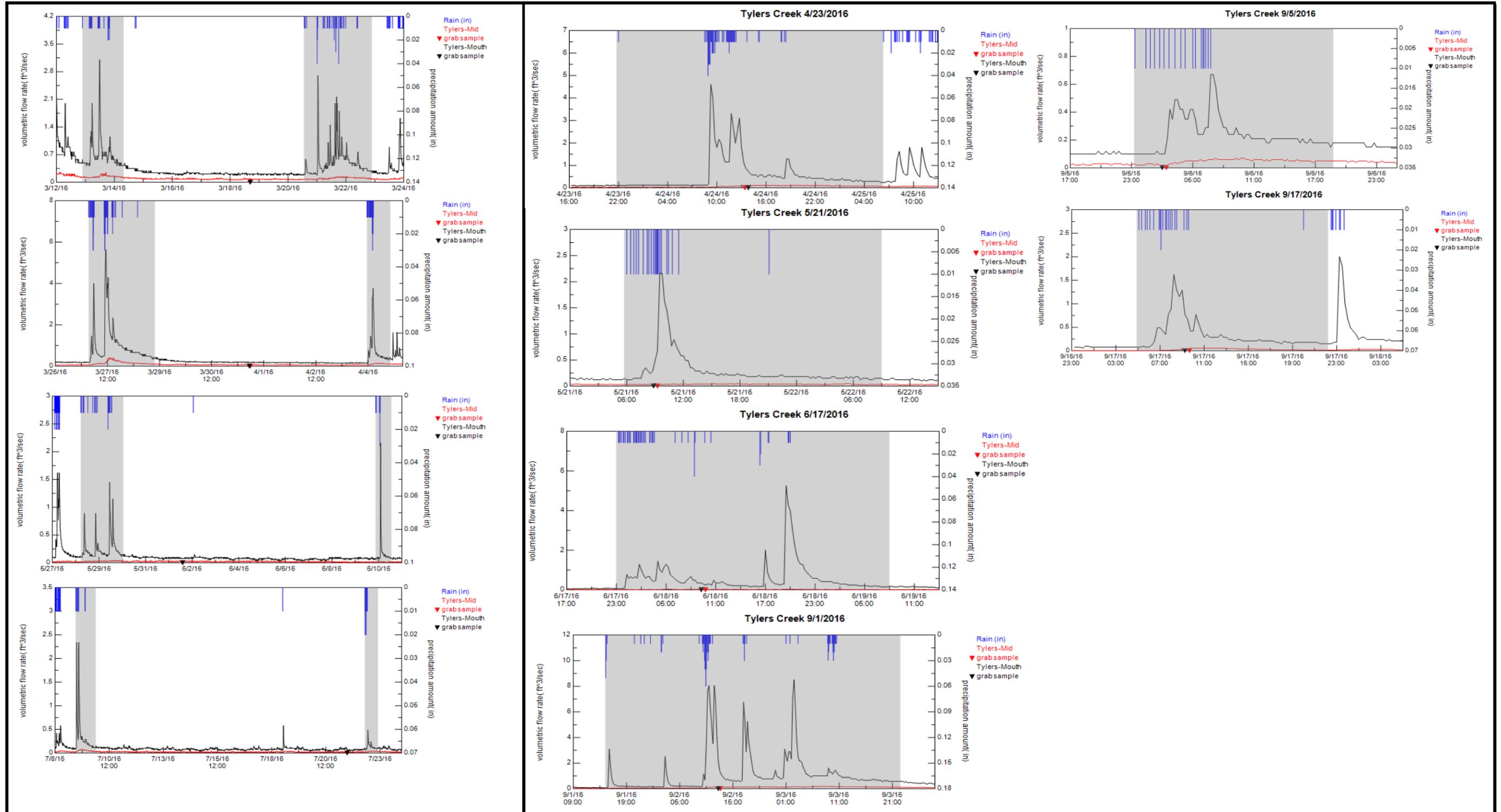
Storm Flow



Tyler's – Control Watershed – Sampled Hydrographs

Base Flow

Storm Flow



APPENDIX F

Laboratory Reports, Field Forms, and Data Quality Assurance Audit Forms for Water Quality Monitoring



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

April 28, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1603-185

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on March 18, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures

Date of Report: April 28, 2016
Samples Submitted: March 18, 2016
Laboratory Reference: 1603-185
Project: 14-05806-000

Case Narrative

Samples were collected on March 18, 2016 and received by the laboratory on March 18, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: April 28, 2016
 Samples Submitted: March 18, 2016
 Laboratory Reference: 1603-185
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLERSMID-20160318					
Laboratory ID:	03-185-01					
Total Suspended Solids	11	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	TYLERSMOU-20160318					
Laboratory ID:	03-185-02					
Total Suspended Solids	1.6	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	COLINMID-20160318					
Laboratory ID:	03-185-03					
Total Suspended Solids	1.0	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	SEIDELMIDN-20160318					
Laboratory ID:	03-185-04					
Total Suspended Solids	3.2	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	MONTMIDN-20160318					
Laboratory ID:	03-185-05					
Total Suspended Solids	2.4	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	MONTMIDS-20160318					
Laboratory ID:	03-185-06					
Total Suspended Solids	1.4	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	MONTMOU-20160318					
Laboratory ID:	03-185-07					
Total Suspended Solids	1.2	1.0	SM 2540D	3-21-16	3-22-16	

Date of Report: April 28, 2016
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**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEIDELMIDS-20160318					
Laboratory ID:	03-185-08					
Total Suspended Solids	13	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	EVANSMOU-20160318					
Laboratory ID:	03-185-09					
Total Suspended Solids	4.4	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	EVANSMID-20160318					
Laboratory ID:	03-185-10					
Total Suspended Solids	11	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	TOSHMOU-20160318					
Laboratory ID:	03-185-11					
Total Suspended Solids	1.4	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	TOSHMID-20160318					
Laboratory ID:	03-185-12					
Total Suspended Solids	3.0	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	COUNTRYMOU-20160318					
Laboratory ID:	03-185-13					
Total Suspended Solids	3.6	1.0	SM 2540D	3-21-16	3-22-16	

Client ID:	COUNTRYMID-20160318					
Laboratory ID:	03-185-14					
Total Suspended Solids	4.6	1.0	SM 2540D	3-21-16	3-22-16	

Date of Report: April 28, 2016
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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0321W1					
Total Suspended Solids	ND	1.0	SM 2540D	3-21-16	3-22-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-185-09							
	ORIG	DUP						
Total Suspended Solids	4.40	4.80	NA	NA	NA	9	17	

SPIKE BLANK								
Laboratory ID:	SB0321W1							
	SB	SB		SB				
Total Suspended Solids	100	100	NA	100	75-114	NA	NA	

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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLERSMID-20160318					
Laboratory ID:	03-185-01					
Turbidity	2.8	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	TYLERSMOU-20160318					
Laboratory ID:	03-185-02					
Turbidity	1.5	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	COLINMID-20160318					
Laboratory ID:	03-185-03					
Turbidity	0.50	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	SEIDELMIDN-20160318					
Laboratory ID:	03-185-04					
Turbidity	1.1	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	MONTMIDN-20160318					
Laboratory ID:	03-185-05					
Turbidity	0.72	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	MONTMIDS-20160318					
Laboratory ID:	03-185-06					
Turbidity	0.91	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	MONTMOU-20160318					
Laboratory ID:	03-185-07					
Turbidity	0.64	0.10	EPA 180.1	3-18-16	3-18-16	

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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEIDELMIDS-20160318					
Laboratory ID:	03-185-08					
Turbidity	1.4	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	EVANSMOU-20160318					
Laboratory ID:	03-185-09					
Turbidity	1.0	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	EVANSMID-20160318					
Laboratory ID:	03-185-10					
Turbidity	0.99	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	TOSHMOU-20160318					
Laboratory ID:	03-185-11					
Turbidity	0.63	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	TOSHMID-20160318					
Laboratory ID:	03-185-12					
Turbidity	1.1	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	COUNTRYMOU-20160318					
Laboratory ID:	03-185-13					
Turbidity	1.7	0.10	EPA 180.1	3-18-16	3-18-16	

Client ID:	COUNTRYMID-20160318					
Laboratory ID:	03-185-14					
Turbidity	1.2	0.10	EPA 180.1	3-18-16	3-18-16	

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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0318W1					
Turbidity	ND	0.10	EPA 180.1	3-18-16	3-18-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-185-01							
	ORIG	DUP						
Turbidity	2.82	2.79	NA	NA	NA	NA	1	15

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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLERSMID-20160318					
Laboratory ID:	03-185-01					
Hardness	79	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	TYLERSMOU-20160318					
Laboratory ID:	03-185-02					
Hardness	75	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	COLINMID-20160318					
Laboratory ID:	03-185-03					
Hardness	9.0	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	SEIDELMIDN-20160318					
Laboratory ID:	03-185-04					
Hardness	25	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	MONTMIDN-20160318					
Laboratory ID:	03-185-05					
Hardness	53	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	MONTMIDS-20160318					
Laboratory ID:	03-185-06					
Hardness	110	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	MONTMOU-20160318					
Laboratory ID:	03-185-07					
Hardness	75	1.0	200.7/SM 2340B	3-22-16	3-23-16	

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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEIDELMIDS-20160318					
Laboratory ID:	03-185-08					
Hardness	42	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	EVANSMOU-20160318					
Laboratory ID:	03-185-09					
Hardness	80	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	EVANSMID-20160318					
Laboratory ID:	03-185-10					
Hardness	88	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	TOSHMOU-20160318					
Laboratory ID:	03-185-11					
Hardness	110	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	TOSHMID-20160318					
Laboratory ID:	03-185-12					
Hardness	120	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	COUNTRYMOU-20160318					
Laboratory ID:	03-185-13					
Hardness	120	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Client ID:	COUNTRYMID-20160318					
Laboratory ID:	03-185-14					
Hardness	120	1.0	200.7/SM 2340B	3-22-16	3-23-16	

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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0322WH1					
Hardness	ND	1.0	200.7/SM 2340B	3-22-16	3-23-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-185-02							
	ORIG	DUP						
Hardness	75.1	76.4	NA	NA	NA	2	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	03-185-02									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	209	208	132	132	75.1	101	101	75-125	0	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
SPIKE BLANK										
Laboratory ID:	SB0322WH1									
	SB		SB		SB					
Hardness	134		132		102			80-120	NA	NA

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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: TYLERSMID-20160318						
Laboratory ID: 03-185-01						
Dissolved Organic Carbon	5.0	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: TYLERSMOU-20160318						
Laboratory ID: 03-185-02						
Dissolved Organic Carbon	4.5	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: COLINMID-20160318						
Laboratory ID: 03-185-03						
Dissolved Organic Carbon	11	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: SEIDELMIDN-20160318						
Laboratory ID: 03-185-04						
Dissolved Organic Carbon	6.0	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: MONTMIDN-20160318						
Laboratory ID: 03-185-05						
Dissolved Organic Carbon	3.7	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: MONTMIDS-20160318						
Laboratory ID: 03-185-06						
Dissolved Organic Carbon	5.8	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: MONTMOU-20160318						
Laboratory ID: 03-185-07						
Dissolved Organic Carbon	3.7	1.0	SM 5310B	3-21-16	3-21-16	

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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: SEIDELMIDS-20160318						
Laboratory ID: 03-185-08						
Dissolved Organic Carbon	3.7	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: EVANSMOU-20160318						
Laboratory ID: 03-185-09						
Dissolved Organic Carbon	3.5	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: EVANSMID-20160318						
Laboratory ID: 03-185-10						
Dissolved Organic Carbon	3.5	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: TOSHMOU-20160318						
Laboratory ID: 03-185-11						
Dissolved Organic Carbon	3.0	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: TOSHMID-20160318						
Laboratory ID: 03-185-12						
Dissolved Organic Carbon	3.7	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: COUNTRYMOU-20160318						
Laboratory ID: 03-185-13						
Dissolved Organic Carbon	3.4	1.0	SM 5310B	3-21-16	3-21-16	
Client ID: COUNTRYMID-20160318						
Laboratory ID: 03-185-14						
Dissolved Organic Carbon	3.2	1.0	SM 5310B	3-21-16	3-21-16	

Date of Report: April 28, 2016
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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0321D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	3-21-16	3-21-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-185-01							
	ORIG	DUP						
Dissolved Organic Carbon	5.01	5.03	NA	NA	NA	0	20	

MATRIX SPIKE

Laboratory ID:	03-185-01							
	MS	MS		MS				
Dissolved Organic Carbon	16.1	10.0	5.01	111	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0321D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.5	10.0	NA	105	75-125	NA	NA	

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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLERSMID-20160318					
Laboratory ID:	03-185-01					
Total Phosphorus	0.022	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	TYLERSMOU-20160318					
Laboratory ID:	03-185-02					
Total Phosphorus	0.024	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	COLINMID-20160318					
Laboratory ID:	03-185-03					
Total Phosphorus	ND	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	SEIDELMIDN-20160318					
Laboratory ID:	03-185-04					
Total Phosphorus	0.018	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	MONTMIDN-20160318					
Laboratory ID:	03-185-05					
Total Phosphorus	0.017	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	MONTMIDS-20160318					
Laboratory ID:	03-185-06					
Total Phosphorus	0.016	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	MONTMOU-20160318					
Laboratory ID:	03-185-07					
Total Phosphorus	0.017	0.010	EPA 365.1	3-22-16	3-22-16	

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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEIDELMIDS-20160318					
Laboratory ID:	03-185-08					
Total Phosphorus	0.040	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	EVANSMOU-20160318					
Laboratory ID:	03-185-09					
Total Phosphorus	0.023	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	EVANSMID-20160318					
Laboratory ID:	03-185-10					
Total Phosphorus	0.023	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	TOSHMOU-20160318					
Laboratory ID:	03-185-11					
Total Phosphorus	0.053	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	TOSHMID-20160318					
Laboratory ID:	03-185-12					
Total Phosphorus	0.048	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	COUNTRYMOU-20160318					
Laboratory ID:	03-185-13					
Total Phosphorus	0.035	0.010	EPA 365.1	3-22-16	3-22-16	

Client ID:	COUNTRYMID-20160318					
Laboratory ID:	03-185-14					
Total Phosphorus	0.063	0.010	EPA 365.1	3-22-16	3-22-16	

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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0322W2					
Total Phosphorus	ND	0.010	EPA 365.1	3-22-16	3-22-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-185-01							
	ORIG	DUP						
Total Phosphorus	0.0221	0.0240	NA	NA	NA	8	10	

MATRIX SPIKE								
Laboratory ID:	03-185-01							
	MS	MS		MS				
Total Phosphorus	0.305	0.250	0.0221	113	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0322W2							
	SB	SB		SB				
Total Phosphorus	0.256	0.250	NA	102	86-112	NA	NA	

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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 03-185-01						
Client ID: TYLERSMID-20160318						
Copper	2.3	1.0	200.8	3-22-16	3-22-16	
Zinc	ND	5.0	200.8	3-22-16	3-22-16	
Lab ID: 03-185-02						
Client ID: TYLERSMOU-20160318						
Copper	1.4	1.0	200.8	3-22-16	3-22-16	
Zinc	11	5.0	200.8	3-22-16	3-22-16	
Lab ID: 03-185-03						
Client ID: COLINMID-20160318						
Copper	1.1	1.0	200.8	3-22-16	3-22-16	
Zinc	6.0	5.0	200.8	3-22-16	3-22-16	
Lab ID: 03-185-04						
Client ID: SEIDELMIDN-20160318						
Copper	ND	1.0	200.8	3-22-16	3-22-16	
Zinc	ND	5.0	200.8	3-22-16	3-22-16	
Lab ID: 03-185-05						
Client ID: MONTMIDN-20160318						
Copper	1.0	1.0	200.8	3-22-16	3-22-16	
Zinc	ND	5.0	200.8	3-22-16	3-22-16	
Lab ID: 03-185-06						
Client ID: MONTMIDS-20160318						
Copper	1.3	1.0	200.8	3-22-16	3-22-16	
Zinc	ND	5.0	200.8	3-22-16	3-22-16	

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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-185-07					
Client ID:	MONTMOU-20160318					
Copper	1.2	1.0	200.8	3-22-16	3-22-16	
Zinc	8.6	5.0	200.8	3-22-16	3-22-16	
Lab ID:	03-185-08					
Client ID:	SEIDELMIDS-20160318					
Copper	ND	1.0	200.8	3-22-16	3-22-16	
Zinc	ND	5.0	200.8	3-22-16	3-22-16	
Lab ID:	03-185-09					
Client ID:	EVANSMOU-20160318					
Copper	ND	1.0	200.8	3-22-16	3-22-16	
Zinc	ND	5.0	200.8	3-22-16	3-22-16	
Lab ID:	03-185-10					
Client ID:	EVANSMID-20160318					
Copper	ND	1.0	200.8	3-22-16	3-22-16	
Zinc	ND	5.0	200.8	3-22-16	3-22-16	
Lab ID:	03-185-11					
Client ID:	TOSHMOU-20160318					
Copper	1.4	1.0	200.8	3-22-16	3-22-16	
Zinc	7.0	5.0	200.8	3-22-16	3-22-16	
Lab ID:	03-185-12					
Client ID:	TOSHMID-20160318					
Copper	1.5	1.0	200.8	3-22-16	3-22-16	
Zinc	13	5.0	200.8	3-22-16	3-22-16	

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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-185-13					
Client ID:	COUNTRYMOU-20160318					
Copper	ND	1.0	200.8	3-22-16	3-22-16	
Zinc	6.4	5.0	200.8	3-22-16	3-22-16	

Lab ID:	03-185-14					
Client ID:	COUNTRYMID-20160318					
Copper	ND	1.0	200.8	3-22-16	3-22-16	
Zinc	12	5.0	200.8	3-22-16	3-22-16	

Date of Report: April 28, 2016
Samples Submitted: March 18, 2016
Laboratory Reference: 1603-185
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 3-22-16
Date Analyzed: 3-22-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0322WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0

Date of Report: April 28, 2016
Samples Submitted: March 18, 2016
Laboratory Reference: 1603-185
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 3-22-16
Date Analyzed: 3-22-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 03-185-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.40	1.59	13	1.0	
Zinc	11.1	12.0	8	5.0	

Date of Report: April 28, 2016
 Samples Submitted: March 18, 2016
 Laboratory Reference: 1603-185
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 3-22-16

Date Analyzed: 3-22-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 03-185-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	97.3	96	96.6	95	1	
Zinc	100	119	108	114	103	4	

Date of Report: April 28, 2016
 Samples Submitted: March 18, 2016
 Laboratory Reference: 1603-185
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 03-185-01						
Client ID: TYLERSMID-20160318						
Copper	1.4	1.0	200.8		3-23-16	
Zinc	ND	5.0	200.8		3-23-16	
Lab ID: 03-185-02						
Client ID: TYLERSMOU-20160318						
Copper	ND	1.0	200.8		3-23-16	
Zinc	9.4	5.0	200.8		3-23-16	
Lab ID: 03-185-03						
Client ID: COLINMID-20160318						
Copper	ND	1.0	200.8		3-23-16	
Zinc	ND	5.0	200.8		3-23-16	
Lab ID: 03-185-04						
Client ID: SEIDELMIDN-20160318						
Copper	ND	1.0	200.8		3-23-16	
Zinc	ND	5.0	200.8		3-23-16	
Lab ID: 03-185-05						
Client ID: MONTMIDN-20160318						
Copper	ND	1.0	200.8		3-23-16	
Zinc	ND	5.0	200.8		3-23-16	
Lab ID: 03-185-06						
Client ID: MONTMIDS-20160318						
Copper	ND	1.0	200.8		3-23-16	
Zinc	ND	5.0	200.8		3-23-16	

Date of Report: April 28, 2016
 Samples Submitted: March 18, 2016
 Laboratory Reference: 1603-185
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-185-07					
Client ID:	MONTMOU-20160318					
Copper	ND	1.0	200.8		3-23-16	
Zinc	9.1	5.0	200.8		3-23-16	
Lab ID:	03-185-08					
Client ID:	SEIDELMIDS-20160318					
Copper	ND	1.0	200.8		3-23-16	
Zinc	ND	5.0	200.8		3-23-16	
Lab ID:	03-185-09					
Client ID:	EVANSMOU-20160318					
Copper	ND	1.0	200.8		3-23-16	
Zinc	ND	5.0	200.8		3-23-16	
Lab ID:	03-185-10					
Client ID:	EVANSMID-20160318					
Copper	ND	1.0	200.8		3-23-16	
Zinc	ND	5.0	200.8		3-23-16	
Lab ID:	03-185-11					
Client ID:	TOSHMOU-20160318					
Copper	ND	1.0	200.8		3-23-16	
Zinc	5.1	5.0	200.8		3-23-16	
Lab ID:	03-185-12					
Client ID:	TOSHMID-20160318					
Copper	ND	1.0	200.8		3-23-16	
Zinc	12	5.0	200.8		3-23-16	

Date of Report: April 28, 2016
 Samples Submitted: March 18, 2016
 Laboratory Reference: 1603-185
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-185-13					
Client ID:	COUNTRYMOU-20160318					
Copper	ND	1.0	200.8		3-23-16	
Zinc	ND	5.0	200.8		3-23-16	

Lab ID:	03-185-14					
Client ID:	COUNTRYMID-20160318					
Copper	ND	1.0	200.8		3-23-16	
Zinc	10	5.0	200.8		3-23-16	

Date of Report: April 28, 2016
Samples Submitted: March 18, 2016
Laboratory Reference: 1603-185
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 3-23-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0322D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0

Date of Report: April 28, 2016
Samples Submitted: March 18, 2016
Laboratory Reference: 1603-185
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 3-23-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 03-185-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.43	1.22	16	1.0	
Zinc	ND	ND	NA	5.0	

Date of Report: April 28, 2016
 Samples Submitted: March 18, 2016
 Laboratory Reference: 1603-185
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 3-23-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 03-185-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	73.2	90	74.3	91	2	
Zinc	80.0	73.6	92	75.9	95	3	



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference



Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

Professional
Analytical
Services

May 10 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your Redmond Paired Watershed Study project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
TYLERSMID-20160318	Water	16-A004216	Micro, NUT
TYLERSMOU-20160318	Water	16-A004217	Micro, NUT
COLINMID-20160318	Water	16-A004218	Micro, NUT
SEIDELMIDN-20160318	Water	16-A004219	Micro, NUT
MONTMIDN-20160318	Water	16-A004220	Micro, NUT
MONTMIDS-20160318	Water	16-A004221	Micro, NUT
MONTMOU-20160318	Water	16-A004222	Micro, NUT
SEIDELMIDS-20160318	Water	16-A004223	Micro, NUT
EVANSMOU-20160318	Water	16-A004224	Micro, NUT
EVANSMID-20160318	Water	16-A004225	Micro, NUT
TOSHMOU-20160318	Water	16-A004226	Micro, NUT
TOSHMID-20160318	Water	16-A004227	Micro, NUT
COUNTRYMOU-20160318	Water	16-A004228	Micro, NUT
COUNTRYMID-20160318	Water	16-A004229	Micro, NUT

Your samples were received on Saturday, March 19, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 03-185

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



*Professional
Analytical
Services*

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Redmond Paired Watershed Study
Project #: 14-05806-000
PO Number: 03-185
All results reported on an as received basis.

Date Received: 03/19/16
Date Reported: 5/10/16

AMTEST Identification Number 16-A004216
Client Identification TYLERSMID-20160318
Sampling Date 03/18/16, 14:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	700	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.91	mg/l		0.1			
Total Nitrogen (TKN)	0.272	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.64	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004217
Client Identification TYLERSMOU-20160318
Sampling Date 03/18/16, 14:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	80.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.92	mg/l		0.1			
Total Nitrogen (TKN)	0.293	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.63	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004218
Client Identification COLINMID-20160318
Sampling Date 03/18/16, 13:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	26.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.28	mg/l		0.1			
Total Nitrogen (TKN)	0.246	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.037	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004219
Client Identification SEIDELMIDN-20160318
Sampling Date 03/18/16, 13:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	< 1	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.53	mg/l		0.1			
Total Nitrogen (TKN)	0.291	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.24	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004220
Client Identification MONTMIDN-20160318
Sampling Date 03/18/16, 12:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.42	mg/l		0.1			
Total Nitrogen (TKN)	0.223	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.20	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004221
Client Identification MONTMIDS-20160318
Sampling Date 03/18/16, 11:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	3.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.92	mg/l		0.1			
Total Nitrogen (TKN)	0.314	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.61	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004222
Client Identification MONTMOU-20160318
Sampling Date 03/18/16, 11:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	5.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.80	mg/l		0.1			
Total Nitrogen (TKN)	0.435	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.37	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004223
Client Identification SEIDELMIDS-20160318
Sampling Date 03/18/16, 10:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	11.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.60	mg/l		0.1			
Total Nitrogen (TKN)	0.323	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.28	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004224
Client Identification EVANSMOU-20160318
Sampling Date 03/18/16, 15:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	8.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	1.86	mg/l		0.1			
Total Nitrogen (TKN)	0.363	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	1.5	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004225
Client Identification EVANSMID-20160318
Sampling Date 03/18/16, 15:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	66.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	2.22	mg/l		0.1			
Total Nitrogen (TKN)	0.224	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	2.0	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004226
Client Identification TOSHMOU-20160318
Sampling Date 03/18/16, 15:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	51.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.86	mg/l		0.1			
Total Nitrogen (TKN)	0.304	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.56	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number **16-A004227**
Client Identification **TOSH MID-20160318**
Sampling Date **03/18/16, 16:10**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	49.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	1.03	mg/l		0.1			
Total Nitrogen (TKN)	0.160	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	0.87	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number **16-A004228**
Client Identification **COUNTRYMOU-20160318**
Sampling Date **03/18/16, 16:30**

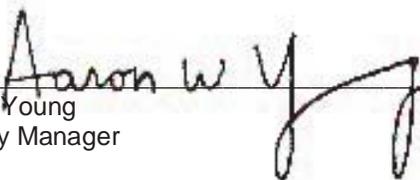
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	44.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	5.99	mg/l		0.1			
Total Nitrogen (TKN)	5.46	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	0.53	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004229
Client Identification COUNTRYMID-20160318
Sampling Date 03/18/16, 16:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	91.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.47	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	0.47	mg/l		0.01	SM4500NO3	JR	03/24/16



Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A004216 to 16-A004229

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A003530	Total Nitrogen (TKN)	mg/l	0.428	0.481	12.
16-A003641	Total Nitrogen (TKN)	mg/l	0.604	0.618	2.3
16-A002917	Total Nitrogen (TKN)	mg/l	3.44	3.14	9.1
16-A003717	Total Nitrogen (TKN)	mg/l	0.118	0.148	23.
16-A003936	Total Nitrogen (TKN)	mg/l	0.168	0.178	5.8
16-A004225	Total Nitrogen (TKN)	mg/l	0.224	0.306	31.
16-A004356	Total Nitrogen (TKN)	mg/l	4.16	4.00	3.9
16-A004075	Nitrate + Nitrite	mg/l	0.50	0.50	0.00
16-A004225	Nitrate + Nitrite	mg/l	2.0	1.9	5.1
16-A004425	Nitrate + Nitrite	mg/l	0.16	0.15	6.5

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A003530	Total Nitrogen (TKN)	mg/l	0.428	0.895	0.500	93.40 %
16-A002917	Total Nitrogen (TKN)	mg/l	3.44	8.31	5.00	97.40 %
16-A003936	Total Nitrogen (TKN)	mg/l	0.168	0.479	0.500	62.20 %
16-A004225	Total Nitrogen (TKN)	mg/l	0.224	0.669	0.500	89.00 %
16-A004356	Total Nitrogen (TKN)	mg/l	4.16	5.04	1.00	88.00 %
16-A004906	Total Nitrogen (TKN)	mg/l	0.264	0.981	0.500	143.40 %
16-A004075	Nitrate + Nitrite	mg/l	0.50	1.0	0.50	100.00 %
16-A004225	Nitrate + Nitrite	mg/l	2.0	2.5	0.50	100.00 %
16-A004425	Nitrate + Nitrite	mg/l	0.16	0.65	0.50	98.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.523	105. %
Total Nitrogen (TKN)	mg/l	0.500	0.517	103. %
Total Nitrogen (TKN)	mg/l	0.500	0.535	107. %
Total Nitrogen (TKN)	mg/l	0.500	0.510	102. %
Total Nitrogen (TKN)	mg/l	0.500	0.517	103. %
Total Nitrogen (TKN)	mg/l	0.500	0.529	106. %
Total Nitrogen (TKN)	mg/l	0.500	0.551	110. %
Total Nitrogen (TKN)	mg/l	0.500	0.544	109. %
Total Nitrogen (TKN)	mg/l	0.500	0.546	109. %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %

QC Summary for sample numbers: 16-A004216 to 16-A004229...

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.02
Nitrate + Nitrite	mg/l	< 0.02



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 03-185

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	TYLERSMID-20160318 4216	3/18/16	14:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
2	TYLERSMOU-20160318 17	3/18/16	14:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
3	COLINMID-20160318 18	3/18/16	13:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
4	SEIDELMIDN-20160318 19	3/18/16	13:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
5	MONTMIDN-20160318 20	3/18/16	12:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
6	MONTMIDS-20160318 21	3/18/16	11:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
7	MONTMOU-20160318 22	3/18/16	11:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
8	SEIDELMIDS-20160318 23	3/18/16	10:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
9	EVANSMOU-20160318 24	3/18/16	15:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
10	EVANSMID-20160318 25	3/18/16	15:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
Signature		Company	Date	Time	Comments/Special Instructions	
Relinquished by:		OnSite Env	3/18/16	7:45	EDDs - CSV T=5.0°C Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L	
Received by:		AmTest	3/19/16	10:10		
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						



Am Test Inc.
 13600 NE 126TH PL
 Suite C
 Kirkland, WA 98034
 (425) 885-1664

**Professional
 Analytical
 Services**

May 10 2016
 On-Site Environmental
 14648 NE 95th ST
 Redmond, WA 98052
 Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your Redmond Paired Watershed Study project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
TYLERSMID-20160318	Water	16-A004216	Micro, NUT
TYLERSMOU-20160318	Water	16-A004217	Micro, NUT
COLINMID-20160318	Water	16-A004218	Micro, NUT
SEIDELMIDN-20160318	Water	16-A004219	Micro, NUT
MONTMIDN-20160318	Water	16-A004220	Micro, NUT
MONTMIDS-20160318	Water	16-A004221	Micro, NUT
MONTMOU-20160318	Water	16-A004222	Micro, NUT
SEIDELMIDS-20160318	Water	16-A004223	Micro, NUT
EVANSMOU-20160318	Water	16-A004224	Micro, NUT
EVANSMID-20160318	Water	16-A004225	Micro, NUT
TOSHMOU-20160318	Water	16-A004226	Micro, NUT
TOSHMID-20160318	Water	16-A004227	Micro, NUT
COUNTRYMOU-20160318	Water	16-A004228	Micro, NUT
COUNTRYMID-20160318	Water	16-A004229	Micro, NUT

Your samples were received on Saturday, March 19, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


 Aaron W. Young
 Laboratory Manager

Project #: 14-05806-000
 PO Number: 03-185

BACT = Bacteriological
 CONV = Conventionals

MET = Metals
 ORG = Organics

NUT=Nutrients
 DEM=Demand

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



Professional
Analytical
Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Redmond Paired Watershed Study
Project #: 14-05806-000
PO Number: 03-185
All results reported on an as received basis.

Date Received: 03/19/16
Date Reported: 5/10/16

AMTEST Identification Number 16-A004216
Client Identification TYLERSMID-20160318
Sampling Date 03/18/16, 14:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	700	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.91	mg/l		0.1			
Total Nitrogen (TKN)	0.272	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.64	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004217
Client Identification TYLERSMOU-20160318
Sampling Date 03/18/16, 14:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	80.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.92	mg/l		0.1			
Total Nitrogen (TKN)	0.293	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.63	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004218
Client Identification COLINMID-20160318
Sampling Date 03/18/16, 13:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	26.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.28	mg/l		0.1			
Total Nitrogen (TKN)	0.246	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.037	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004219
Client Identification SEIDELMIDN-20160318
Sampling Date 03/18/16, 13:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	< 1	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.53	mg/l		0.1			
Total Nitrogen (TKN)	0.291	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.24	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004220
Client Identification MONTMIDN-20160318
Sampling Date 03/18/16, 12:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.42	mg/l		0.1			
Total Nitrogen (TKN)	0.223	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.20	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004221
Client Identification MONTMIDS-20160318
Sampling Date 03/18/16, 11:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	3.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.92	mg/l		0.1			
Total Nitrogen (TKN)	0.314	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.61	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004222
Client Identification MONTMOU-20160318
Sampling Date 03/18/16, 11:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	5.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.80	mg/l		0.1			
Total Nitrogen (TKN)	0.435	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.37	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004223
Client Identification SEIDELMIDS-20160318
Sampling Date 03/18/16, 10:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	11.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.60	mg/l		0.1			
Total Nitrogen (TKN)	0.323	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.28	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004224
Client Identification EVANSMOU-20160318
Sampling Date 03/18/16, 15:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	8.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	1.86	mg/l		0.1			
Total Nitrogen (TKN)	0.363	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	1.5	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004225
Client Identification EVANSMID-20160318
Sampling Date 03/18/16, 15:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	66.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	2.22	mg/l		0.1			
Total Nitrogen (TKN)	0.224	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	2.0	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004226
Client Identification TOSHMOU-20160318
Sampling Date 03/18/16, 15:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	51.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.86	mg/l		0.1			
Total Nitrogen (TKN)	0.304	mg/l		0.1	SM4500N	JR	03/28/16
Nitrate + Nitrite	0.56	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004227
Client Identification TOSH MID-20160318
Sampling Date 03/18/16, 16:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	49.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	1.03	mg/l		0.1			
Total Nitrogen (TKN)	0.160	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	0.87	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004228
Client Identification COUNTRYMOU-20160318
Sampling Date 03/18/16, 16:30

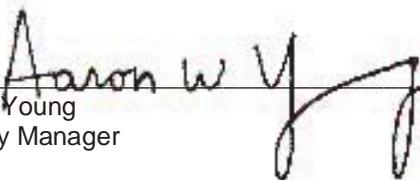
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	44.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	5.99	mg/l		0.1			
Total Nitrogen (TKN)	5.46	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	0.53	mg/l		0.01	SM4500NO3	JR	03/24/16

AMTEST Identification Number 16-A004229
Client Identification COUNTRYMID-20160318
Sampling Date 03/18/16, 16:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	91.	CFU/100 ml		1	SM 9222D	KF	03/19/16
Total Nitrogen (NOX&TKN)	0.47	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	0.47	mg/l		0.01	SM4500NO3	JR	03/24/16



Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A004216 to 16-A004229

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A003530	Total Nitrogen (TKN)	mg/l	0.428	0.481	12.
16-A003641	Total Nitrogen (TKN)	mg/l	0.604	0.618	2.3
16-A002917	Total Nitrogen (TKN)	mg/l	3.44	3.14	9.1
16-A003717	Total Nitrogen (TKN)	mg/l	0.118	0.148	23.
16-A003936	Total Nitrogen (TKN)	mg/l	0.168	0.178	5.8
16-A004225	Total Nitrogen (TKN)	mg/l	0.224	0.306	31.
16-A004356	Total Nitrogen (TKN)	mg/l	4.16	4.00	3.9
16-A004075	Nitrate + Nitrite	mg/l	0.50	0.50	0.00
16-A004225	Nitrate + Nitrite	mg/l	2.0	1.9	5.1
16-A004425	Nitrate + Nitrite	mg/l	0.16	0.15	6.5

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A003530	Total Nitrogen (TKN)	mg/l	0.428	0.895	0.500	93.40 %
16-A002917	Total Nitrogen (TKN)	mg/l	3.44	8.31	5.00	97.40 %
16-A003936	Total Nitrogen (TKN)	mg/l	0.168	0.479	0.500	62.20 %
16-A004225	Total Nitrogen (TKN)	mg/l	0.224	0.669	0.500	89.00 %
16-A004356	Total Nitrogen (TKN)	mg/l	4.16	5.04	1.00	88.00 %
16-A004906	Total Nitrogen (TKN)	mg/l	0.264	0.981	0.500	143.40 %
16-A004075	Nitrate + Nitrite	mg/l	0.50	1.0	0.50	100.00 %
16-A004225	Nitrate + Nitrite	mg/l	2.0	2.5	0.50	100.00 %
16-A004425	Nitrate + Nitrite	mg/l	0.16	0.65	0.50	98.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.523	105. %
Total Nitrogen (TKN)	mg/l	0.500	0.517	103. %
Total Nitrogen (TKN)	mg/l	0.500	0.535	107. %
Total Nitrogen (TKN)	mg/l	0.500	0.510	102. %
Total Nitrogen (TKN)	mg/l	0.500	0.517	103. %
Total Nitrogen (TKN)	mg/l	0.500	0.529	106. %
Total Nitrogen (TKN)	mg/l	0.500	0.551	110. %
Total Nitrogen (TKN)	mg/l	0.500	0.544	109. %
Total Nitrogen (TKN)	mg/l	0.500	0.546	109. %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %

QC Summary for sample numbers: 16-A004216 to 16-A004229...

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.02
Nitrate + Nitrite	mg/l	< 0.02



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th Pl Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 03-185

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	TYLERSMID-20160318 4216	3/18/16	14:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
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3	COLINMID-20160318 18	3/18/16	13:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
4	SEIDELMIDN-20160318 19	3/18/16	13:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
5	MONTMIDN-20160318 20	3/18/16	12:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
6	MONTMIDS-20160318 21	3/18/16	11:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
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9	EVANSMOU-20160318 24	3/18/16	15:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
10	EVANSMID-20160318 25	3/18/16	15:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B

Signature	Company	Date	Time	Comments/Special Instructions
	OnSite Env	3/18/16	7:45	EDDs - CSV T=5.0°C Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:	AmTest	3/19/16	10:10	
Relinquished by:				
Received by:				
Relinquished by:				



CHAIN OF CUSTODY

14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants

Project No.: 14-05806-000

Project Name: Redmond Paired Watershed Study

Project Manager: George Itfner

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No. **03-185**

Requested Analyses

Total Suspended Solids	Turbidity	Hardness	Dissolved Organ Carbon*	Fecal Coliform	Total Phosphorus	Total Nitrogen	Total Cu and Zn	Dissolved Cu and Zn*										
------------------------	-----------	----------	-------------------------	----------------	------------------	----------------	-----------------	----------------------	--	--	--	--	--	--	--	--	--	--

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids	Turbidity	Hardness	Dissolved Organ Carbon*	Fecal Coliform	Total Phosphorus	Total Nitrogen	Total Cu and Zn	Dissolved Cu and Zn*				
1	TYLERS MID-20160318	3/18/16	14:30	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
2	TYLERS MOW-20160318		14:15	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
3	COLIN MID-20160318		13:30	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
4	SEIDEL MIDN-20160318		13:00	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
5	MONT MIDN-20160318		12:10	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
6	MONT MIDS-20160318		11:40	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
7	MONT MOW-20160318		11:15	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
8	SEIDEL MIDS-20160318		10:15	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
9	EVANS MOW-20160318		15:15	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
10	EVANS MID-20160318		15:25	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
11	TOSH MOW-20160318		15:50	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
12	TOSH MID-20160318		16:10	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
13	COUNTRY MOW-20160318		16:30	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				
14	COUNTRY MID-20160318		16:45	Water	7	✓	✓	✓	✓	✓	✓	✓	✓	✓				

Relinquished by manu/w Date 3/18/16 Received by [Signature] Date 3/18/16
 Firm Herrera Time 17:05 Firm OSE Time 1205
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A Svendsen, G. Iftner

Sample Date: 3/18/2016

Sample Time: 14:30

PDT:

SITE

ID: Tyler's mid

Base Flow or Storm Event? Base

Field Filtered Time: 14:35

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 52°F

Water Quality Sampling

Sample ID: TYLERSMID-20160318

(TYLMI)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: John Lenth

Signature: [Signature]

Date Checked: 3-16-16

Time: 16:30

Data Entered into Database? _____

YES

NO

initials: _____

Date Entered: _____

Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.54117

Reference Point (description): top of culvert down

Water Quality Measurements

Temperature (°C) 9.9

Conductivity (µs/cm) 169

Dissolved Oxygen (mg/L) 10.9

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Winer

Sample Date: 3/18/2010

Sample Time: 14:15

PDT:

SITE

ID: Tylersmou

Base Flow or Storm Event? Base

Field Filtered Time: 14:20

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 35°F

Water Quality Sampling

Sample ID: TYLERSMOU-20100318

(TYLMO)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]

Date Checked: 3-6-10 Time: 16:30

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.833

Reference Point (description): down from top of culvert

Water Quality Measurements

Temperature (°C) 9.6

Conductivity (µs/cm) 1160

Dissolved Oxygen (mg/L) 11.82

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Auer

Sample Date: 3/18/2010

Sample Time: 13:30

PDT:

SITE ID: COLINMID

Base Flow or Storm Event? Base

Field Filtered Time: 13:35

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny & 55°F

Water Quality Sampling
Sample ID: COLINMID-20100318 (COLM)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank	

Visual and Olfactory Conditions:

Clarity:	<u>clear</u>
Color:	<u>colorless</u>
Odor:	<u>odorless</u>
Sheen:	<u>NA</u>
Floatables:	<u>NA</u>

LABORATORY DELIVERY

Date:	Time:

Quality Assurance

Checked By: <u>John Leuth</u>	Signature: <u>[Signature]</u>
Date Checked: <u>3-18-10</u>	Time: <u>16:30</u>
Data Entered into Database?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> initials:
Date Entered:	Time:
Notes:	

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): No measurement - waiting for staff gauge to be installed
Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 7.1
Conductivity (µs/cm) 210
Dissolved Oxygen (mg/L) 11.50

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iftner

Sample Date: 3/18/2016

Sample Time: 13:00

PDT:

SITE

ID: SEIDELMIDN

Base Flow or Storm Event? Base

Field Filtered Time: 13:05

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 52°F

Water Quality Sampling

Sample ID: SEIDELMIDN-20160318

(SEIMN)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.72917

Reference Point (description): top of bolt down to water

Water Quality Measurements

Temperature (°C) 7.4

Conductivity (µs/cm) 112

Dissolved Oxygen (mg/L) 11.6

Quality Assurance

Checked By: John Lenth

Signature: [Signature]

Date Checked: 3-6-16

Time: 10:30

Data Entered into Database?

YES

NO

initials: _____

Date Entered: _____

Time: _____

Notes: _____

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Aher

Sample Date: 3/18/2016

Sample Time: 12:10

PDT:

SITE ID: MONTMIDN

Base Flow or Storm Event? Base

Field Filtered Time: 12:15

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Water Quality Sampling

Sample ID: MONTMIDN-20160318

(MONTMIDN)

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 55°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank	

Visual and Olfactory Conditions:

Clarity:	<u>clear</u>
Color:	<u>colorless</u>
Odor:	<u>odorless</u>
Sheen:	<u>NA</u>
Floatables:	<u>NA</u>

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]

Date Checked: 3-6-16 Time: 10:30

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.03125

Reference Point (description): up from bottom of bolt

Water Quality Measurements

Temperature (°C) 8.3

Conductivity (µs/cm) 119

Dissolved Oxygen (mg/L) 12.08

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iftner

Sample Date: 3/18/2016

Sample Time: 11:40

PDT:

SITE ID: MONTMIDS

Base Flow or Storm Event? Base

Field Filtered Time: 11:45

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY, 52°F

Water Quality Sampling

Sample ID: MONTMIDS-20160318

(MONMIDS)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank	

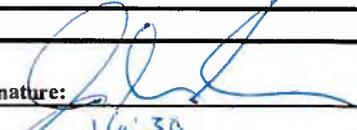
Visual and Olfactory Conditions:

Clarity:	<u>clear</u>
Color:	<u>colorless</u>
Odor:	<u>odorless</u>
Sheen:	<u>NA</u>
Floatables:	<u>NA</u>

LABORATORY DELIVERY

Date:	Time:

Quality Assurance

Checked By: <u>John Lenth</u>	Signature: 
Date Checked: <u>3-23-16</u>	Time: <u>16:30</u>
Data Entered into Database?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> initials:
Date Entered:	Time:
Notes:	

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.79

Reference Point (description): down from top of PVC in vault

Water Quality Measurements

Temperature (°C) 6.6

Conductivity (µs/cm) 259

Dissolved Oxygen (mg/L) 10.41

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iftner

Sample Date: 3/18/2016

Sample Time: 11:15

PDT:

SITE ID: MONTMOU

Base Flow or Storm Event? Base

Field Filtered Time: 11:20

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 52°F

Water Quality Sampling

Sample ID: MONTMOU-20160318

(MONTMOU)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: colorless

Odor: odorless

Sheen: NA

Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]

Date Checked: 3-6-16 Time: 16:50

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.45833

Reference Point (description): top of culvert to water surface

Water Quality Measurements

Temperature (°C) 6.6

Conductivity (µs/cm) 170

Dissolved Oxygen (mg/L) 12.80

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iftner

Sample Date: 3/18/2016

Sample Time: 10:15

PDT:

SITE

ID: SEIDELMIDS

Base Flow or Storm Event? Base

Field Filtered Time: 10:25

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 52° F

Water Quality Sampling

Sample ID: SEIDELMIDS - 20160318

(SEIMIS)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: colorless

Odor: odorless

Sheen: NA

Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leath Signature: [Signature]

Date Checked: 3-16-16 Time: 10:25

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.72917

Reference Point (description): from top of bolt down

Water Quality Measurements

Temperature (°C) 6.0

Conductivity (µs/cm) 94

Dissolved Oxygen (mg/L) 11.90

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iftner

Sample Date: 3/18/2010

Sample Time: 15:15

PDT:

SITE ID: EVANSMOU

Base Flow or Storm Event? base

Field Filtered Time: 15:20

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY, 55°F

Water Quality Sampling

Sample ID: EVANSMOU-20100318

(EVALSS)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank	

Visual and Olfactory Conditions:

Clarity:	<u>clear</u>
Color:	<u>colorless</u>
Odor:	<u>odorless</u>
Sheen:	<u>NA</u>
Floatables:	<u>NA</u>

LABORATORY DELIVERY

Date:	Time:

Quality Assurance

Checked By: <u>John Lentz</u>	Signature: <u>[Signature]</u>
Date Checked: <u>3-6-10</u>	Time: <u>16:35</u>
Data Entered into Database?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> initials:
Date Entered:	Time:
Notes:	

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.68

Reference Point (description): w/ water level indicator

Water Quality Measurements

Temperature (°C) 8.8

Conductivity (µs/cm) 172

Dissolved Oxygen (mg/L) 11.48

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A Svendsen, G. Pfner

Sample Date: 3/18/2010

Sample Time: 15:25

PDT:

SITE ID: EVANSMID

Base Flow or Storm Event? Base

Field Filtered Time: 15:30

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 55°F

Water Quality Sampling

Sample ID: EVANSMID-20100318

(EVAMS)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank	

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.20833

Reference Point (description): down from top of fence post

Water Quality Measurements

Temperature (°C) 9.2

Conductivity (µs/cm) 187

Dissolved Oxygen (mg/L) 11.12

Quality Assurance

Checked By: John Lentz Signature: _____

Date Checked: 3-16-10 Time: 16:35

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iffner

Sample Date: 3/18/2016

Sample Time: 15:50

PDT:

SITE

ID: TOSHM0U

Base Flow or Storm Event? Base

Field Filtered Time: 15:55

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 55°F

Water Quality Sampling

Sample ID: TOSHM0U-20160318

(TOSMO)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank	

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date:	Time:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.45833

Reference Point (description): down from steel pin

Water Quality Measurements

Temperature (°C) 9.2

Conductivity (µs/cm) 231

Dissolved Oxygen (mg/L) 11.58

Quality Assurance

Checked By: <u>S. Van Leuven</u>	Signature: <u>[Signature]</u>
Date Checked: <u>3-16-16</u>	Time: <u>16:35</u>
Data Entered into Database?	YES NO initials:
Date Entered:	Time:
Notes:	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Ihner

Sample Date: 3/18/16

Sample Time: 16:10

PDT:

SITE ID: TOSH MID

Base Flow or Storm Event? Base

Field Filtered Time: 16:15

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 55°

Water Quality Sampling

Sample ID: TOSH MID-20160318

(TOSM I)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]

Date Checked: 3-16-16 Time: 16:55

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.25521

Reference Point (description): down from bottom of bank

Water Quality Measurements

Temperature (°C) 9.4

Conductivity (µs/cm) 212

Dissolved Oxygen (mg/L) 11.17

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Ithner

Sample Date: 3/18/2016

Sample Time: 16:30

PDT:

SITE ID: COUNTRY MOUNTAIN

Base Flow or Storm Event? BASE

Field Filtered Time: 16:35

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 55°F

Water Quality Sampling

Sample ID: COUNTRY MOUNTAIN-20160318 (COUNTRY MOUNTAIN)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lamb Signature: [Signature]

Date Checked: 3-6-16 Time: 16:35

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1

Reference Point (description): from top of steel pin, down

Water Quality Measurements

Temperature (°C) 8.8

Conductivity (µs/cm) 242

Dissolved Oxygen (mg/L) 11.24

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svedsen, G. Iffner

Sample Date: 3/18/2016

Sample Time: 16:45

PDT:

SITE ID: COUNTRYMID

Base Flow or Storm Event? Base

Field Filtered Time: 16:50

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 55° F

Water Quality Sampling

Sample ID: COUNTRYMID-20160318 (COUNM1)

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: [Signature]

Date Checked: 3-16-16 Time: 16:35

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.29117

Reference Point (description): down from steel pin

Water Quality Measurements

Temperature (°C) 8.8

Conductivity (µs/cm) ~~256~~

Dissolved Oxygen (mg/L) 11.46



Data Quality Assurance Worksheet

G

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 4/27/2016 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials
JL

Sample Date/Sample ID: 3/18/2016 / All sites

date 5/23/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	4	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	100	±20	8.7	≤25	NS	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1.1	≤25	NS	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	5	≤180	≤1.0 mg/L 1.0 mg/L	101,101	±25	102	±15	1.7 0(MS)	≤20	NS	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	3	≤28	≤1.0 mg/L 1.0 mg/L	111	±25	105	±15	0.4	≤20	NS	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	4	≤28	≤0.01 mg/L 0.01 mg/L	113	±25	102	±20	8	≤20	NS	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	6,10, 35	≤28	≤0.1 mg/L 0.1 mg/L	89-100	±25	102-110	±20	5.1 D=0.01, 0.082	≤20	NS	≤20	OK	SAMPLES TOSH MID, COUNTRYMOU, COUNTRYMID FLAG "J" DUE TO HOLDING TIME.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 4/27/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials
JL

Sample Date/Sample ID: 3/18/2016 / All sites

date 5/23/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	4	≤180	≤1.0 µg/L 1.0 µg/L	96,96	±25	NR	±15	13 1 (MS)	≤20	NS	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	4	≤180	≤5.0 µg/L 5.0 µg/L	108,103	±25	NR	±15	8 4 (MS)	≤20	NS	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	5	≤180	≤1.0 µg/L 1.0 µg/L	90,91	±25	NR	±15	16 2(MS)	≤20	NS	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	5	≤180	≤5.0 µg/L 5.0 µg/L	92,95	±25	NR	±15	NA 3 (MS)	≤20	NS	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	NA	≤35	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

April 28, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1603-275

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on March 31, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: April 28, 2016
Samples Submitted: March 31, 2016
Laboratory Reference: 1603-275
Project: 14-05806-000

Case Narrative

Samples were collected on March 31, 2016 and received by the laboratory on March 31, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160331					
Laboratory ID:	03-275-01					
Total Suspended Solids	1.4	1.0	SM 2540D	4-4-16	4-5-16	
Client ID:	COUMI-20160331					
Laboratory ID:	03-275-02					
Total Suspended Solids	5.4	1.0	SM 2540D	4-4-16	4-5-16	
Client ID:	COUMO-20160331					
Laboratory ID:	03-275-03					
Total Suspended Solids	4.8	1.0	SM 2540D	4-4-16	4-5-16	
Client ID:	EVAMS-20160331					
Laboratory ID:	03-275-04					
Total Suspended Solids	9.0	1.0	SM 2540D	4-4-16	4-5-16	
Client ID:	EVALSS-20160331					
Laboratory ID:	03-275-05					
Total Suspended Solids	7.0	1.0	SM 2540D	4-4-16	4-5-16	
Client ID:	MONMN-20160331					
Laboratory ID:	03-275-06					
Total Suspended Solids	2.2	1.0	SM 2540D	4-4-16	4-5-16	
Client ID:	MONMS-20160331					
Laboratory ID:	03-275-07					
Total Suspended Solids	1.4	1.0	SM 2540D	4-4-16	4-5-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160331					
Laboratory ID:	03-275-08					
Total Suspended Solids	1.8	1.0	SM 2540D	4-4-16	4-5-16	

Client ID:	SEIMN-20160331					
Laboratory ID:	03-275-09					
Total Suspended Solids	5.2	1.0	SM 2540D	4-4-16	4-5-16	

Client ID:	SEIMS-20160331					
Laboratory ID:	03-275-10					
Total Suspended Solids	6.2	1.0	SM 2540D	4-4-16	4-5-16	

Client ID:	TOSMI-20160331					
Laboratory ID:	03-275-11					
Total Suspended Solids	5.4	1.0	SM 2540D	4-4-16	4-5-16	

Client ID:	TOSMO-20160331					
Laboratory ID:	03-275-12					
Total Suspended Solids	4.0	1.0	SM 2540D	4-4-16	4-5-16	

Client ID:	TYLMI-20160331					
Laboratory ID:	03-275-13					
Total Suspended Solids	3.2	1.0	SM 2540D	4-4-16	4-5-16	

Client ID:	TYLMO-20160331					
Laboratory ID:	03-275-14					
Total Suspended Solids	1.8	1.0	SM 2540D	4-4-16	4-5-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA1-20160331					
Laboratory ID:	03-275-15					
Total Suspended Solids	1.6	1.0	SM 2540D	4-4-16	4-5-16	

Client ID:	QA2-20160331					
Laboratory ID:	03-275-16					
Total Suspended Solids	1.2	1.0	SM 2540D	4-4-16	4-5-16	

Client ID:	QA4-20160331					
Laboratory ID:	03-275-18					
Total Suspended Solids	ND	1.0	SM 2540D	4-4-16	4-5-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0404W1					
Total Suspended Solids	ND	1.0	SM 2540D	4-4-16	4-5-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-275-12							
	ORIG	DUP						
Total Suspended Solids	4.00	4.40	NA	NA	NA	10	17	

SPIKE BLANK								
Laboratory ID:	SB0404W1							
	SB	SB		SB				
Total Suspended Solids	91.0	100	NA	91	75-114	NA	NA	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160331					
Laboratory ID:	03-275-01					
Turbidity	1.2	0.10	EPA 180.1	4-1-16	4-1-16	
Client ID:	COUMI-20160331					
Laboratory ID:	03-275-02					
Turbidity	2.7	0.10	EPA 180.1	4-1-16	4-1-16	
Client ID:	COUMO-20160331					
Laboratory ID:	03-275-03					
Turbidity	3.3	0.10	EPA 180.1	4-1-16	4-1-16	
Client ID:	EVAMS-20160331					
Laboratory ID:	03-275-04					
Turbidity	1.8	0.10	EPA 180.1	4-1-16	4-1-16	
Client ID:	EVALSS-20160331					
Laboratory ID:	03-275-05					
Turbidity	2.0	0.10	EPA 180.1	4-1-16	4-1-16	
Client ID:	MONMN-20160331					
Laboratory ID:	03-275-06					
Turbidity	2.2	0.10	EPA 180.1	4-1-16	4-1-16	
Client ID:	MONMS-20160331					
Laboratory ID:	03-275-07					
Turbidity	1.7	0.10	EPA 180.1	4-1-16	4-1-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160331					
Laboratory ID:	03-275-08					
Turbidity	1.2	0.10	EPA 180.1	4-1-16	4-1-16	

Client ID:	SEIMN-20160331					
Laboratory ID:	03-275-09					
Turbidity	2.3	0.10	EPA 180.1	4-1-16	4-1-16	

Client ID:	SEIMS-20160331					
Laboratory ID:	03-275-10					
Turbidity	2.0	0.10	EPA 180.1	4-1-16	4-1-16	

Client ID:	TOSMI-20160331					
Laboratory ID:	03-275-11					
Turbidity	2.2	0.10	EPA 180.1	4-1-16	4-1-16	

Client ID:	TOSMO-20160331					
Laboratory ID:	03-275-12					
Turbidity	1.3	0.10	EPA 180.1	4-1-16	4-1-16	

Client ID:	TYLMI-20160331					
Laboratory ID:	03-275-13					
Turbidity	2.3	0.10	EPA 180.1	4-1-16	4-1-16	

Client ID:	TYLMO-20160331					
Laboratory ID:	03-275-14					
Turbidity	2.0	0.10	EPA 180.1	4-1-16	4-1-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA1-20160331					
Laboratory ID:	03-275-15					
Turbidity	2.3	0.10	EPA 180.1	4-1-16	4-1-16	

Client ID:	QA2-20160331					
Laboratory ID:	03-275-16					
Turbidity	2.1	0.10	EPA 180.1	4-1-16	4-1-16	

Client ID:	QA4-20160331					
Laboratory ID:	03-275-18					
Turbidity	0.55	0.10	EPA 180.1	4-1-16	4-1-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0401W1					
Turbidity	ND	0.10	EPA 180.1	4-1-16	4-1-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-275-01							
	ORIG	DUP						
Turbidity	1.17	1.16	NA	NA	NA	NA	1	15



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

HARDNESS
EPA 6010C/SM2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160331					
Laboratory ID:	03-275-01					
Hardness	8.8	1.0	200.7/SM 2340B	4-6-16	4-7-16	
Client ID:	COUMI-20160331					
Laboratory ID:	03-275-02					
Hardness	130	10	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	COUMO-20160331					
Laboratory ID:	03-275-03					
Hardness	120	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	EVAMS-20160331					
Laboratory ID:	03-275-04					
Hardness	87	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	EVALSS-20160331					
Laboratory ID:	03-275-05					
Hardness	80	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	MONMN-20160331					
Laboratory ID:	03-275-06					
Hardness	55	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	MONMS-20160331					
Laboratory ID:	03-275-07					
Hardness	110	5.0	200.7/SM 2340B	4-6-16	4-6-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

HARDNESS
EPA 6010C/SM2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160331					
Laboratory ID:	03-275-08					
Hardness	78	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	SEIMN-20160331					
Laboratory ID:	03-275-09					
Hardness	26	1.0	200.7/SM 2340B	4-6-16	4-7-16	
Client ID:	SEIMS-20160331					
Laboratory ID:	03-275-10					
Hardness	43	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	TOSMI-20160331					
Laboratory ID:	03-275-11					
Hardness	130	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	TOSMO-20160331					
Laboratory ID:	03-275-12					
Hardness	110	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	TYLMI-20160331					
Laboratory ID:	03-275-13					
Hardness	74	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	TYLMO-20160331					
Laboratory ID:	03-275-14					
Hardness	75	5.0	200.7/SM 2340B	4-6-16	4-6-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

HARDNESS
EPA 6010C/SM2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA1-20160331					
Laboratory ID:	03-275-15					
Hardness	76	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	QA2-20160331					
Laboratory ID:	03-275-16					
Hardness	76	5.0	200.7/SM 2340B	4-6-16	4-6-16	
Client ID:	QA4-20160331					
Laboratory ID:	03-275-18					
Hardness	ND	1.0	200.7/SM 2340B	4-6-16	4-7-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

HARDNESS
EPA 6010C/SM2340B
QUALITY CONTROL

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0406WH1					
Hardness	ND	1.0	200.7/SM 2340B	4-6-16	4-6-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-275-02							
	ORIG	DUP						
Hardness	134	133	NA	NA	NA	NA	1	20

MATRIX SPIKES

Laboratory ID:	03-275-02									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	298	287	132	132	134	124	116	75-125	4	20

SPIKE BLANK

Laboratory ID:	SB0406WH1								
	SB		SB		SB				
Hardness	130		132		98		80-120	NA	NA



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160331					
Laboratory ID:	03-275-01					
Dissolved Organic Carbon	11	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	COUMI-20160331					
Laboratory ID:	03-275-02					
Dissolved Organic Carbon	3.6	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	COUMO-20160331					
Laboratory ID:	03-275-03					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	EVAMS-20160331					
Laboratory ID:	03-275-04					
Dissolved Organic Carbon	3.8	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	EVALSS-20160331					
Laboratory ID:	03-275-05					
Dissolved Organic Carbon	3.4	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	MONMN-20160331					
Laboratory ID:	03-275-06					
Dissolved Organic Carbon	3.7	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	MONMS-20160331					
Laboratory ID:	03-275-07					
Dissolved Organic Carbon	6.6	1.0	SM 5310B	4-6-16	4-6-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160331					
Laboratory ID:	03-275-08					
Dissolved Organic Carbon	3.8	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	SEIMN-20160331					
Laboratory ID:	03-275-09					
Dissolved Organic Carbon	5.9	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	SEIMS-20160331					
Laboratory ID:	03-275-10					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	TOSMI-20160331					
Laboratory ID:	03-275-11					
Dissolved Organic Carbon	3.6	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	TOSMO-20160331					
Laboratory ID:	03-275-12					
Dissolved Organic Carbon	3.0	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	TYLMI-20160331					
Laboratory ID:	03-275-13					
Dissolved Organic Carbon	4.8	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	TYLMO-20160331					
Laboratory ID:	03-275-14					
Dissolved Organic Carbon	4.0	1.0	SM 5310B	4-6-16	4-6-16	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA1-20160331					
Laboratory ID:	03-275-15					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	QA2-20160331					
Laboratory ID:	03-275-16					
Dissolved Organic Carbon	4.3	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	QA3-20160331					
Laboratory ID:	03-275-17					
Dissolved Organic Carbon	ND	1.0	SM 5310B	4-6-16	4-6-16	
Client ID:	QA4-20160331					
Laboratory ID:	03-275-18					
Dissolved Organic Carbon	ND	1.0	SM 5310B	4-6-16	4-6-16	



Date of Report: April 28, 2016
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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0406D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	4-6-16	4-6-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-275-01							
	ORIG	DUP						
Dissolved Organic Carbon	10.7	11.0	NA	NA	NA	3	20	

MATRIX SPIKE

Laboratory ID:	03-275-01							
	MS	MS		MS				
Dissolved Organic Carbon	21.6	10.0	10.7	109	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0406D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.5	10.0	NA	105	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160331					
Laboratory ID:	03-275-01					
Total Phosphorus	0.013	0.010	EPA 365.1	4-7-16	4-8-16	
Client ID:	COUMI-20160331					
Laboratory ID:	03-275-02					
Total Phosphorus	0.073	0.010	EPA 365.1	4-7-16	4-8-16	
Client ID:	COUMO-20160331					
Laboratory ID:	03-275-03					
Total Phosphorus	0.050	0.010	EPA 365.1	4-7-16	4-8-16	
Client ID:	EVAMS-20160331					
Laboratory ID:	03-275-04					
Total Phosphorus	0.027	0.010	EPA 365.1	4-7-16	4-8-16	
Client ID:	EVALSS-20160331					
Laboratory ID:	03-275-05					
Total Phosphorus	0.028	0.010	EPA 365.1	4-7-16	4-8-16	
Client ID:	MONMN-20160331					
Laboratory ID:	03-275-06					
Total Phosphorus	0.027	0.010	EPA 365.1	4-7-16	4-8-16	
Client ID:	MONMS-20160331					
Laboratory ID:	03-275-07					
Total Phosphorus	0.026	0.010	EPA 365.1	4-7-16	4-8-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160331					
Laboratory ID:	03-275-08					
Total Phosphorus	0.027	0.010	EPA 365.1	4-7-16	4-8-16	

Client ID:	SEIMN-20160331					
Laboratory ID:	03-275-09					
Total Phosphorus	0.028	0.010	EPA 365.1	4-7-16	4-8-16	

Client ID:	SEIMS-20160331					
Laboratory ID:	03-275-10					
Total Phosphorus	0.034	0.010	EPA 365.1	4-7-16	4-8-16	

Client ID:	TOSMI-20160331					
Laboratory ID:	03-275-11					
Total Phosphorus	0.054	0.010	EPA 365.1	4-7-16	4-8-16	

Client ID:	TOSMO-20160331					
Laboratory ID:	03-275-12					
Total Phosphorus	0.052	0.010	EPA 365.1	4-7-16	4-8-16	

Client ID:	TYLMI-20160331					
Laboratory ID:	03-275-13					
Total Phosphorus	0.023	0.010	EPA 365.1	4-7-16	4-8-16	

Client ID:	TYLMO-20160331					
Laboratory ID:	03-275-14					
Total Phosphorus	0.029	0.010	EPA 365.1	4-7-16	4-8-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA1-20160331					
Laboratory ID:	03-275-15					
Total Phosphorus	0.028	0.010	EPA 365.1	4-7-16	4-8-16	

Client ID:	QA2-20160331					
Laboratory ID:	03-275-16					
Total Phosphorus	0.030	0.010	EPA 365.1	4-7-16	4-8-16	

Client ID:	QA4-20160331					
Laboratory ID:	03-275-18					
Total Phosphorus	ND	0.010	EPA 365.1	4-7-16	4-8-16	



Date of Report: April 28, 2016
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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0407W1					
Total Phosphorus	ND	0.010	EPA 365.1	4-7-16	4-8-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-275-01							
	ORIG	DUP						
Total Phosphorus	0.0130	0.0138	NA	NA	NA	6	10	

MATRIX SPIKE								
Laboratory ID:	03-275-01							
	MS	MS		MS				
Total Phosphorus	0.281	0.250	0.0130	107	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0407W1							
	SB	SB		SB				
Total Phosphorus	0.253	0.250	NA	101	86-112	NA	NA	



Date of Report: April 28, 2016
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TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 03-275-01						
Client ID: COLM-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	ND	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-02						
Client ID: COUMI-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	12	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-03						
Client ID: COUMO-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	13	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-04						
Client ID: EVAMS-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	ND	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-05						
Client ID: EVALSS-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	ND	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-06						
Client ID: MONMN-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	ND	5.0	200.8	4-5-16	4-5-16	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

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Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 03-275-07						
Client ID: MONMS-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	ND	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-08						
Client ID: MONM-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	8.4	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-09						
Client ID: SEIMN-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	ND	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-10						
Client ID: SEIMS-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	ND	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-11						
Client ID: TOSMI-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	14	5.0	200.8	4-5-16	4-5-16	
Lab ID: 03-275-12						
Client ID: TOSMO-20160331						
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	5.7	5.0	200.8	4-5-16	4-5-16	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-275-13					
Client ID:	TYLMI-20160331					
Copper	1.6	1.0	200.8	4-5-16	4-5-16	
Zinc	ND	5.0	200.8	4-5-16	4-5-16	
Lab ID:	03-275-14					
Client ID:	TYLMO-20160331					
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	11	5.0	200.8	4-5-16	4-5-16	
Lab ID:	03-275-15					
Client ID:	QA1-20160331					
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	11	5.0	200.8	4-5-16	4-5-16	
Lab ID:	03-275-16					
Client ID:	QA2-20160331					
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	10	5.0	200.8	4-5-16	4-5-16	
Lab ID:	03-275-18					
Client ID:	QA4-20160331					
Copper	ND	1.0	200.8	4-5-16	4-5-16	
Zinc	ND	5.0	200.8	4-5-16	4-5-16	



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**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 4-5-16
Date Analyzed: 4-5-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0405WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



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**TOTAL METALS
 EPA 200.8
 DUPLICATE QUALITY CONTROL**

Date Extracted: 4-5-16

Date Analyzed: 4-5-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 03-275-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



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**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 4-5-16

Date Analyzed: 4-5-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 03-275-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	104	104	99.1	99	5	
Zinc	100	119	119	113	113	5	



Date of Report: April 28, 2016
 Samples Submitted: March 31, 2016
 Laboratory Reference: 1603-275
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 03-275-01						
Client ID: COLM-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	
Lab ID: 03-275-02						
Client ID: COUMI-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	7.1	5.0	200.8		4-5-16	
Lab ID: 03-275-03						
Client ID: COUMO-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	5.6	5.0	200.8		4-5-16	
Lab ID: 03-275-04						
Client ID: EVAMS-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	
Lab ID: 03-275-05						
Client ID: EVALSS-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	
Lab ID: 03-275-06						
Client ID: MONMN-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	



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 Samples Submitted: March 31, 2016
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 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 03-275-07						
Client ID: MONMS-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	
Lab ID: 03-275-08						
Client ID: MONM-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	7.6	5.0	200.8		4-5-16	
Lab ID: 03-275-09						
Client ID: SEIMN-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	
Lab ID: 03-275-10						
Client ID: SEIMS-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	
Lab ID: 03-275-11						
Client ID: TOSMI-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	11	5.0	200.8		4-5-16	
Lab ID: 03-275-12						
Client ID: TOSMO-20160331						
Copper	ND	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	



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**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	03-275-13					
Client ID:	TYLMI-20160331					
Copper	1.6	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	
Lab ID:	03-275-14					
Client ID:	TYLMO-20160331					
Copper	ND	1.0	200.8		4-5-16	
Zinc	8.1	5.0	200.8		4-5-16	
Lab ID:	03-275-15					
Client ID:	QA1-20160331					
Copper	ND	1.0	200.8		4-5-16	
Zinc	8.0	5.0	200.8		4-5-16	
Lab ID:	03-275-16					
Client ID:	QA2-20160331					
Copper	ND	1.0	200.8		4-5-16	
Zinc	8.5	5.0	200.8		4-5-16	
Lab ID:	03-275-17					
Client ID:	QA3-20160331					
Copper	ND	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	
Lab ID:	03-275-18					
Client ID:	QA4-20160331					
Copper	3.9	1.0	200.8		4-5-16	
Zinc	ND	5.0	200.8		4-5-16	



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Date of Report: April 28, 2016
Samples Submitted: March 31, 2016
Laboratory Reference: 1603-275
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 4-5-16
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0405D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: April 28, 2016
Samples Submitted: March 31, 2016
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Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 4-5-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 03-275-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	7.10	7.86	10	5.0	



Date of Report: April 28, 2016
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 Laboratory Reference: 1603-275
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 4-5-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 03-275-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	72.5	91	74.4	93	3	
Zinc	80.0	88.9	102	94.4	109	6	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

May 10 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your Redmond Paired Watershed Study project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20160331	Water	16-A004903	Micro, NUT
COUMI-20160331	Water	16-A004904	Micro, NUT
COUMO-20160331	Water	16-A004905	Micro, NUT
EVAMS-20160331	Water	16-A004906	Micro, NUT
EVALSS-20160331	Water	16-A004907	Micro, NUT
MONMN-20160331	Water	16-A004908	Micro, NUT
MONMS-20160331	Water	16-A004909	Micro, NUT
MONM-20160331	Water	16-A004910	Micro, NUT
SEIMN-20160331	Water	16-A004911	Micro, NUT
SEIMS-20160331	Water	16-A004912	Micro, NUT
TOSMI-20160331	Water	16-A004913	Micro, NUT
TOSMO-20160331	Water	16-A004914	Micro, NUT
TYLMI-20160331	Water	16-A004915	Micro, NUT
TYLMO-20160331	Water	16-A004916	Micro, NUT
QA1-20160331	Water	16-A004917	Micro, NUT
QA2-20160331	Water	16-A004918	Micro, NUT
QA4-20160331	Water	16-A004919	Micro, NUT

Your samples were received on Friday, April 1, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

May 10 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 03-275

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



Professional
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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Redmond Paired Watershed Study
Project #: 14-05806-000
PO Number: 03-275
All results reported on an as received basis.

Date Received: 04/01/16
Date Reported: 5/10/16

AMTEST Identification Number 16-A004903
Client Identification COLM-20160331
Sampling Date 03/31/16, 12:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.21	mg/l		0.1			
Total Nitrogen (TKN)	0.168	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	0.042	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number **16-A004904**
Client Identification **COUMI-20160331**
Sampling Date **03/31/16, 16:10**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	32.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.38	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	0.38	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number **16-A004905**
Client Identification **COUMO-20160331**
Sampling Date **03/31/16, 16:30**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	28.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.57	mg/l		0.1			
Total Nitrogen (TKN)	0.121	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	0.45	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004906
Client Identification EVAMS-20160331
Sampling Date 03/31/16, 15:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	8.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	2.16	mg/l		0.1			
Total Nitrogen (TKN)	0.264	mg/l		0.1	SM4500N	JR	04/22/16
Nitrate + Nitrite	1.9	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004907
Client Identification EVALSS-20160331
Sampling Date 03/31/16, 15:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	12.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	2.98	mg/l		0.1			
Total Nitrogen (TKN)	1.48	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	1.5	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number **16-A004908**
Client Identification **MONMN-20160331**
Sampling Date **03/31/16, 11:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	370	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	1.29	mg/l		0.1			
Total Nitrogen (TKN)	1.14	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.15	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number **16-A004909**
Client Identification **MONMS-20160331**
Sampling Date **03/31/16, 11:10**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	6.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	1.59	mg/l		0.1			
Total Nitrogen (TKN)	1.22	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.37	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number **16-A004910**
Client Identification **MONM-20160331**
Sampling Date **03/31/16, 10:30**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	58.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	1.08	mg/l		0.1			
Total Nitrogen (TKN)	0.794	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.29	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number **16-A004911**
Client Identification **SEIMN-20160331**
Sampling Date **03/31/16, 13:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	1.25	mg/l		0.1			
Total Nitrogen (TKN)	1.05	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.20	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004912
Client Identification SEIMS-20160331
Sampling Date 03/31/16, 09:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	24.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.26	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.26	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004913
Client Identification TOSMI-20160331
Sampling Date 03/31/16, 17:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	78.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.88	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.88	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004914
Client Identification TOSMO-20160331
Sampling Date 03/31/16, 16:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	54.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.52	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.52	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004915
Client Identification TYLMI-20160331
Sampling Date 03/31/16, 14:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	42.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.54	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.54	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004916
Client Identification TYLMO-20160331
Sampling Date 03/31/16, 14:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	38.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.43	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.43	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004917
Client Identification QA1-20160331
Sampling Date 03/31/16, 16:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	78.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.30	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.30	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004918
Client Identification QA2-20160331
Sampling Date 03/31/16, 15:00

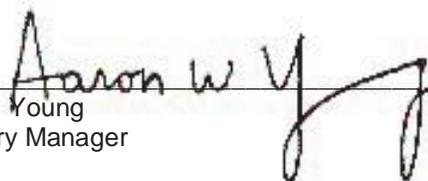
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	36.	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	0.47	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.47	mg/l		0.01	SM4500NO3	JR	04/04/16

AMTEST Identification Number 16-A004919
Client Identification QA4-20160331
Sampling Date 03/31/16, 14:20

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	< 1	CFU/100 ml		1	SM 9222D	NG	04/01/16
Total Nitrogen (NOX&TKN)	< 0.1	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	04/19/16
Nitrate + Nitrite	0.030	mg/l		0.01	SM4500NO3	JR	04/04/16


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A004903 to 16-A004919

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A004905	Fecal Coliform	CFU/100 ml	28.	20.	33.
16-A004915	Fecal Coliform	CFU/100 ml	42.	46.	9.1
16-A004916	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A005070	Total Nitrogen (TKN)	mg/l	1.14	1.03	10.
16-A005163	Total Nitrogen (TKN)	mg/l	2.05	1.90	7.6
16-A004356	Total Nitrogen (TKN)	mg/l	4.16	4.00	3.9
16-A004791	Nitrate + Nitrite	mg/l	0.82	0.79	3.7
16-A004801	Nitrate + Nitrite	mg/l	0.29	0.29	0.00
16-A004892	Nitrate + Nitrite	mg/l	0.60	0.62	3.3
16-A004902	Nitrate + Nitrite	mg/l	0.026	0.026	0.00
16-A004912	Nitrate + Nitrite	mg/l	0.26	0.26	0.00
16-A004919	Nitrate + Nitrite	mg/l	0.030	0.030	0.00

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A005070	Total Nitrogen (TKN)	mg/l	1.14	2.14	1.00	100.00 %
16-A005163	Total Nitrogen (TKN)	mg/l	2.05	4.19	2.00	107.00 %
16-A004356	Total Nitrogen (TKN)	mg/l	4.16	5.04	1.00	88.00 %
16-A004906	Total Nitrogen (TKN)	mg/l	0.264	0.981	0.500	143.40 %
16-A004791	Nitrate + Nitrite	mg/l	0.82	1.4	0.50	116.00 %
16-A004801	Nitrate + Nitrite	mg/l	0.29	0.76	0.50	94.00 %
16-A004892	Nitrate + Nitrite	mg/l	0.60	1.1	0.50	100.00 %
16-A004902	Nitrate + Nitrite	mg/l	0.026	0.43	0.50	80.80 %
16-A004912	Nitrate + Nitrite	mg/l	0.26	0.70	0.50	88.00 %
16-A004919	Nitrate + Nitrite	mg/l	0.030	0.41	0.50	76.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.486	97.2 %
Total Nitrogen (TKN)	mg/l	0.500	0.488	97.6 %
Total Nitrogen (TKN)	mg/l	0.500	0.544	109. %
Total Nitrogen (TKN)	mg/l	0.500	0.546	109. %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.46	92.0 %

QC Summary for sample numbers: 16-A004903 to 16-A004919...

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th Pl Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 03-275

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: _____

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
4903	COLM-20160331	3/31/16	1215	W	2	Fecal Coliform, Total Nitrogen
104	COUMI-20160331	3/31/16	1610	W	2	Fecal Coliform, Total Nitrogen
105	COUMO-20160331	3/31/16	1630	W	2	Fecal Coliform, Total Nitrogen
106	EVAMS-20160331	3/31/16	1540	W	2	Fecal Coliform, Total Nitrogen
107	EVALSS-20160331	3/31/16	1515	W	2	Fecal Coliform, Total Nitrogen
108	MONMN-20160331	3/31/16	1140	W	2	Fecal Coliform, Total Nitrogen
109	MONMS-20160331	3/31/16	1110	W	2	Fecal Coliform, Total Nitrogen
4910	MONM-20160331	3/31/16	1030	W	2	Fecal Coliform, Total Nitrogen
111	SEIMN-20160331	3/31/16	1300	W	2	Fecal Coliform, Total Nitrogen
4912	SEIMS-20160331	3/31/16	0935	W	2	Fecal Coliform, Total Nitrogen
Signature	Company	Date	Time	Comments/Special Instructions		
Relinquished by:	OnSite Env Amtest	4/1/16	752	5.8°C AM 4/1/16 08:00		
Received by:		4/1/16	752			
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 03-275

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: _____

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
4913	TOSMI-20160331	3/31/16	1715	W	2	Fecal Coliform, Total Nitrogen
114	TOSMO-20160331	3/31/16	1650	W	2	Fecal Coliform, Total Nitrogen
15	TYLMI-20160331	3/31/16	1445	W	2	Fecal Coliform, Total Nitrogen
16	TYLMO-20160331	3/31/16	1400	W	2	Fecal Coliform, Total Nitrogen
17	QA1-20160331	3/31/16	1600	W	2	Fecal Coliform, Total Nitrogen
18	QA2-20160331	3/31/16	1500	W	2	Fecal Coliform, Total Nitrogen
4919	QA4-20160331	3/31/16	1420	W	2	Fecal Coliform, Total Nitrogen
Signature		Company	Date	Time	Comments/Special Instructions	
Relinquished by:		OnSite Env	4/1/16	752		
Received by:		AmTest	4/1/16	752		
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

03-275 Page 1 of 2

Turnaround Requested:

___ 1 Day

___ 2 Day

___ 3 Day

Standard

Laboratory No. _____

Requested Analyses

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *			
1	COLM-20160331	3/31/16	12:15	Water	7	X	X	X	X	X	X	X	X	X			
2	COUMI-20160331	3/31/16	16:10	Water	7	X	X	X	X	X	X	X	X	X			
3	COUMO-20160331	3/31/16	16:30	Water	7	X	X	X	X	X	X	X	X	X			
4	EVAMS-20160331	3/31/16	15:40	Water	7	X	X	X	X	X	X	X	X	X			
5	EVALSS-20160331	3/31/16	15:15	Water	7	X	X	X	X	X	X	X	X	X			
6	MONMN-20160331	3/31/16	11:40	Water	7	X	X	X	X	X	X	X	X	X			
7	MONMS-20160331	3/31/16	11:10	Water	7	X	X	X	X	X	X	X	X	X			
8	MONM-20160331	3/31/16	10:30	Water	7	X	X	X	X	X	X	X	X	X			
9	SEIMN-20160331	3/31/16	13:00	Water	7	X	X	X	X	X	X	X	X	X			
10	SEIMS-20160331	3/31/16	09:35	Water	7	X	X	X	X	X	X	X	X	X			
11	TOSMI-20160331	3/31/16	17:15	Water	7	X	X	X	X	X	X	X	X	X			
12	TOSMO-20160331	3/31/16	16:50	Water	7	X	X	X	X	X	X	X	X	X			
13	TYLMI-20160331	3/31/16	14:45	Water	7	X	X	X	X	X	X	X	X	X			
14	TYLMO-20160331	3/31/16	14:00	Water	7	X	X	X	X	X	X	X	X	X			
15	QA1-20160331	3/31/16	16:00	Water	7	X	X	X	X	X	X	X	X	X			
16	QA2-20160331	3/31/16	15:00	Water	7	X	X	X	X	X	X	X	X	X			

Relinquished by George Iftner Date 3/31/16 Received by [Signature] Date 3/31/16
 Firm Herrera Time 17:38 Firm OBE Time 1738

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Ifthner

CHAIN OF CUSTODY

03-275

Page 1 of 2

Turnaround Requested:

 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. _____
Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *									
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *			
1	COLM-20160331	3/31/16	12:15	Water	7	X	X	X	X	X	X	X	X	X			
2	COUMI-20160331	3/31/16	16:10	Water	7	X	X	X	X	X	X	X	X	X			
3	COUMO-20160331	3/31/16	16:30	Water	7	X	X	X	X	X	X	X	X	X			
4	EVAMS-20160331	3/31/16	15:40	Water	7	X	X	X	X	X	X	X	X	X			
5	EVALSS-20160331	3/31/16	15:15	Water	7	X	X	X	X	X	X	X	X	X			
6	MONMN-20160331	3/31/16	11:40	Water	7	X	X	X	X	X	X	X	X	X			
7	MONMS-20160331	3/31/16	11:10	Water	7	X	X	X	X	X	X	X	X	X			
8	MONM-20160331	3/31/16	10:30	Water	7	X	X	X	X	X	X	X	X	X			
9	SEIMN-20160331	3/31/16	13:00	Water	7	X	X	X	X	X	X	X	X	X			
10	SEIMS-20160331	3/31/16	09:35	Water	7	X	X	X	X	X	X	X	X	X			
11	TOSMI-20160331	3/31/16	17:15	Water	7	X	X	X	X	X	X	X	X	X			
12	TOSMO-20160331	3/31/16	16:50	Water	7	X	X	X	X	X	X	X	X	X			
13	TYLMI-20160331	3/31/16	14:45	Water	7	X	X	X	X	X	X	X	X	X			
14	TYLMO-20160331	3/31/16	14:00	Water	7	X	X	X	X	X	X	X	X	X			
15	QA1-20160331	3/31/16	16:00	Water	7	X	X	X	X	X	X	X	X	X			
16	QA2-20160331	3/31/16	15:00	Water	7	X	X	X	X	X	X	X	X	X			

Relinquished by George Ifthner Date 3/31/16 Received by [Signature] Date 3/31/16
 Firm Herrera Time 17:38 Firm OBE Time 1738
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:		14-05806-000		
Personnel Performing Calibration:		ALAN SVENSSON		
Meter:		YSI PRO PLUS		
Date/Time:		3/31/16 0800		
Barometric Pressure Start of Day: ^{mm}		Inches Hg:	76.7	Time: 0805
Barometric Pressure End of Day: ^{mm}		Inches Hg:		Time:
PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1	0	21.9	CALIB. CHECK
Conductivity (µS/cm)	96	100	21.8	CALIB. CHECK
DO % Saturation	99.2	100	21.5	100.2 AFTER CAL.
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	1	0	22.3	OK ✓
Conductivity (µS/cm)	96	100	22.3	CALIB CHECK OK
DO % Saturation	98.7	100	22.2	OK ✓

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse three times with tap water, three times with deionized water, then three times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®).
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup to within a centimeter of the top of the calibration cup with dilute standard (100 µS) so that the probes are covered.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate value for the standard into SpCond.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the Surveyor.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iffner
 Sample Date: 03/31/16 Sample Time: 12:15 PDT:
 Base Flow or Storm Event? base Field Filtered Time: 12:20 PST:
(Must filter within 15 minutes of collection)

SITE ID: COLM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Sunny 60° F

Water Quality Sampling

Sample ID: COLM-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	↓ NA ↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA
Handwritten notes: yellow, slight brown, tannins

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 4-18-16 Time: 2:52
 Data Entered into Database? YES NO Initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): _____
 Reference Point (description): No Staff gauge set up in stream

Water Quality Measurements

Temperature (°C) 10.0
 Conductivity (µs/cm) 26
 Dissolved Oxygen (mg/L) 10.65

Note: DOC volume collected was ≈ 150 ml, due to filter clogging

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen G. Eftner
 Sample Date: 3/31/16 Sample Time: 16:10 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 18:15 PST:
(Must filter within 15 minutes of collection)

SITE ID: COUNTI
 Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 62°

Water Quality Sampling

Sample ID: COUNTI-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NA</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>X</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:
 Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.30'
 Reference Point (description): Top of pin down to water

Water Quality Measurements

Temperature (°C) 10.9 °C
 Conductivity (µs/cm) 253
 Dissolved Oxygen (mg/L) 10.97

Quality Assurance

Checked By: Sohn Lantz Signature: [Signature]
 Date Checked: 4-18-16 Time: 2:55
 Data Entered into Database? YES NO initials:
 Date Entered: Time:
 Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Ifthar
 Sample Date: 3/31/16 Sample Time: 16:30 PDT:
 Base Flow or Storm Event? base Field Filtered Time: 16:35 PST:
(Must filter within 15 minutes of collection)

SITE ID: COUMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Sunny 62° F

Water Quality Sampling

Sample ID: COUMO-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: Clear
 Color: Colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 4-18-16 Time: 7:56
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.99

Reference Point (description): Top of pin down to water

Water Quality Measurements

Temperature (°C) 11.4° C

Conductivity (µs/cm) 240

Dissolved Oxygen (mg/L) 10.9

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. J. Fisher, A. Svendsen

Sample Date: 3/31/16

Sample Time: 15:40

PDT:

SITE ID: EVAMS

Base Flow or Storm Event? Base

Field Filtered Time: 15:45

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 62°

Water Quality Sampling

Sample ID: EVAMS-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	NA
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	↓
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	↓
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	↓
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	↓
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 μm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 4-18-16 Time: 3:57
 Data Entered into Database? YES NO initials: [Initials]
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.20'

Reference Point (description): Down from top of fence post.

Water Quality Measurements

Temperature (°C) 12.0°C

Conductivity (μs/cm) 188

Dissolved Oxygen (mg/L) 10.87

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Supendsen, G. Jether
 Sample Date: 3/31/16 Sample Time: 15:15 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 15:20 PST:
(Must filter within 15 minutes of collection)

SITE ID: EVALLSS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: EVALLSS-20160331

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 62°

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 1.68'
 Reference Point (description): top of PVC down with water level indicator.

Water Quality Measurements

Temperature (°C) 11.3° C
 Conductivity (µs/cm) 175
 Dissolved Oxygen (mg/L) 11.29

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 4-18-16 Time: 4:40
 Data Entered into Database? YES NO initials:
 Date Entered: Time:
 Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Sverdrup, G. Effer
 Sample Date: 03/31/16 Sample Time: 11:40
 Base Flow or Storm Event? Base Field Filtered Time: 11:45
(Must filter within 15 minutes of collection)

SITE ID: MONMN
 Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 57°

Water Quality Sampling

Sample ID: MONMN-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA ↓ ↓ ↓ ↓ ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: Colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: John Lentz Signature: _____
 Date Checked: 4-18-16 Time: 4:41
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.01'

Reference Point (description): bottom edge of bolt up

Water Quality Measurements

Temperature (°C) 10.9° C

Conductivity (µs/cm) 128

Dissolved Oxygen (mg/L) 11.0

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iffner

Sample Date: 3/31/16

Sample Time: 11:16

PDT:

SITE ID: MONMS

Base Flow or Storm Event? Base

Field Filtered Time: 11:15

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 57°

Water Quality Sampling

Sample ID: MONMS-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	}
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	}

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: _____
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16

Time: 17:38

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 4-18-16 Time: 4:42
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.80'

Reference Point (description): Water level indicator, top of PVC down to water

Water Quality Measurements

Temperature (°C) 9.3
 Conductivity (µs/cm) 147
 Dissolved Oxygen (mg/L) 9.37

Filamentous algae growth in stream channel

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Sverdrsen, G. Iffner

Sample Date: 03/31/16

Sample Time: 10:30

PDT:

SITE ID: MONM

Base Flow or Storm Event? Base

Field Filtered Time: 10:35

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 57°

Water Quality Sampling

Sample ID: MONM-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorus	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA1-20160331 @ 16:00

Filter blank sample ID: QA3-20160331 @ 10:00

Transfer blank sample ID: NA - see Tylers-mouth for QA2 and QA4

Visual and Olfactory Conditions:

Clarity: Clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16

Time: 17:38

Quality Assurance

Checked By: John Leuth

Signature:

Date Checked: 4-10-16

Time: 9:43

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.50

Reference Point (description): Top culvert down to water

Water Quality Measurements

Temperature (°C) 8.8°C

Conductivity (µs/cm) 176

Dissolved Oxygen (mg/L) 11.1

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iftner

Sample Date: _____ Sample Time: 13:00

Base Flow or Storm Event? _____ Field Filtered Time: 13:05
(Must filter within 15 minutes of collection)

SITE ID: SEIMN

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 60°

Water Quality Sampling

Sample ID: SEIMN-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	↓ ↓ ↓ ↓ ↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: NA
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: _____

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: [Signature] Signature: [Signature]

Date Checked: 4-18-16 Time: 4:04

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.72'

Reference Point (description): Down from top of bolt on side of stand pipe.

Water Quality Measurements

Temperature (°C) 9.3° C

Conductivity (µs/cm) 63

Dissolved Oxygen (mg/L) 11.6

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. I. Fisher
 Sample Date: 03/31/16 Sample Time: 09:35 PDT:
 Base Flow or Storm Event? Base Flow Field Filtered Time: 09:40 PST:
(Must filter within 15 minutes of collection)

SITE ID: SEIMS



Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 57°F

Water Quality Sampling

Sample ID: SEIMS-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: /
 Filter blank sample ID: /
 Transfer blank sample ID: /

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.76'

Reference Point (description): Top of Bolt in bank.

Water Quality Measurements

Temperature (°C) 7.8
 Conductivity (µs/cm) 97.0
 Dissolved Oxygen (mg/L) 11.8

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 4-18-16 Time: 4:44
 Data Entered into Database? YES NO initials:
 Date Entered: Time:
 Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Ifkhar
 Sample Date: 3/31/16 Sample Time: 17:15 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 17:20 PST:
(Must filter within 15 minutes of collection)

SITE ID: T05MI
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Sunny 62°F

Water Quality Sampling

Sample ID: T05MI-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	X

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:
 Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA =
 Floatables: NA =

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 4-18-16 Time: 4:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.23'
 Reference Point (description): Down from bottom of bolt.

Water Quality Measurements

Temperature (°C) 11.6°C
 Conductivity (µs/cm) 259
 Dissolved Oxygen (mg/L) 10.99

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen - G. Iffner
 Sample Date: 3/31/16 Sample Time: 16:50 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 16:55 PST:
(Must filter within 15 minutes of collection)

SITE ID: TOSMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Sunny 62°

Water Quality Sampling

Sample ID: TOSMO-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NA</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorus	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: [Signature] Signature: [Signature]
 Date Checked: 4-18-16 Time: 4:45
 Data Entered into Database? YES NO initials:
 Date Entered: Time:
 Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.45'

Reference Point (description): Top of pin down

Water Quality Measurements

Temperature (°C) 11.9°c
 Conductivity (µs/cm) 234
 Dissolved Oxygen (mg/L) 11.04

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Sverdrup, G. Iffner
 Sample Date: 3/31/16 Sample Time: 14:45 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 14:50 PST:
(Must filter within 15 minutes of collection)

SITE ID: TYLMI
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Sunny 65°

Water Quality Sampling

Sample ID: TYLMI-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:
 Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA =
 Floatables: " =

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 4-18-16 Time: 4:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 4.55'
 Reference Point (description): Top of culvert down to water surface

Water Quality Measurements

Temperature (°C) 12.9° C
 Conductivity (µs/cm) 160
 Dissolved Oxygen (mg/L) 10.84

* Filamentous algae growth in stream channel

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: A. Svendsen, G. Iffler
 Sample Date: 3/31/16 Sample Time: 14:00
 Base Flow or Storm Event? Base Field Filtered Time: 14:05
(Must filter within 15 minutes of collection)

SITE ID: TYLMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: Sunny 60°F

Water Quality Sampling

Sample ID: TYLMO-20160331

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	✓
DOC *	HDPE	250 ml	1	HCL	✓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	✓
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	✓
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	✓
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	✓
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	✓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA2-20160331 @ 15:00
 Filter blank sample ID: NA
 Transfer blank sample ID: QA4-20160331 @ 14:20

Visual and Olfactory Conditions:

Clarity: Clear
 Color: Colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date: 3/31/16 Time: 17:38

Quality Assurance

Checked By: Schubert Signature: [Signature]
 Date Checked: 4-18-16 Time: 9:46
 Data Entered into Database? YES NO initials:
 Date Entered: Time:
 Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.86'

Reference Point (description): top edge of culvert down to water

Water Quality Measurements

Temperature (°C) 12.6°C
 Conductivity (µs/cm) 168
 Dissolved Oxygen (mg/L) 10.54

1 Juvenile salmonid observed.



Data Quality Assurance Worksheet

G

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 4/26/2016 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials
JL

Sample Date/Sample ID: 3/31/2016 / All sites, 2 FD (QA1 and QA2), 1 filter blank (QA3), 1 transfer blank (QA4)

date 5/23/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	5	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	91	±20	10	≤25	DIFF = 0.2 DIFF= 0.6	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	68 4.9	≤25	OK	FLAG MONM "J" DUE TO FIELD DUPLICATE RPD
Hardness	OK / SM 2340B	NA	NA	6-7	≤180	≤1.0 mg/L 1.0 mg/L	124,116	±25	98	±15	1 4(MS)	≤20	2.6 1.3	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	6	≤28	≤1.0 mg/L 1.0 mg/L	109	±25	105	±15	3	≤20	10 7.2	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	8	≤28	≤0.01 mg/L 0.01 mg/L	107	±25	101	±20	6	≤20	3.6 3.4	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	4, 19, 22	≤28	≤0.1 mg/L 0.1 mg/L	143,88, 76	±25	92-109	±20	NC,0,0	≤20	D=0.78 8.9	≤20	OK	MS OKAY – SAMPLE > 4X SPIKE AMOUNT. FLAG MONM "J" DUE TO FIELD DUPLICATE RPD

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 4/26/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials
JL

Sample Date/Sample ID: 3/31/2016 / All sites, 2 FD (QA1 and QA2), 1 filter blank (QA3), 1 transfer blank (QA4)

date 5/23/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	5	≤180	≤1.0 µg/L 1.0 µg/L	104,99	±25	NR	±15	NC 5 (MS)	≤20	NC NC	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	5	≤180	≤5.0 µg/L 5.0 µg/L	119,113	±25	NR	±15	NC 5 (MS)	≤20	D = 1.6 D = 1.0	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	5	≤180	≤1.0 µg/L 1.0 µg/L	91,93	±25	NR	±15	NC 3(MS)	≤20	NC NC	≤20	TRANSFER BLANK = 3.9	ALL SAMPLES ND, NO FLAG DUE TO TRANSFER BLANK
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	5	≤180	≤5.0 µg/L 5.0 µg/L	102,109	±25	NR	±15	10 6 (MS)	≤20	5.1 4.8	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	33,9.1	≤35	29 5.4	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

May 11, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1604-188

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on April 24, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy scribble.

Blair Goodrow
Project Manager

Enclosures

Date of Report: May 11, 2016
Samples Submitted: April 24, 2016
Laboratory Reference: 1604-188
Project: 14-05806-000

Case Narrative

Samples were collected on April 24, 2016 and received by the laboratory on April 24, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160424					
Laboratory ID:	04-188-01					
Total Suspended Solids	71	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	MONMN-20160424					
Laboratory ID:	04-188-02					
Total Suspended Solids	25	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	MONMS-20160424					
Laboratory ID:	04-188-03					
Total Suspended Solids	21	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	TYLMI-20160424					
Laboratory ID:	04-188-04					
Total Suspended Solids	30	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	TYLMO-20160424					
Laboratory ID:	04-188-05					
Total Suspended Solids	9.2	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	SEIMS-20160424					
Laboratory ID:	04-188-06					
Total Suspended Solids	39	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	SEIMN-20160424					
Laboratory ID:	04-188-07					
Total Suspended Solids	12	1.0	SM 2540D	4-28-16	4-29-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160424					
Laboratory ID:	04-188-08					
Total Suspended Solids	3.6	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	TOSMO-20160424					
Laboratory ID:	04-188-09					
Total Suspended Solids	67	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	TOSMI-20160424					
Laboratory ID:	04-188-10					
Total Suspended Solids	82	1.3	SM 2540D	4-28-16	4-29-16	

Client ID:	EVALSS-20160424					
Laboratory ID:	04-188-11					
Total Suspended Solids	19	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	EVAMS-20160424					
Laboratory ID:	04-188-12					
Total Suspended Solids	14	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	COUMI-20160424					
Laboratory ID:	04-188-13					
Total Suspended Solids	24	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	COUMO-20160424					
Laboratory ID:	04-188-14					
Total Suspended Solids	16	1.0	SM 2540D	4-28-16	4-29-16	

Client ID:	QA5-20160424					
Laboratory ID:	04-188-15					
Total Suspended Solids	76	1.3	SM 2540D	4-28-16	4-29-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0428W1					
Total Suspended Solids	ND	1.0	SM 2540D	4-28-16	4-29-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-188-13							
	ORIG	DUP						
Total Suspended Solids	24.2	25.4	NA	NA	NA	5	17	

SPIKE BLANK								
Laboratory ID:	SB0428W1							
	SB	SB		SB				
Total Suspended Solids	98.0	100	NA	98	75-114	NA	NA	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160424					
Laboratory ID:	04-188-01					
Turbidity	15	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	MONMN-20160424					
Laboratory ID:	04-188-02					
Turbidity	6.7	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	MONMS-20160424					
Laboratory ID:	04-188-03					
Turbidity	5.6	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	TYLMI-20160424					
Laboratory ID:	04-188-04					
Turbidity	6.7	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	TYLMO-20160424					
Laboratory ID:	04-188-05					
Turbidity	3.6	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	SEIMS-20160424					
Laboratory ID:	04-188-06					
Turbidity	5.7	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	SEIMN-20160424					
Laboratory ID:	04-188-07					
Turbidity	2.2	0.10	EPA 180.1	4-25-16	4-25-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160424					
Laboratory ID:	04-188-08					
Turbidity	1.7	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	TOSMO-20160424					
Laboratory ID:	04-188-09					
Turbidity	12	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	TOSMI-20160424					
Laboratory ID:	04-188-10					
Turbidity	8.1	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	EVALSS-20160424					
Laboratory ID:	04-188-11					
Turbidity	2.2	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	EVAMS-20160424					
Laboratory ID:	04-188-12					
Turbidity	2.0	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	COUMI-20160424					
Laboratory ID:	04-188-13					
Turbidity	2.5	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	COUMO-20160424					
Laboratory ID:	04-188-14					
Turbidity	3.7	0.10	EPA 180.1	4-25-16	4-25-16	

Client ID:	QA5-20160424					
Laboratory ID:	04-188-15					
Turbidity	11	0.10	EPA 180.1	4-25-16	4-25-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0425W1					
Turbidity	ND	0.10	EPA 180.1	4-25-16	4-25-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-193-01							
	ORIG	DUP						
Turbidity	0.940	0.960	NA	NA	NA	NA	2	15

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160424					
Laboratory ID:	04-188-01					
Dissolved Organic Carbon	6.9	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	MONMN-20160424					
Laboratory ID:	04-188-02					
Dissolved Organic Carbon	7.5	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	MONMS-20160424					
Laboratory ID:	04-188-03					
Dissolved Organic Carbon	9.4	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	TYLMI-20160424					
Laboratory ID:	04-188-04					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	TYLMO-20160424					
Laboratory ID:	04-188-05					
Dissolved Organic Carbon	5.9	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	SEIMS-20160424					
Laboratory ID:	04-188-06					
Dissolved Organic Carbon	7.5	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	SEIMN-20160424					
Laboratory ID:	04-188-07					
Dissolved Organic Carbon	5.3	1.0	SM 5310B	4-25-16	4-26-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160424					
Laboratory ID:	04-188-08					
Dissolved Organic Carbon	14	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	TOSMO-20160424					
Laboratory ID:	04-188-09					
Dissolved Organic Carbon	8.7	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	TOSMI-20160424					
Laboratory ID:	04-188-10					
Dissolved Organic Carbon	8.2	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	EVALSS-20160424					
Laboratory ID:	04-188-11					
Dissolved Organic Carbon	4.4	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	EVAMS-20160424					
Laboratory ID:	04-188-12					
Dissolved Organic Carbon	5.6	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	COUMI-20160424					
Laboratory ID:	04-188-13					
Dissolved Organic Carbon	6.2	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	COUMO-20160424					
Laboratory ID:	04-188-14					
Dissolved Organic Carbon	5.7	1.0	SM 5310B	4-25-16	4-26-16	
Client ID:	QA5-20160424					
Laboratory ID:	04-188-15					
Dissolved Organic Carbon	8.0	1.0	SM 5310B	4-25-16	4-26-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0425D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	4-25-16	4-26-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-188-01							
	ORIG	DUP						
Dissolved Organic Carbon	6.93	6.98	NA	NA	NA	NA	1	20

MATRIX SPIKE

Laboratory ID:	04-188-01							
	MS	MS		MS				
Dissolved Organic Carbon	17.9	10.0	6.93	110	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0425D1							
	SB	SB		SB				
Dissolved Organic Carbon	11.4	10.0	NA	114	75-125	NA	NA	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160424					
Laboratory ID:	04-188-01					
Total Phosphorus	0.18	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	MONMN-20160424					
Laboratory ID:	04-188-02					
Total Phosphorus	0.11	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	MONMS-20160424					
Laboratory ID:	04-188-03					
Total Phosphorus	0.078	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	TYLMI-20160424					
Laboratory ID:	04-188-04					
Total Phosphorus	0.097	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	TYLMO-20160424					
Laboratory ID:	04-188-05					
Total Phosphorus	0.062	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	SEIMS-20160424					
Laboratory ID:	04-188-06					
Total Phosphorus	0.074	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	SEIMN-20160424					
Laboratory ID:	04-188-07					
Total Phosphorus	0.052	0.010	EPA 365.1	4-28-16	4-28-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160424					
Laboratory ID:	04-188-08					
Total Phosphorus	0.030	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	TOSMO-20160424					
Laboratory ID:	04-188-09					
Total Phosphorus	0.16	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	TOSMI-20160424					
Laboratory ID:	04-188-10					
Total Phosphorus	0.17	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	EVALSS-20160424					
Laboratory ID:	04-188-11					
Total Phosphorus	0.042	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	EVAMS-20160424					
Laboratory ID:	04-188-12					
Total Phosphorus	0.038	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	COUMI-20160424					
Laboratory ID:	04-188-13					
Total Phosphorus	0.13	0.010	EPA 365.1	4-28-16	4-28-16	

Client ID:	COUMO-20160424					
Laboratory ID:	04-188-14					
Total Phosphorus	0.097	0.010	EPA 365.1	4-28-16	4-28-16	

Date of Report: May 11, 2016
Samples Submitted: April 24, 2016
Laboratory Reference: 1604-188
Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA5-20160424					
Laboratory ID:	04-188-15					
Total Phosphorus	0.17	0.010	EPA 365.1	4-28-16	4-28-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0428W1					
Total Phosphorus	ND	0.010	EPA 365.1	4-28-16	4-28-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-188-02							
	ORIG	DUP						
Total Phosphorus	0.114	0.114	NA	NA	NA	0	10	

MATRIX SPIKE								
Laboratory ID:	04-188-02							
	MS	MS		MS				
Total Phosphorus	0.354	0.250	0.114	96	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0428W1							
	SB	SB		SB				
Total Phosphorus	0.227	0.250	NA	91	86-112	NA	NA	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 04-188-01						
Client ID: MONM-20160424						
Copper	1.4	1.0	200.8		4-27-16	
Zinc	11	5.0	200.8		4-27-16	
Lab ID: 04-188-02						
Client ID: MONMN-20160424						
Copper	ND	1.0	200.8		4-27-16	
Zinc	ND	5.0	200.8		4-27-16	
Lab ID: 04-188-03						
Client ID: MONMS-20160424						
Copper	3.8	1.0	200.8		4-27-16	
Zinc	ND	5.0	200.8		4-27-16	
Lab ID: 04-188-04						
Client ID: TYLMI-20160424						
Copper	6.3	1.0	200.8		4-27-16	
Zinc	7.7	5.0	200.8		4-27-16	
Lab ID: 04-188-05						
Client ID: TYLMO-20160424						
Copper	6.0	1.0	200.8		4-27-16	
Zinc	26	5.0	200.8		4-27-16	
Lab ID: 04-188-06						
Client ID: SEIMS-20160424						
Copper	ND	1.0	200.8		4-27-16	
Zinc	ND	5.0	200.8		4-27-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-188-07					
Client ID:	SEIMN-20160424					
Copper	ND	1.0	200.8		4-27-16	
Zinc	ND	5.0	200.8		4-27-16	
Lab ID:	04-188-08					
Client ID:	COLM-20160424					
Copper	ND	1.0	200.8		4-27-16	
Zinc	ND	5.0	200.8		4-27-16	
Lab ID:	04-188-09					
Client ID:	TOSMO-20160424					
Copper	5.7	1.0	200.8		4-27-16	
Zinc	140	5.0	200.8		4-27-16	
Lab ID:	04-188-10					
Client ID:	TOSMI-20160424					
Copper	6.8	1.0	200.8		4-27-16	
Zinc	230	5.0	200.8		4-27-16	
Lab ID:	04-188-11					
Client ID:	EVALSS-20160424					
Copper	ND	1.0	200.8		4-27-16	
Zinc	ND	5.0	200.8		4-27-16	
Lab ID:	04-188-12					
Client ID:	EVAMS-20160424					
Copper	ND	1.0	200.8		4-27-16	
Zinc	ND	5.0	200.8		4-27-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-188-13					
Client ID:	COUMI-20160424					
Copper	2.2	1.0	200.8		4-27-16	
Zinc	9.3	5.0	200.8		4-27-16	
Lab ID:	04-188-14					
Client ID:	COUMO-20160424					
Copper	2.4	1.0	200.8		4-27-16	
Zinc	27	5.0	200.8		4-27-16	
Lab ID:	04-188-15					
Client ID:	QA5-20160424					
Copper	5.3	1.0	200.8		4-27-16	
Zinc	130	5.0	200.8		4-27-16	

Date of Report: May 11, 2016
Samples Submitted: April 24, 2016
Laboratory Reference: 1604-188
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 4-27-16
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0427D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0

Date of Report: May 11, 2016
Samples Submitted: April 24, 2016
Laboratory Reference: 1604-188
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 4-27-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 04-188-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.35	1.21	11	1.0	
Zinc	11.1	10.8	3	5	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 4-27-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 04-188-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	70.2	86	70.9	87	1	
Zinc	80.0	87.9	96	88.0	96	0	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160424					
Laboratory ID:	04-188-01					
Hardness	82	5.0	200.7/SM 2340B	5-2-16	5-2-16	

Client ID:	MONMN-20160424					
Laboratory ID:	04-188-02					
Hardness	74	5.0	200.7/SM 2340B	5-2-16	5-2-16	

Client ID:	MONMS-20160424					
Laboratory ID:	04-188-03					
Hardness	90	5.0	200.7/SM 2340B	5-2-16	5-2-16	

Client ID:	TYLMI-20160424					
Laboratory ID:	04-188-04					
Hardness	97	5.0	200.7/SM 2340B	5-2-16	5-2-16	

Client ID:	TYLMO-20160424					
Laboratory ID:	04-188-05					
Hardness	55	5.0	200.7/SM 2340B	5-2-16	5-2-16	

Client ID:	SEIMS-20160424					
Laboratory ID:	04-188-06					
Hardness	52	1.0	200.7/SM 2340B	4-28-16	4-28-16	

Client ID:	SEIMN-20160424					
Laboratory ID:	04-188-07					
Hardness	39	1.0	200.7/SM 2340B	4-28-16	4-28-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160424					
Laboratory ID:	04-188-08					
Hardness	14	1.0	200.7/SM 2340B	4-28-16	4-28-16	

Client ID:	TOSMO-20160424					
Laboratory ID:	04-188-09					
Hardness	41	1.0	200.7/SM 2340B	4-28-16	4-28-16	

Client ID:	TOSMI-20160424					
Laboratory ID:	04-188-10					
Hardness	32	1.0	200.7/SM 2340B	4-28-16	4-28-16	

Client ID:	EVALSS-20160424					
Laboratory ID:	04-188-11					
Hardness	88	5.0	200.7/SM 2340B	5-2-16	5-2-16	

Client ID:	EVAMS-20160424					
Laboratory ID:	04-188-12					
Hardness	92	5.0	200.7/SM 2340B	5-2-16	5-2-16	

Client ID:	COUMI-20160424					
Laboratory ID:	04-188-13					
Hardness	120	5.0	200.7/SM 2340B	5-2-16	5-2-16	

Client ID:	COUMO-20160424					
Laboratory ID:	04-188-14					
Hardness	95	5.0	200.7/SM 2340B	5-2-16	5-2-16	

Client ID:	QA5-20160424					
Laboratory ID:	04-188-15					
Hardness	41	1.0	200.7/SM 2340B	4-28-16	4-28-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0428WH1					
Hardness	ND	1.0	200.7/SM 2340B	4-28-16	4-28-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-188-05							
	ORIG	DUP						
Hardness	55.0	51.1	NA	NA	NA	7	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	04-188-05									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	193	184	132	132	55.0	105	98	75-125	5	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0428WH1							
	SB	SB	SB	SB	SB			
Hardness	136	132	NA	103	80-120	NA	NA	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 04-188-01						
Client ID: MONM-20160424						
Copper	4.1	1.0	200.8	4-28-16	4-28-16	
Zinc	82	5.0	200.8	4-28-16	4-28-16	
Lab ID: 04-188-02						
Client ID: MONMN-20160424						
Copper	1.8	1.0	200.8	4-28-16	4-28-16	
Zinc	16	5.0	200.8	4-28-16	4-28-16	
Lab ID: 04-188-03						
Client ID: MONMS-20160424						
Copper	6.2	1.0	200.8	4-28-16	4-28-16	
Zinc	16	5.0	200.8	4-28-16	4-28-16	
Lab ID: 04-188-04						
Client ID: TYLMI-20160424						
Copper	13	1.0	200.8	4-28-16	4-28-16	
Zinc	38	5.0	200.8	4-28-16	4-28-16	
Lab ID: 04-188-05						
Client ID: TYLMO-20160424						
Copper	8.5	1.0	200.8	4-28-16	4-28-16	
Zinc	36	5.0	200.8	4-28-16	4-28-16	
Lab ID: 04-188-06						
Client ID: SEIMS-20160424						
Copper	1.8	1.0	200.8	4-28-16	4-28-16	
Zinc	6.8	5.0	200.8	4-28-16	4-28-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-188-07					
Client ID:	SEIMN-20160424					
Copper	1.0	1.0	200.8	4-28-16	4-28-16	
Zinc	5.0	5.0	200.8	4-28-16	4-28-16	
Lab ID:	04-188-08					
Client ID:	COLM-20160424					
Copper	ND	1.0	200.8	4-28-16	4-28-16	
Zinc	ND	5.0	200.8	4-28-16	4-28-16	
Lab ID:	04-188-09					
Client ID:	TOSMO-20160424					
Copper	11	1.0	200.8	4-28-16	4-28-16	
Zinc	350	5.0	200.8	4-28-16	4-28-16	
Lab ID:	04-188-10					
Client ID:	TOSMI-20160424					
Copper	13	1.0	200.8	4-28-16	4-28-16	
Zinc	550	5.0	200.8	4-28-16	4-28-16	
Lab ID:	04-188-11					
Client ID:	EVALSS-20160424					
Copper	1.1	1.0	200.8	4-28-16	4-28-16	
Zinc	5.8	5.0	200.8	4-28-16	4-28-16	
Lab ID:	04-188-12					
Client ID:	EVAMS-20160424					
Copper	ND	1.0	200.8	4-28-16	4-28-16	
Zinc	ND	5.0	200.8	4-28-16	4-28-16	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
<hr/>						
Lab ID:	04-188-13					
Client ID:	COUMI-20160424					
Copper	4.5	1.0	200.8	4-28-16	4-28-16	
Zinc	35	5.0	200.8	4-28-16	4-28-16	
<hr/>						
<hr/>						
Lab ID:	04-188-14					
Client ID:	COUMO-20160424					
Copper	4.5	1.0	200.8	4-28-16	4-28-16	
Zinc	55	5.0	200.8	4-28-16	4-28-16	
<hr/>						
<hr/>						
Lab ID:	04-188-15					
Client ID:	QA5-20160424					
Copper	11	1.0	200.8	4-28-16	4-28-16	
Zinc	330	5.0	200.8	4-28-16	4-28-16	
<hr/>						

Date of Report: May 11, 2016
Samples Submitted: April 24, 2016
Laboratory Reference: 1604-188
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 4-28-16
Date Analyzed: 4-28-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0428WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0

Date of Report: May 11, 2016
Samples Submitted: April 24, 2016
Laboratory Reference: 1604-188
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 4-28-16
Date Analyzed: 4-28-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 04-188-05

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	8.50	8.24	3	1.0	
Zinc	36.0	34.2	5	5	

Date of Report: May 11, 2016
 Samples Submitted: April 24, 2016
 Laboratory Reference: 1604-188
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 4-28-16

Date Analyzed: 4-28-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 04-188-05

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	101	92	108	99	7	
Zinc	100	131	95	138	102	5	



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference



Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
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Services**

May 10 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
MONM-20160424	Water	16-A006452	Micro, NUT
MONMN-20160424	Water	16-A006453	Micro, NUT
MONMS-20160424	Water	16-A006454	Micro, NUT
TYLMI-20160424	Water	16-A006455	Micro, NUT
TYLMO-20160424	Water	16-A006456	Micro, NUT
SEIMS-20160424	Water	16-A006457	Micro, NUT
SEIMN-20160424	Water	16-A006458	Micro, NUT
COLM-20160424	Water	16-A006459	Micro, NUT
TOSMO-20160424	Water	16-A006460	Micro, NUT
TOSMI-20160424	Water	16-A006461	Micro, NUT
EVALSS-20160424	Water	16-A006462	Micro, NUT
EVAMS-20160424	Water	16-A006463	Micro, NUT
COUMI-20160424	Water	16-A006464	Micro, NUT
COUMO-20160424	Water	16-A006465	Micro, NUT
QA5-20160424	Water	16-A006466	Micro, NUT

Your samples were received on Monday, April 25, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
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Services**

May 10 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 04-188
PO Number: 14-05806-000

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 04-188
PO Number: 14-05806-000
All results reported on an as received basis.

Date Received: 04/25/16
Date Reported: 5/10/16

AMTEST Identification Number 16-A006452
Client Identification MONM-20160424
Sampling Date 04/24/16, 13:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1200	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	1.77	mg/l		0.1			
Total Nitrogen (TKN)	1.39	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.38	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006453
Client Identification MONMN-20160424
Sampling Date 04/24/16, 12:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1300	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	0.83	mg/l		0.1			
Total Nitrogen (TKN)	0.501	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.33	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006454
Client Identification MONMS-20160424
Sampling Date 04/24/16, 12:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1600	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	0.84	mg/l		0.1			
Total Nitrogen (TKN)	0.565	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006455
Client Identification TYLMI-20160424
Sampling Date 04/24/16, 13:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	200	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	1.34	mg/l		0.1			
Total Nitrogen (TKN)	0.380	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.96	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006456
Client Identification TYLMO-20160424
Sampling Date 04/24/16, 13:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2.	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	0.56	mg/l		0.1			
Total Nitrogen (TKN)	0.195	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.36	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number **16-A006457**
Client Identification **SEIMS-20160424**
Sampling Date **04/24/16, 14:15**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	180	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	0.62	mg/l		0.1			
Total Nitrogen (TKN)	0.426	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.19	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number **16-A006458**
Client Identification **SEIMN-20160424**
Sampling Date **04/24/16, 15:15**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	140	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	0.27	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006459
Client Identification COLM-20160424
Sampling Date 04/24/16, 15:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	36.	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	0.34	mg/l		0.1			
Total Nitrogen (TKN)	0.288	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.053	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006460
Client Identification TOSMO-20160424
Sampling Date 04/24/16, 13:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	14.	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	1.37	mg/l		0.1			
Total Nitrogen (TKN)	1.06	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.31	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006461
Client Identification TOSMI-20160424
Sampling Date 04/24/16, 12:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	40.	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	1.29	mg/l		0.1			
Total Nitrogen (TKN)	1.04	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.25	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006462
Client Identification EVALSS-20160424
Sampling Date 04/24/16, 16:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	290	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	1.31	mg/l		0.1			
Total Nitrogen (TKN)	0.109	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	1.2	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006463
Client Identification EVAMS-20160424
Sampling Date 04/24/16, 15:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	390	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	1.69	mg/l		0.1			
Total Nitrogen (TKN)	0.288	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	1.4	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006464
Client Identification COUMI-20160424
Sampling Date 04/24/16, 15:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	810	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	0.94	mg/l		0.1			
Total Nitrogen (TKN)	0.553	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.39	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006465
Client Identification COUMO-20160424
Sampling Date 04/24/16, 14:20

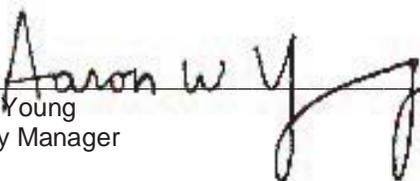
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1600	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	0.86	mg/l		0.1			
Total Nitrogen (TKN)	0.470	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.39	mg/l		0.01	SM4500NO3	JR	04/26/16

AMTEST Identification Number 16-A006466
Client Identification QA5-20160424
Sampling Date 04/24/16, 10:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	< 2	CFU/100 ml		1	SM 9222D	JM	04/25/16
Total Nitrogen (NOX&TKN)	1.48	mg/l		0.1			
Total Nitrogen (TKN)	1.18	mg/l		0.1	SM4500N	MJ	05/03/16
Nitrate + Nitrite	0.30	mg/l		0.01	SM4500NO3	JR	04/26/16


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A006452 to 16-A006466

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A006457	Fecal Coliform	CFU/100 ml	180	220	20.
16-A006462	Fecal Coliform	CFU/100 ml	290	330	13.
16-A006156	Total Nitrogen (TKN)	mg/l	0.238	0.275	14.
16-A006178	Total Nitrogen (TKN)	mg/l	0.382	0.350	8.7
16-A006447	Total Nitrogen (TKN)	mg/l	0.347	0.301	14.
16-A006461	Total Nitrogen (TKN)	mg/l	1.04	1.08	3.8
16-A006563	Total Nitrogen (TKN)	mg/l	0.423	0.401	5.3
16-A006687	Total Nitrogen (TKN)	mg/l	0.537	0.579	7.5
16-A006942	Total Nitrogen (TKN)	mg/l	0.289	0.347	18.
16-A006954	Total Nitrogen (TKN)	mg/l	1.46	1.42	2.8
16-A006112	Nitrate + Nitrite	mg/l	2.2	2.1	4.7
16-A006160	Nitrate + Nitrite	mg/l	0.18	0.18	0.00
16-A006272	Nitrate + Nitrite	mg/l	0.091	0.097	6.4
16-A006340	Nitrate + Nitrite	mg/l	0.52	0.51	1.9
16-A006454	Nitrate + Nitrite	mg/l	0.27	0.27	0.00
16-A006464	Nitrate + Nitrite	mg/l	0.39	0.37	5.3
16-A006466	Nitrate + Nitrite	mg/l	0.30	0.27	11.

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A006156	Total Nitrogen (TKN)	mg/l	0.238	1.27	1.00	103.20 %
16-A006178	Total Nitrogen (TKN)	mg/l	0.382	1.01	0.500	125.60 %
16-A006447	Total Nitrogen (TKN)	mg/l	0.347	1.29	1.00	94.30 %
16-A006461	Total Nitrogen (TKN)	mg/l	1.04	2.14	1.00	110.00 %
16-A006563	Total Nitrogen (TKN)	mg/l	0.423	1.44	1.00	101.70 %
16-A006687	Total Nitrogen (TKN)	mg/l	0.537	1.74	1.00	120.30 %
16-A006942	Total Nitrogen (TKN)	mg/l	0.289	1.55	1.00	126.10 %
16-A006112	Nitrate + Nitrite	mg/l	2.2	2.7	0.50	100.00 %
16-A006160	Nitrate + Nitrite	mg/l	0.18	0.63	0.50	90.00 %
16-A006272	Nitrate + Nitrite	mg/l	0.091	0.53	0.50	87.80 %
16-A006340	Nitrate + Nitrite	mg/l	0.52	1.0	0.50	96.00 %
16-A006454	Nitrate + Nitrite	mg/l	0.27	0.70	0.50	86.00 %
16-A006464	Nitrate + Nitrite	mg/l	0.39	0.82	0.50	86.00 %
16-A006466	Nitrate + Nitrite	mg/l	0.30	0.72	0.50	84.00 %

QC Summary for sample numbers: 16-A006452 to 16-A006466...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.495	99.0 %
Total Nitrogen (TKN)	mg/l	0.500	0.510	102. %
Total Nitrogen (TKN)	mg/l	0.500	0.532	106. %
Nitrate + Nitrite	mg/l	0.50	0.46	92.0 %
Nitrate + Nitrite	mg/l	0.50	0.47	94.0 %
Nitrate + Nitrite	mg/l	0.50	0.47	94.0 %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 04-188

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	MONTM-20160424 <i>6452</i>	4/24/16	13:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
2	MONMN-20160424 <i>53</i>	4/24/16	12:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
3	MONMS-20160424 <i>54</i>	4/24/16	12:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
4	TYLMI-20160424 <i>55</i>	4/24/16	13:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
5	TYLMO-20160424 <i>56</i>	4/24/16	13:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
6	SEIMS-20160424 <i>57</i>	4/24/16	14:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
7	SEIMN <i>SEM</i> <i>4/25/16</i> SEM-20160424 <i>58</i>	4/24/16	15:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
8	COLMN <i>59</i> COLM-20160424	4/24/16	15:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
9	TOSMO-20160424 <i>60</i>	4/24/16	13:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
10	TOSMI-20160424 <i>61</i>	4/24/16	12:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N B
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by: <i>[Signature]</i>		<i>CSV</i>		<i>4/25/16</i>	<i>11:00</i>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:						
Relinquished by:						
Received by:						
Relinquished by:						
Received by: <i>CH</i>		<i>Amtest</i>		<i>4/29/16</i>	<i>11:10</i>	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Ittner

Sample Date: 4-24-16

Sample Time: 15:00

SITE ID: COMMI

Base Flow or Storm Event? Storm

Field Filtered Time: 15:10

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Water Quality Sampling

Sample ID: COMMI-20160424

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 43° cloudy - Light rain

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]

Date Checked: 4-27-16 Time: 5:23

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: meter calibration failure
* Reject Conductivity Data *

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.291

Reference Point (description): Top of pin down

Water Quality Measurements

Temperature (°C) 6.4°

Conductivity (µs/cm) 393 Reject SL

Dissolved Oxygen (mg/L) 12.03

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Iffner

Sample Date: 4-24-16

Sample Time: 14:20

FDT:

SITE ID: Coumo

Base Flow or Storm Event? storm

Field Filtered Time: 14:30

PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 43° cloudy

Water Quality Sampling

Sample ID: Coumo-20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	}
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Leuth

Signature: [Signature]

Date Checked: 4-27-16

Time:

4:50

Date Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes: Calibration of conductivity meter - field REJECT DATA

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft):

0.95'

Reference Point (description):

TOP of pin down

Water Quality Measurements

Temperature (°C)

7.4° C

Conductivity (µs/cm)

345

Dissolved Oxygen (mg/L)

11.52

REJECT

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW

Sample Date: 4/24/2016

Sample Time: 13:00

SITE ID: MONTA

Base Flow or Storm Event? storm

Field Filtered Time: 13:00

PDT:
PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 48: sprinkling

Water Quality Sampling

Sample ID: MONTA 2016 0424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
Filter blank sample ID: _____
Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: ~~not brown~~ not clear/bubbly
Color: brown not soap
Odor: none
Sheen: none
Floatables: turbid

LABORATORY DELIVERY

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.6

Reference Point (description): from top of culvert to water flowing over weir

Water Quality Measurements

Temperature (°C) 10.50
 Conductivity (µs/cm) 168
 Dissolved Oxygen (mg/L) 10.94

Quality Assurance

Checked By: Jolan Lenth Signature: [Signature]
 Date Checked: 4-27-16 Time: 14:54
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW

Sample Date: 4/24/16

Sample Time: 12:10

PDT:

SITE ID: MONMN
MONMN

Base Flow or Storm Event? Storm

Field Filtered Time: 12:10

PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: MONMN20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 μm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: no color
 Odor: no odor
 Sheen: no
 Floatables: no high turbidity

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 4-27-16 Time: 4:55
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Current Weather and Temp: 48° showers

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.0

Reference Point (description): nail by boulder

Water Quality Measurements

Temperature (°C) 9.5

Conductivity (μs/cm) 150

Dissolved Oxygen (mg/L) 10.55

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW

Sample Date: 4/24/2016

Sample Time: 12:45

SITE ID: MONMS

Base Flow or Storm Event? Storm

Field Filtered Time: 12:45

PDT:
PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 48 sprinkling/sunny

Water Quality Sampling

Sample ID: MONMS20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
Filter blank sample ID: _____
Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
Color: none
Odor: none
Sheen: none
Floatables: none - light turbidity

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Juan Lopez Signature: _____
Date Checked: 4-27-16 Time: 4:56
Data Entered into Database? YES NO initials: _____
Date Entered: _____ Time: _____
Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.67

Reference Point (description): Downstream Pipe in manhole

Water Quality Measurements

Temperature (°C) 10.36

Conductivity (µs/cm) 185

Dissolved Oxygen (mg/L) 8.98

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW

Sample Date: 4/24/2016

Sample Time: 13:25

SITE ID: TYLERSMID TYLMI

Base Flow or Storm Event?

Field Filtered Time: 13:25
(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 48 sprinkling

Water Quality Sampling

Sample ID: TYLMI-20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 μm filter and vacuum hand pump

Duplicate sample ID: _____
Filter blank sample ID: _____
Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
Color: none
Odor: none
Sheen: none
Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Keith Signature: [Signature]

Date Checked: 4-27-16 Time: 4:56

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.50

Reference Point (description): top of culvert (middle) to water surface

Water Quality Measurements

Temperature (°C) 10.23

Conductivity (μs/cm) 200

Dissolved Oxygen (mg/L) 11.28

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW

Sample Date: 4/24/2016

Sample Time: 13:50

SITE ID: TYLERSMou TYLMO

Base Flow or Storm Event? Storm

Field Filtered Time: 13:50

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Water Quality Sampling

Sample ID: TYLMO-20160424

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 48 sprinkling

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: no color
 Odor: light asphalt / car road smell
 Sheen: none
 Floatables: very light turbidity

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leath Signature: [Signature]
 Date Checked: 4-27-16 Time: 4:57
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.77

Reference Point (description): top of culvert to ~~at~~ water surface

Water Quality Measurements

Temperature (°C) 10.94

Conductivity (µs/cm) 115

Dissolved Oxygen (mg/L) 11.02

* sample bottles say 12:35 - correct time is 14:15

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/KW

Sample Date: 4/24/2016

Sample Time: 14:15

PDT:

SITE ID: Seidelmids (SEIMS)

Base Flow or Storm Event? Storm

Field Filtered Time: 14:15
(Must filter within 15 minutes of collection)

PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 48 sprinkling

Water Quality Sampling

Sample ID: SEIMS20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: not clear.

Color: Tannin

Odor: none

Sheen: none

Floatables: some turbidity

LABORATORY DELIVERY

Date: _____

Time: _____

Quality Assurance

Checked By: John Leuth Signature: [Signature]

Date Checked: 4-27-16 Time: 5:03

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.67

Reference Point (description): bottom of nail

Water Quality Measurements

Temperature (°C) 9.44

Conductivity (µs/cm) 75

Dissolved Oxygen (mg/L) 10.96

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/vw

Sample Date: 04/24/2016

Sample Time: 15:15

PDT:

SITE ID: SEIDEMN (SEIMN)

Base Flow or Storm Event? Storm

Field Filtered Time: 15:15

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 48 sprinkling

Water Quality Sampling

Sample ID: SEIMN-20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: none
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]

Date Checked: 4-27-16 Time: 5:11

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.71

Reference Point (description): top of bolt on pipe.

Water Quality Measurements

Temperature (°C) 8.73

Conductivity (µs/cm) 101.7

Dissolved Oxygen (mg/L) 11.83

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW

Sample Date: 4/24/2016

Sample Time: 15:30

SITE ID: COLLIMMOUTH (COLM)

Base Flow or Storm Event? Storm

Field Filtered Time: 15:45

PDT:
PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 48 sprinkling

Water Quality Sampling

Sample ID: COLM20160427

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
Filter blank sample ID: _____
Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
Color: hahn
Odor: none
Sheen: none
Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sohn Leuth Signature: _____
Date Checked: 5-27-16 Time: 5:13
Data Entered into Database? YES NO initials: _____
Date Entered: _____ Time: _____
Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): _____

Reference Point (description): _____

Water Quality Measurements

Temperature (°C) 10.24

Conductivity (µs/cm) 35

Dissolved Oxygen (mg/L) 9.66

→ Salmon fry in stream. @ sample spot

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Gi Iffner
 Sample Date: 4-24-16 Sample Time: 13:00 PDT:
 Base Flow or Storm Event? Storm Field-Filtered Time: 13:10 PST:
(Must filter within 15 minutes of collection)

SITE ID: TOSMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 43° Rain

Water Quality Sampling

Sample ID: TOSMO-20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	✓
DOC *	HDPE	250 ml	1	HCL	✓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	✓
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	✓
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	✓
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	✓
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	✓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: RAS-20160424 @ 10:00AM
 Filter blank sample ID: NA >
 Transfer blank sample ID: NA >

Visual and Olfactory Conditions:
 Clarity: Very slightly turbid
 Color: colorless
 Odor: odorless
 Sheen: NA >
 Floatables: NA >

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 4-27-16 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: Meter Calibration Failure
* REJECT Conductivity data *

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.29
 Reference Point (description): Top of pin down

Water Quality Measurements

Temperature (°C) 7.1
 Conductivity (µs/cm) 244 Reject JC
 Dissolved Oxygen (mg/L) 12.00

[Handwritten Signature]

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Jaffer

Sample Date: 4/24/16

Sample Time: 12:10

PDT:

SITE ID: TOSMI

Base Flow or Storm Event? Storm

Field Filtered Time: 12:20

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rain 43° F

Water Quality Sampling

Sample ID: TOSMI-20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NA
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 um filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: Slightly turbid.
 Color: clear
 Odor: odorless
 Sheen: NA
 Floatables: NA

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Leuth Signature: [Signature]

Date Checked: 5-27-16 Time: 5:15

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes: Meter Calibration Failure
* Reject Conductivity Data *

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.027

Reference Point (description): Bottom edge spike in stream bed.

Water Quality Measurements

Temperature (°C) 7.6° C

Conductivity (µs/cm) 205. Reject JL

Dissolved Oxygen (mg/L) 11.88

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Iffner
 Sample Date: 4-24-16 Sample Time: 16:10 PDT:
 Base Flow or Storm Event? storm Field Filtered Time: 16:20 PST:
(Must filter within 15 minutes of collection)

SITE ID: EVALSS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: EVALSS-20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: _____
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 4-22-16 Time: 5:18
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: Meter Calibration Failure
* Reject Conductivity Data *

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 46° cloudy

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 1.65'
 Reference Point (description): Top of PVC down w/ water level indicator

Water Quality Measurements

Temperature (°C) 6.4°
 Conductivity (µs/cm) 336 Reject IL
 Dissolved Oxygen (mg/L) 12.19

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: G. Ifsher

Sample Date: 4-24-16

Sample Time: 15:30

PDT:

SITE ID: EVAMS

Base Flow or Storm Event? Storm

Field Filtered Time: 15:40

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 46° light rain

Water Quality Sampling

Sample ID: EVAMS-20160424

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: _____
 Floatables: NA

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Robin Leath Signature: [Signature]

Date Checked: 4-27-16 Time: 5:22

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: Meter Calibration Failure
* Reject Conductivity Data *

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.19'

Reference Point (description): Top of fence post down.

Water Quality Measurements

Temperature (°C) 6.5°

Conductivity (µs/cm) 354

Reject IC

Dissolved Oxygen (mg/L) 11.97

METER CALIBRATION LOG - Redmond Paired Watershed Study



Project Number: 14-05806-000
Personnel Performing Calibration: G. Iffner
Meter: YSI PRO
Date/Time: 4/24/16 10:15
Barometric Pressure Start of Day: Inches Hg: 759.7 Time: 10:15
Barometric Pressure End of Day: Inches Hg: 761.4 Time: 19:10

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes: (SpCond)

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	64.	0	18.1	Poor Cal.
Conductivity (µS/cm)	106.1	100	17.5	okay cal.
DO % Saturation	104.1	100	17.8	Good ✓

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	72	0	15.6	Poor Cal.
Conductivity (µS/cm)	225.1	100	15.5°C	Poor cal.
DO % Saturation	100.7	100	15.6	Okay Cal.

100.7 Hce

Note errors with conductivity calibration - field measurement not accurate.

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®).
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup to within a centimeter of the top of the calibration cup with dilute standard (100 µS) so that the probes are covered.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate value for the standard into SpCond. *Specific Cond.*
- Dissolved Oxygen Calibration Notes:** (%)
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
 Personnel Performing Calibration: Valerie Wu
 Meter: 556 MPS
 Date/Time: 4/24/2016 10:15
 Barometric Pressure Start of Day: Inches Hg: 760.2 Time: 10:15
 Barometric Pressure End of Day: Inches Hg: 761.6 Time: 19:05

Calibration Procedures:

Rinse Multimetric Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes: (SpC. cond)



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	3	0	21.08	Good cal.
Conductivity (µS/cm)	100 ⁹⁹	100	21.08	Okay cal.
DO % Saturation	105.4	100	21.07	Good cal.

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	3	0	20.22	Good cal.
Conductivity (µS/cm)	101	100	20.07	Good cal.
DO % Saturation	102.7	100	19.02	Good cal.

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®).
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup to within a centimeter of the top of the calibration cup with dilute standard (100 µS) so that the probes are covered.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate value for the standard into SpCond.

Dissolved Oxygen Calibration Notes: (0/0)

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



Data Quality Assurance Worksheet

G

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 5/18/2016 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials
JL

Sample Date/Sample ID: 4/24/2016 / All sites, 1 FD (QA5) at TOSMO

date 5/23/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	5	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	98	±20	5	≤25	13	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	Batch 2	≤25	8.7	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	8	≤180	≤1.0 mg/L 1.0 mg/L	105,98	±25	103	±15	7	≤20	0	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	2	≤28	≤1.0 mg/L 1.0 mg/L	110	±25	114	±15	1	≤20	8.4	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	4	≤28	≤0.01 mg/L 0.01 mg/L	96	±25	91	±20	0	≤20	6.1	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	2-9	≤28	≤0.1 mg/L 0.1 mg/L	84-126	±25	92-106	±20	0-18	≤20	11 3.3	≤20	OK	NO FLAG FOR MS – MARGINAL EXCEEDANCE (1%)

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 5/18/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 4/24/2016 / All sites, 1 FD (QA5) at TOSMO

date 5/23/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	4	≤180	≤1.0 µg/L 1.0 µg/L	92,99	±25	NR	±15	3	≤20	0	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	4	≤180	≤5.0 µg/L 5.0 µg/L	95,102	±25	NR	±15	5	≤20	5.9	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	3	≤180	≤1.0 µg/L 1.0 µg/L	86,87	±25	NR	±15	11	≤20	7.3	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	3	≤180	≤5.0 µg/L 5.0 µg/L	96,96	±25	NR	±15	3	≤20	7.4	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	20,13	≤35	NC	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 13, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1605-187

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on May 21, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 13, 2016
Samples Submitted: May 21, 2016
Laboratory Reference: 1605-187
Project: 14-05806-000

Case Narrative

Samples were collected on May 21, 2016 and received by the laboratory on May 21, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: June 13, 2016
 Samples Submitted: May 21, 2016
 Laboratory Reference: 1605-187
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160521					
Laboratory ID:	05-187-01					
Total Suspended Solids	11	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	COUMI-20160521					
Laboratory ID:	05-187-02					
Total Suspended Solids	27	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	COUMO-20160521					
Laboratory ID:	05-187-03					
Total Suspended Solids	9.6	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	EVAMS-20160521					
Laboratory ID:	05-187-04					
Total Suspended Solids	21	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	EVALSS-20160521					
Laboratory ID:	05-187-05					
Total Suspended Solids	19	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	MONMN-20160521					
Laboratory ID:	05-187-06					
Total Suspended Solids	5.4	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	MONMS-20160521					
Laboratory ID:	05-187-07					
Total Suspended Solids	2.6	1.0	SM 2540D	5-23-16	5-24-16	



Date of Report: June 13, 2016
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**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160521					
Laboratory ID:	05-187-08					
Total Suspended Solids	4.4	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	SEIMN-20160521					
Laboratory ID:	05-187-09					
Total Suspended Solids	13	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	SEIMS-20160521					
Laboratory ID:	05-187-10					
Total Suspended Solids	30	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	TOSMI-20160521					
Laboratory ID:	05-187-11					
Total Suspended Solids	92	1.1	SM 2540D	5-23-16	5-24-16	

Client ID:	TOSMO-20160521					
Laboratory ID:	05-187-12					
Total Suspended Solids	26	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	TYLMI-20160521					
Laboratory ID:	05-187-13					
Total Suspended Solids	16	1.0	SM 2540D	5-23-16	5-24-16	

Client ID:	TYLMO-20160521					
Laboratory ID:	05-187-14					
Total Suspended Solids	20	1.0	SM 2540D	5-23-16	5-24-16	



Date of Report: June 13, 2016
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TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA6-20160521					
Laboratory ID:	05-187-15					
Total Suspended Solids	12	1.0	SM 2540D	5-23-16	5-24-16	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0523W2					
Total Suspended Solids	ND	1.0	SM 2540D	5-23-16	5-24-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-187-08							
	ORIG	DUP						
Total Suspended Solids	4.40	4.20	NA	NA	NA	NA	5	17

SPIKE BLANK								
Laboratory ID:	SB0523W2							
	SB	SB		SB				
Total Suspended Solids	90.0	100	NA	90	75-114	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160521					
Laboratory ID:	05-187-01					
Turbidity	2.9	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	COUMI-20160521					
Laboratory ID:	05-187-02					
Turbidity	9.6	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	COUMO-20160521					
Laboratory ID:	05-187-03					
Turbidity	5.0	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	EVAMS-20160521					
Laboratory ID:	05-187-04					
Turbidity	5.5	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	EVALSS-20160521					
Laboratory ID:	05-187-05					
Turbidity	4.3	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	MONMN-20160521					
Laboratory ID:	05-187-06					
Turbidity	2.9	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	MONMS-20160521					
Laboratory ID:	05-187-07					
Turbidity	2.1	0.10	EPA 180.1	5-22-16	5-22-16	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160521					
Laboratory ID:	05-187-08					
Turbidity	2.5	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	SEIMN-20160521					
Laboratory ID:	05-187-09					
Turbidity	5.3	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	SEIMS-20160521					
Laboratory ID:	05-187-10					
Turbidity	7.3	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	TOSMI-20160521					
Laboratory ID:	05-187-11					
Turbidity	21	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	TOSMO-20160521					
Laboratory ID:	05-187-12					
Turbidity	6.6	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	TYLMI-20160521					
Laboratory ID:	05-187-13					
Turbidity	4.8	0.10	EPA 180.1	5-22-16	5-22-16	

Client ID:	TYLMO-20160521					
Laboratory ID:	05-187-14					
Turbidity	6.5	0.10	EPA 180.1	5-22-16	5-22-16	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA6-20160521					
Laboratory ID:	05-187-15					
Turbidity	6.0	0.10	EPA 180.1	5-22-16	5-22-16	



Date of Report: June 13, 2016
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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0522W1					
Turbidity	ND	0.10	EPA 180.1	5-22-16	5-22-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-187-01							
	ORIG	DUP						
Turbidity	2.88	2.89	NA	NA	NA	NA	0	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160521					
Laboratory ID:	05-187-01					
Hardness	13	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	COUMI-20160521					
Laboratory ID:	05-187-02					
Hardness	130	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	COUMO-20160521					
Laboratory ID:	05-187-03					
Hardness	95	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	EVAMS-20160521					
Laboratory ID:	05-187-04					
Hardness	100	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	EVALSS-20160521					
Laboratory ID:	05-187-05					
Hardness	92	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	MONMN-20160521					
Laboratory ID:	05-187-06					
Hardness	60	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	MONMS-20160521					
Laboratory ID:	05-187-07					
Hardness	140	5.0	200.7/SM 2340B	5-25-16	5-26-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160521					
Laboratory ID:	05-187-08					
Hardness	80	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	SEIMN-20160521					
Laboratory ID:	05-187-09					
Hardness	44	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	SEIMS-20160521					
Laboratory ID:	05-187-10					
Hardness	53	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	TOSMI-20160521					
Laboratory ID:	05-187-11					
Hardness	68	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	TOSMO-20160521					
Laboratory ID:	05-187-12					
Hardness	110	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	TYLMI-20160521					
Laboratory ID:	05-187-13					
Hardness	66	5.0	200.7/SM 2340B	5-25-16	5-26-16	

Client ID:	TYLMO-20160521					
Laboratory ID:	05-187-14					
Hardness	84	5.0	200.7/SM 2340B	5-25-16	5-26-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA6-20160521					
Laboratory ID:	05-187-15					
Hardness	42	5.0	200.7/SM 2340B	5-25-16	5-26-16	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0525WH2					
Hardness	ND	1.0	200.7/SM 2340B	5-25-16	5-26-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-187-01							
	ORIG	DUP						
Hardness	13.5	13.5	NA	NA	NA	0	20	

MATRIX SPIKES

Laboratory ID:	05-187-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	149	150	132	132	13.5	103	103	75-125	1	20

SPIKE BLANK

Laboratory ID:	SB0525WH2									
	SB		SB		SB					
Hardness	137		132		104			80-120	NA	NA



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160521					
Laboratory ID:	05-187-01					
Dissolved Organic Carbon	13	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	COUMI-20160521					
Laboratory ID:	05-187-02					
Dissolved Organic Carbon	4.9	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	COUMO-20160521					
Laboratory ID:	05-187-03					
Dissolved Organic Carbon	4.6	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	EVAMS-20160521					
Laboratory ID:	05-187-04					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	EVALSS-20160521					
Laboratory ID:	05-187-05					
Dissolved Organic Carbon	3.0	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	MONMN-20160521					
Laboratory ID:	05-187-06					
Dissolved Organic Carbon	4.9	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	MONMS-20160521					
Laboratory ID:	05-187-07					
Dissolved Organic Carbon	6.6	1.0	SM 5310B	5-24-16	5-24-16	



Date of Report: June 13, 2016
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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160521					
Laboratory ID:	05-187-08					
Dissolved Organic Carbon	4.8	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	SEIMN-20160521					
Laboratory ID:	05-187-09					
Dissolved Organic Carbon	4.3	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	SEIMS-20160521					
Laboratory ID:	05-187-10					
Dissolved Organic Carbon	4.8	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	TOSMI-20160521					
Laboratory ID:	05-187-11					
Dissolved Organic Carbon	8.9	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	TOSMO-20160521					
Laboratory ID:	05-187-12					
Dissolved Organic Carbon	3.3	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	TYLMI-20160521					
Laboratory ID:	05-187-13					
Dissolved Organic Carbon	6.5	1.0	SM 5310B	5-24-16	5-24-16	
Client ID:	TYLMO-20160521					
Laboratory ID:	05-187-14					
Dissolved Organic Carbon	5.2	1.0	SM 5310B	5-24-16	5-24-16	



Date of Report: June 13, 2016
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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA6-20160521					
Laboratory ID:	05-187-15					
Dissolved Organic Carbon	4.0	1.0	SM 5310B	5-24-16	5-24-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0524D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	5-24-16	5-24-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-187-02							
	ORIG	DUP						
Dissolved Organic Carbon	4.86	4.57	NA	NA	NA	6	20	

MATRIX SPIKE

Laboratory ID:	05-187-02							
	MS	MS		MS				
Dissolved Organic Carbon	14.6	10.0	4.86	97	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0524D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.5	10.0	NA	105	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160521					
Laboratory ID:	05-187-01					
Total Phosphorus	0.055	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	COUMI-20160521					
Laboratory ID:	05-187-02					
Total Phosphorus	0.14	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	COUMO-20160521					
Laboratory ID:	05-187-03					
Total Phosphorus	0.081	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	EVAMS-20160521					
Laboratory ID:	05-187-04					
Total Phosphorus	0.052	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	EVALSS-20160521					
Laboratory ID:	05-187-05					
Total Phosphorus	0.036	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	MONMN-20160521					
Laboratory ID:	05-187-06					
Total Phosphorus	0.049	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	MONMS-20160521					
Laboratory ID:	05-187-07					
Total Phosphorus	0.027	0.010	EPA 365.1	5-31-16	5-31-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160521					
Laboratory ID:	05-187-08					
Total Phosphorus	0.046	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	SEIMN-20160521					
Laboratory ID:	05-187-09					
Total Phosphorus	0.067	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	SEIMS-20160521					
Laboratory ID:	05-187-10					
Total Phosphorus	0.073	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	TOSMI-20160521					
Laboratory ID:	05-187-11					
Total Phosphorus	0.11	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	TOSMO-20160521					
Laboratory ID:	05-187-12					
Total Phosphorus	0.074	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	TYLMI-20160521					
Laboratory ID:	05-187-13					
Total Phosphorus	0.046	0.010	EPA 365.1	5-31-16	5-31-16	

Client ID:	TYLMO-20160521					
Laboratory ID:	05-187-14					
Total Phosphorus	0.086	0.010	EPA 365.1	5-31-16	5-31-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA6-20160521					
Laboratory ID:	05-187-15					
Total Phosphorus	0.066	0.010	EPA 365.1	5-31-16	5-31-16	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0531W2					
Total Phosphorus	ND	0.010	EPA 365.1	5-31-16	5-31-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-187-01							
	ORIG	DUP						
Total Phosphorus	0.0548	0.0553	NA	NA	NA	1	10	

MATRIX SPIKE								
Laboratory ID:	05-187-01							
	MS	MS		MS				
Total Phosphorus	0.327	0.250	0.0548	109	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0531W2							
	SB	SB		SB				
Total Phosphorus	0.238	0.250	NA	95	86-112	NA	NA	



Date of Report: June 13, 2016
 Samples Submitted: May 21, 2016
 Laboratory Reference: 1605-187
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-187-01						
Client ID: COLM-20160521						
Copper	ND	1.0	200.8	5-25-16	5-25-16	
Zinc	ND	5.0	200.8	5-25-16	5-25-16	
Lab ID: 05-187-02						
Client ID: COUMI-20160521						
Copper	2.6	1.0	200.8	5-25-16	5-25-16	
Zinc	32	5.0	200.8	5-25-16	5-25-16	
Lab ID: 05-187-03						
Client ID: COUMO-20160521						
Copper	3.8	1.0	200.8	5-25-16	5-25-16	
Zinc	18	5.0	200.8	5-25-16	5-25-16	
Lab ID: 05-187-04						
Client ID: EVAMS-20160521						
Copper	ND	1.0	200.8	5-25-16	5-25-16	
Zinc	8.7	5.0	200.8	5-25-16	5-25-16	
Lab ID: 05-187-05						
Client ID: EVALSS-20160521						
Copper	ND	1.0	200.8	5-25-16	5-25-16	
Zinc	6.5	5.0	200.8	5-25-16	5-25-16	
Lab ID: 05-187-06						
Client ID: MONMN-20160521						
Copper	ND	1.0	200.8	5-25-16	5-25-16	
Zinc	7.8	5.0	200.8	5-25-16	5-25-16	



Date of Report: June 13, 2016
 Samples Submitted: May 21, 2016
 Laboratory Reference: 1605-187
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-187-07						
Client ID: MONMS-20160521						
Copper	1.2	1.0	200.8	5-25-16	5-25-16	
Zinc	10	5.0	200.8	5-25-16	5-25-16	
Lab ID: 05-187-08						
Client ID: MONM-20160521						
Copper	ND	1.0	200.8	5-25-16	5-25-16	
Zinc	22	5.0	200.8	5-25-16	5-25-16	
Lab ID: 05-187-09						
Client ID: SEIMN-20160521						
Copper	ND	1.0	200.8	5-25-16	5-25-16	
Zinc	5.5	5.0	200.8	5-25-16	6-1-16	
Lab ID: 05-187-10						
Client ID: SEIMS-20160521						
Copper	ND	1.0	200.8	5-25-16	5-25-16	
Zinc	6.3	5.0	200.8	5-25-16	5-25-16	
Lab ID: 05-187-11						
Client ID: TOSMI-20160521						
Copper	10	1.0	200.8	5-25-16	5-25-16	
Zinc	82	5.0	200.8	5-25-16	5-25-16	
Lab ID: 05-187-12						
Client ID: TOSMO-20160521						
Copper	2.0	1.0	200.8	5-25-16	5-25-16	
Zinc	25	5.0	200.8	5-25-16	5-25-16	



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 Samples Submitted: May 21, 2016
 Laboratory Reference: 1605-187
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-187-13					
Client ID:	TYLMI-20160521					
Copper	5.7	1.0	200.8	5-25-16	5-25-16	
Zinc	32	5.0	200.8	5-25-16	5-25-16	
Lab ID:	05-187-14					
Client ID:	TYLMO-20160521					
Copper	4.6	1.0	200.8	5-25-16	5-25-16	
Zinc	26	5.0	200.8	5-25-16	5-25-16	
Lab ID:	05-187-15					
Client ID:	QA6-20160521					
Copper	ND	1.0	200.8	5-25-16	5-25-16	
Zinc	ND	5.0	200.8	5-25-16	5-25-16	



Date of Report: June 13, 2016
Samples Submitted: May 21, 2016
Laboratory Reference: 1605-187
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 5-25-16
Date Analyzed: 5-25-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0525WH2

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 13, 2016
 Samples Submitted: May 21, 2016
 Laboratory Reference: 1605-187
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 DUPLICATE QUALITY CONTROL**

Date Extracted: 5-25-16

Date Analyzed: 5-25-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-187-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5	



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 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 5-25-16

Date Analyzed: 5-25-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 05-187-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	94.7	95	92.9	93	2	
Zinc	100	101	101	101	101	0	



Date of Report: June 13, 2016
 Samples Submitted: May 21, 2016
 Laboratory Reference: 1605-187
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-187-01						
Client ID: COLM-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	ND	5.0	200.8		5-25-16	
Lab ID: 05-187-02						
Client ID: COUMI-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	14	5.0	200.8		5-25-16	
Lab ID: 05-187-03						
Client ID: COUMO-20160521						
Copper	2.2	1.0	200.8		5-25-16	
Zinc	11	5.0	200.8		5-25-16	
Lab ID: 05-187-04						
Client ID: EVAMS-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	7.5	5.0	200.8		5-25-16	
Lab ID: 05-187-05						
Client ID: EVALSS-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	ND	5.0	200.8		5-25-16	
Lab ID: 05-187-06						
Client ID: MONMN-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	ND	5.0	200.8		5-25-16	



Date of Report: June 13, 2016
 Samples Submitted: May 21, 2016
 Laboratory Reference: 1605-187
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 05-187-07						
Client ID: MONMS-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	ND	5.0	200.8		5-25-16	
Lab ID: 05-187-08						
Client ID: MONM-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	16	5.0	200.8		5-25-16	
Lab ID: 05-187-09						
Client ID: SEIMN-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	ND	5.0	200.8		5-25-16	
Lab ID: 05-187-10						
Client ID: SEIMS-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	6.7	5.0	200.8		5-25-16	
Lab ID: 05-187-11						
Client ID: TOSMI-20160521						
Copper	4.4	1.0	200.8		5-25-16	
Zinc	29	5.0	200.8		5-25-16	
Lab ID: 05-187-12						
Client ID: TOSMO-20160521						
Copper	ND	1.0	200.8		5-25-16	
Zinc	15	5.0	200.8		5-25-16	



Date of Report: June 13, 2016
 Samples Submitted: May 21, 2016
 Laboratory Reference: 1605-187
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-187-13					
Client ID:	TYLMI-20160521					
Copper	4.3	1.0	200.8		5-25-16	
Zinc	24	5.0	200.8		5-25-16	
Lab ID:	05-187-14					
Client ID:	TYLMO-20160521					
Copper	3.3	1.0	200.8		5-25-16	
Zinc	13	5.0	200.8		5-25-16	
Lab ID:	05-187-15					
Client ID:	QA6-20160521					
Copper	ND	1.0	200.8		5-25-16	
Zinc	ND	5.0	200.8		5-25-16	



Date of Report: June 13, 2016
Samples Submitted: May 21, 2016
Laboratory Reference: 1605-187
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 5-25-16
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0525D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 13, 2016
Samples Submitted: May 21, 2016
Laboratory Reference: 1605-187
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 5-25-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-187-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	14.0	15.1	8	5	



Date of Report: June 13, 2016
 Samples Submitted: May 21, 2016
 Laboratory Reference: 1605-187
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 5-25-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 05-187-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	74.7	93	77.5	97	4	
Zinc	80.0	95.2	101	97.6	104	3	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Jun 12 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20160521	Water	16-A009613	Micro, NUT
COUMI-20160521	Water	16-A009614	Micro, NUT
COUMO-20160521	Water	16-A009615	Micro, NUT
EVAMS-20160521	Water	16-A009616	Micro, NUT
EVALSS-20160521	Water	16-A009617	Micro, NUT
MONMN-20160521	Water	16-A009618	Micro, NUT
MONMS-20160521	Water	16-A009619	Micro, NUT
MONM-20160521	Water	16-A009620	Micro, NUT
SEIMN-20160521	Water	16-A009621	Micro, NUT
SEIMS-20160521	Water	16-A009622	Micro, NUT
TOSMI-20160521	Water	16-A009623	Micro, NUT
TOSMO-20160521	Water	16-A009624	Micro, NUT
TYLMI-20160521	Water	16-A009625	Micro, NUT
TYLMO-20160521	Water	16-A009626	Micro, NUT
QA6-20160521	Water	16-A009627	Micro, NUT

Your samples were received on Saturday, May 21, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
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Jun 12 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



Professional
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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
All results reported on an as received basis.

Date Received: 05/21/16
Date Reported: 6/12/16

AMTEST Identification Number 16-A009613
Client Identification COLM-20160521
Sampling Date 05/21/16, 10:30

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	30.	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.71	mg/l		0.1			
Total Nitrogen (TKN)	0.520	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.19	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009614**
Client Identification **COUMI-20160521**
Sampling Date **05/21/16, 07:15**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	400	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.75	mg/l		0.1			
Total Nitrogen (TKN)	0.183	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.57	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009615**
Client Identification **COUMO-20160521**
Sampling Date **05/21/16, 08:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1200	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	1.30	mg/l		0.1			
Total Nitrogen (TKN)	0.203	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	1.1	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009616**
Client Identification **EVAMS-20160521**
Sampling Date **05/21/16, 10:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	300	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	2.34	mg/l		0.1			
Total Nitrogen (TKN)	0.438	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	1.9	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009617**
Client Identification **EVALSS-20160521**
Sampling Date **05/21/16, 09:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	130	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	1.40	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	1.4	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009618**
Client Identification **MONMN-20160521**
Sampling Date **05/21/16, 07:20**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	150	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.21	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.21	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009619**
Client Identification **MONMS-20160521**
Sampling Date **05/21/16, 07:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	140	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.27	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009620**
Client Identification **MONM-20160521**
Sampling Date **05/21/16, 07:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	500	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.30	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.30	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009621**
Client Identification **SEIMN-20160521**
Sampling Date **05/21/16, 10:15**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	140	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.29	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.29	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009622**
Client Identification **SEIMS-20160521**
Sampling Date **05/21/16, 11:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	110	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.52	mg/l		0.1			
Total Nitrogen (TKN)	0.253	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009623**
Client Identification **TOSMI-20160521**
Sampling Date **05/21/16, 09:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	3800	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	1.71	mg/l		0.1			
Total Nitrogen (TKN)	0.954	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.76	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009624**
Client Identification **TOSMO-20160521**
Sampling Date **05/21/16, 08:30**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2100	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.64	mg/l		0.1			
Total Nitrogen (TKN)	0.134	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.51	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009625**
Client Identification **TYLMI-20160521**
Sampling Date **05/21/16, 09:15**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1200	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.52	mg/l		0.1			
Total Nitrogen (TKN)	0.159	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.36	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009626**
Client Identification **TYLMO-20160521**
Sampling Date **05/21/16, 08:50**

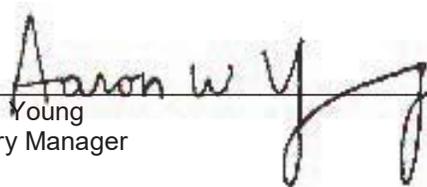
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	140	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.57	mg/l		0.1			
Total Nitrogen (TKN)	0.112	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.46	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A009627**
Client Identification **QA6-20160521**
Sampling Date **05/21/16, 10:15**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	64.	CFU/100 ml		1	SM 9222D	KF	05/21/16
Total Nitrogen (NOX&TKN)	0.27	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	06/10/16
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	JR	06/02/16


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A009613 to 16-A009627

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A009620	Fecal Coliform	CFU/100 ml	500	400	22.
16-A009627	Fecal Coliform	CFU/100 ml	64.	58.	9.8
16-A008391	Total Nitrogen (TKN)	mg/l	0.207	0.234	12.
16-A009474	Total Nitrogen (TKN)	mg/l	0.222	0.240	7.8
16-A009602	Total Nitrogen (TKN)	mg/l	0.118	0.108	8.8
16-A009619	Total Nitrogen (TKN)	mg/l	< 0.1	0.107	
16-A009995	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A009622	Nitrate + Nitrite	mg/l	0.27	0.30	11.
16-A009998	Nitrate + Nitrite	mg/l	0.38	0.38	0.00
16-A010349	Nitrate + Nitrite	mg/l	0.67	0.60	11.
16-A010395	Nitrate + Nitrite	mg/l	1.8	1.7	5.7
16-A010740	Nitrate + Nitrite	mg/l	1.0	0.99	1.0
16-A010817	Nitrate + Nitrite	mg/l	1.4	1.4	0.00
16-A011830	Nitrate + Nitrite	mg/l	0.54	0.55	1.8
16-A011840	Nitrate + Nitrite	mg/l	0.78	0.73	6.6

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A008115	Total Nitrogen (TKN)	mg/l	0.196	1.45	1.00	125.40 %
16-A008391	Total Nitrogen (TKN)	mg/l	0.207	1.12	1.00	91.30 %
16-A009474	Total Nitrogen (TKN)	mg/l	0.222	1.19	1.00	96.80 %
16-A009602	Total Nitrogen (TKN)	mg/l	0.118	1.04	1.00	92.20 %
16-A009619	Total Nitrogen (TKN)	mg/l	< 0.1	1.06	1.00	106.00 %
16-A009995	Total Nitrogen (TKN)	mg/l	< 0.1	0.860	1.00	86.00 %
16-A009622	Nitrate + Nitrite	mg/l	0.27	0.65	0.50	76.00 %
16-A009998	Nitrate + Nitrite	mg/l	0.38	0.82	0.50	88.00 %
16-A010349	Nitrate + Nitrite	mg/l	0.67	3.1	2.5	97.20 %
16-A010395	Nitrate + Nitrite	mg/l	1.8	2.8	1.0	100.00 %
16-A010740	Nitrate + Nitrite	mg/l	1.0	2.0	1.0	100.00 %
16-A010817	Nitrate + Nitrite	mg/l	1.4	2.0	0.50	120.00 %
16-A011830	Nitrate + Nitrite	mg/l	0.54	1.0	0.50	92.00 %
16-A011840	Nitrate + Nitrite	mg/l	0.78	1.2	0.50	84.00 %

QC Summary for sample numbers: 16-A009613 to 16-A009627...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.494	98.8 %
Total Nitrogen (TKN)	mg/l	0.500	0.489	97.8 %
Total Nitrogen (TKN)	mg/l	0.500	0.480	96.0 %
Total Nitrogen (TKN)	mg/l	0.500	0.502	100. %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	0.276
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	2.0
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 05-187

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20160521	5/21/16	10:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20160521	5/21/16	7:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20160521	5/21/16	8:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20160521	5/21/16	10:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20160521	5/21/16	9:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20160521	5/21/16	7:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20160521	5/21/16	7:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20160521	5/21/16	7:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20160521	5/21/16	10:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20160521	5/21/16	11:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
<i>[Signature]</i>	OnSite Env	5/21/16	1215	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
<i>[Signature]</i>	AmTest	5/21/16	1215	
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

T = 9.4



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 05-187

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

96
23
24
25
26
27

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20160521	5/21/16	9:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20160521	5/21/16	8:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20160521	5/21/16	9:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20160521	5/21/16	8:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA6-20160521	5/21/16	10:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
	OnSite Env	5/21/16	1215	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:	AmTest	5/21/16	1215	
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

1 Day

2 Day

3 Day

Standard

Laboratory No. **05-187**

Requested Analyses

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.71 SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 0521	2016 05/21	1030	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0521	2016 05/21	0715	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0521	2016 05/21	0800	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0521	2016 05/21	1000	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0521	2016 05/21	0935	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 0521	2016 05/21	0920	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0521	2016 05/21	0935	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0521	2016 05/21	0700	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0521	2016 05/21	1015	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0521	2016 05/21	1100	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0521	2016 05/21	0900	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0521	2016 05/21	0830	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0521	2016 05/21	0915	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0521	2016 05/21	0850	Water	7	X	X	X	X	X	X	X	X	X
15	QA 0-20160521	2016 05/21	1015	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by [Signature] Date 5/21/16 Received by [Signature] Date 5/21/16

Firm HEC Time 1135 Firm [Signature] Time 1135

Relinquished by [Signature] Date 5/21/16 Received by [Signature] Date 5/21/16

Firm HEC Time 1150 Firm [Signature] Time 1150

2-5, 10-12

7, 1, 6-9, 13-15

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Ifner

CHAIN OF CUSTODY

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. **05-187**
 Requested Analyses

Total Suspended Solids (SM 2610D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2610D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 0521	2016 05/21	1030	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0521	2016 05/21	0715	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0521	2016 05/21	0800	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0521	2016 05/21	1000	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0521	2016 05/21	0935	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 0521	2016 05/21	0720	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0521	2016 05/21	0735	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0521	2016 05/21	0700	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0521	2016 05/21	1015	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0521	2016 05/21	1100	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0521	2016 05/21	0900	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0521	2016 05/21	0830	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0521	2016 05/21	0915	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0521	2016 05/21	0850	Water	7	X	X	X	X	X	X	X	X	X
15	QA W-2016 0521	2016 05/21	1015	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by [Signature] Date 5/21/16 Received by [Signature] Date 5/21/16
 Firm HEC Time 1135 Firm [Signature] Time 1135 > 2-5, 10-12
 Relinquished by [Signature] Date 5/21/16 Received by [Signature] Date 5/21/16
 Firm HEC Time 1150 Firm [Signature] Time 1150 > 1, 6-9, 13-15

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: *WJ/JB*
Meter: *YSI 550*
Date/Time: *5/21/2016 6:10*
Barometric Pressure Start of Day: Inches Hg: *29.7* Time: *6:10*
Barometric Pressure End of Day: Inches Hg: ~~29.8~~ *30.1* Time: *11:30*

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®).
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup to within a centimeter of the top of the calibration cup with dilute standard (100 µS) so that the probes are covered.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate value for the standard into SpCond.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)		0		
Conductivity (µS/cm)	<i>100</i>	100	<i>15.11</i>	<i>Good</i>
DO % Saturation	<i>100</i>	100		<i>Good</i>
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)		0		
Conductivity (µS/cm)	<i>101</i>	100	<i>13.35</i>	
DO % Saturation	<i>96.7</i>	100	<i>13.35</i>	

METER CALIBRATION LOG - Redmond Paired Watershed Study



Project Number:	14-05806-000		
Personnel Performing Calibration:	Dan Bennett		
Meter:	YSI PRO PLUS		
Date/Time:	5/21/2016 06:10		
Barometric Pressure Start of Day:	Inches Hg: 29.7	Time: 06:13	
Barometric Pressure End of Day:	Inches Hg: 30.1	Time: 10:30	

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®).
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup to within a centimeter of the top of the calibration cup with dilute standard (100 µS) so that the probes are covered.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate value for the standard into SpCond.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.

PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	0	0	13.7	
Conductivity (µS/cm)	100	100	13.7	Used 100 based on protocol
DO % Saturation	100	100	13.7	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	0	0	13.7	
Conductivity (µS/cm)	101.6	100	13.4	
DO % Saturation	99.4	100	13.4	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: DB & DB

Sample Date: 5/21/16

Sample Time: 1030

SITE ID: WOLM

Base Flow or Storm Event? storm

Field Filtered Time: 1030
(Must filter within 15 minutes of collection)

PVT: X

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining (storming) 50°F

Water Quality Sampling

Sample ID: COLM-20160521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
Filter blank sample ID: _____
Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: cloudy
Color: tann - orange / yellow
Odor: none
Sheen: none
Floatables: exp sed

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. L. [Signature] Signature: [Signature]
Date Checked: 6-17-16 Time: 14:00
Data Entered into Database? YES NO initials:
Date Entered: _____ Time: _____
Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020) _____

Y.S. [Signature]
[Signature]

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): _____

Reference Point (description): _____

Water Quality Measurements

Temperature (°C) 11.6

Conductivity (µs/cm) 24.3

Dissolved Oxygen (mg/L) 8.62

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JS, VW
 Sample Date: 2016-05-21 Sample Time: 0715
 Base Flow or Storm Event? SE Field Filtered Time: 0715
(Must filter within 15 minutes of collection)

SITE ID: COUMI

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54°F rain

Water Quality Sampling

Sample ID: COUMI 20160521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: /
 Filter blank sample ID: /
 Transfer blank sample ID: /

Visual and Olfactory Conditions:

Clarity: MINOR TURBIDITY
 Color: CLEAR
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Silvia Lenter Signature: [Signature]
 Date Checked: 05-16-16 Time: 14:00
 Data Entered into Database? YES NO Initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): -1.10 ~~down from~~ top gage stake

Reference Point (description): ↓

Water Quality Measurements

Temperature (°C) 11.69
 Conductivity (µs/cm) 257.5
 Dissolved Oxygen (mg/L) 9.87

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB, VW
 Sample Date: 2016-05-21 Sample Time: 0800
 Base Flow or Storm Event? SE Field Filtered Time: 0800
(Must filter within 15 minutes of collection)

SITE ID: COUMO

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54°F rain

Water Quality Sampling

Sample ID: COUMO 20160521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: /
 Filter blank sample ID: /
 Transfer blank sample ID: /

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: NONE
 Odor: NONE
 Sheen: NO
 Floatables: NU

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: *[Signature]* Signature: *[Signature]*
 Date Checked: 05-17-16 Time: 19:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466)
 YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): -0.98
 Reference Point (description): ~~down from~~ top metal pin

Water Quality Measurements

Temperature (°C) 13.20
 Conductivity (µs/cm) 192
 Dissolved Oxygen (mg/L) 8.73

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB, VW

Sample Date: 2016-05-21

Sample Time: 0935

PJT:

SITE ID: EVALSS

Base Flow or Storm Event? SE

Field Filtered Time: 0935

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: RAINY @ 54°F

Water Quality Sampling

Sample ID: EVALSS20160521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	/
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	/
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	/
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	/
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	/
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	/

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	/
Filter blank sample ID:	/
Transfer blank sample ID:	/

Visual and Olfactory Conditions:

Clarity: MINOR TURBIDITY
 Color: LT BROWN-15H
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 6-17-16 Time: 14:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): -1.67

Reference Point (description): down from top of PVC pipe after removing cap

Water Quality Measurements

Temperature (°C) 11.28

Conductivity (µs/cm) 200

Dissolved Oxygen (mg/L) 10.17

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JBS, VW

Sample Date: 2016-05-21 Sample Time: 1000

Base Flow or Storm Event? SE Field Filtered Time: 1000

(Must filter within 15 minutes of collection)

SITE ID: EVAMS

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SPRINKLING, 54 °F

Water Quality Sampling

Sample ID: EVAMS 20160521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	/
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	/
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	/
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	/
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	/
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	/

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	/
Filter blank sample ID:	/
Transfer blank sample ID:	/

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: NO
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]

Date Checked: 6-17-16 Time: 14:00

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (1SD100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): -2.19

Reference Point (description): top of fence post attached to blk PVC pipe.

Water Quality Measurements

Temperature (°C) 11.20

Conductivity (µs/cm) 198 - 234

Dissolved Oxygen (mg/L) 10.15

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & DB

Sample Date: 5/21/16

Sample Time: 0700

PWT:

SITE

ID: MONM

Base Flow or Storm Event? Storm

Field Filtered Time: 0700

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Water Quality Sampling

Sample ID: MONM

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rainy 53°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 5-17-16 Time: 14:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.55

Reference Point (description): top of culvert

Water Quality Measurements

Temperature (°C) 12.4

Conductivity (µs/cm) 179

Dissolved Oxygen (mg/L) 9.70



HERRERA

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & DB

Sample Date: 5/29/2016

Sample Time: 0720

SITE ID:

MONMN

Base Flow or Storm Event? Storm

Field Filtered Time: 0720

PDT:

PST: X

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining 53°F

Water Quality Sampling

Sample ID: MONMN-10100521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: —
 Floatables: —

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: T. Lenth Signature: [Signature]
 Date Checked: 6-17-16 Time: 15:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.02

Reference Point (description): measured ~~at~~ from bottom of bolt to top of water

Water Quality Measurements

Temperature (°C) 12.8

Conductivity (µs/cm) 133.0

Dissolved Oxygen (mg/L) 8.81

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BR & DB

Sample Date: 5/21/10

Sample Time: 0735

UNIT:

SITE

ID: MONMS

Base Flow or Storm Event? storm

Field Filtered Time: 0735

PST: ✓

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining 53°F

Water Quality Sampling

Sample ID: MONMS - 20100521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 μm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: _____
 Floatables: _____

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 6-17-10 Time: 2:40pm
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 10.80

Reference Point (description): _____

Water Quality Measurements

Temperature (°C) 11.8

Conductivity (μs/cm) 301

Dissolved Oxygen (mg/L) 7.13

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: KSB & DB

Sample Date: 5/21/10

Sample Time: 10:15

PDT:

SITE ID: SEIMN

Base Flow or Storm Event? storm

Field Filtered Time: 10:15

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy 56°F

Water Quality Sampling

Sample ID: SEIMN-20100521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	Y
Focal Col. Bact.	HDPE	250 ml	1	EDTA	Y
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	Y
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	Y
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	Y
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	<u>QA6-20100521</u>
Filter blank sample ID:	
Transfer blank sample ID:	

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Silvia Lenth Signature: [Signature]
 Date Checked: 6-17-10 Time: 7:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.77

Reference Point (description): _____

Water Quality Measurements

Temperature (°C) 10.6

Conductivity (µs/cm) 98.4

Dissolved Oxygen (mg/L) 10.91

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB, VW

Sample Date: 2016-05-21

Sample Time: 1100

SITE ID: SEIMS

Base Flow or Storm Event? SE

Field Filtered Time: 1100

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Water Quality Sampling

Sample ID: SEIMS 20160521

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: RAINING, 54°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	/
DOC *	HDPE	250 ml	1	HCL	/
Focal Col. Bact.	HDPE	250 ml	1	EDTA	/
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	/
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	/
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	/
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	/

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	/
Filter blank sample ID:	/
Transfer blank sample ID:	/

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: LIGHTISH BROWNISH
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: *[Signature]*
 Date Checked: 6-17-16 Time: 1400
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): -0.72
 Reference Point (description): top corner of bolt head closest to stream

Water Quality Measurements

Temperature (°C) 10.73
 Conductivity (µs/cm) 99-137
 Dissolved Oxygen (mg/L) 9.44

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB, VW

Sample Date: 2016-05-24

Sample Time: 0900

P.L.T.:

SITE ID: TOSMI

Base Flow or Storm Event? SE

Field Filtered Time: 0900

P.S.T.:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54°F RAINING

Water Quality Sampling

Sample ID: TOSM.1 20160521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	/
Filter blank sample ID:	/
Transfer blank sample ID:	/

Visual and Olfactory Conditions:

Clarity: LITTLE BIT TURBID
 Color: LT BROWN
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 6-17-16 Time: 19:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) ✓

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.13

Reference Point (description): bottom of heel of steel pin @ middle of pin on line L to stream CL

Water Quality Measurements

Temperature (°C) 13.20

Conductivity (µs/cm) 150

Dissolved Oxygen (mg/L) 9.49

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB, VW

Sample Date: 2016-05-21

Sample Time: 0830

SITE ID: TOS#MO

Base Flow or Storm Event? SE

Field Filtered Time: 0830

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54 and rain

Water Quality Sampling

Sample ID: TOS#MO 20160521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	<u>/</u>
Filter blank sample ID:	<u>/</u>
Transfer blank sample ID:	<u>/</u>

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: VERY LIGHT BROWN
 Odor: NONE
 Sheen: NONE
 Floatables: NONE

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: J. M. Lenth Signature: [Signature]
 Date Checked: 6-17-16 Time: 14:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): -0.40

Reference Point (description): top of pin in bed

Water Quality Measurements

Temperature (°C) 11.28
 Conductivity (µs/cm) 240
 Dissolved Oxygen (mg/L) 10.18

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BDB

Sample Date: 5/21/16

Sample Time: 0915

POT:

SITE

ID: TYLMI

Base Flow or Storm Event? Storm

Field Filtered Time: 0915

PST: X

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rainy 56°F

Water Quality Sampling

Sample ID: TYLMI-20160521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: slightly yellow
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leath Signature: [Signature]

Date Checked: 5-17-16 Time: 14:00

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.89

Reference Point (description): _____

Water Quality Measurements

Temperature (°C) 12.1

Conductivity (µs/cm) 140.0

Dissolved Oxygen (mg/L) 8.91

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BBBDB

Sample Date: 5/21/10

Sample Time: 08:50

PJT:

SITE ID: TYLMO

Base Flow or Storm Event? storm

Field Filtered Time: 08:50

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining 54°F

Water Quality Sampling

Sample ID: TYLMO-20100521

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: —
 Floatables: —

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: [Signature] Signature: [Signature]

Date Checked: 6-17-10 Time: 14:00

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.89

Reference Point (description): _____

Water Quality Measurements

Temperature (°C) 11.9

Conductivity (µs/cm) 175

Dissolved Oxygen (mg/L) 10.54

mm



Data Quality Assurance Worksheet

G

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 6/16/2016 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials

Sample Date/Sample ID: 5/21/2016 / All sites, 1 FD (QA6) at SEIMN

date _____

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	3	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	90	±20	5	≤25	8.0	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	0	≤25	12	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	5	≤180	≤1.0 mg/L 5.0 mg/L	103,103	±25	104	±15	0	≤20	4.6	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	3	≤28	≤1.0 mg/L 1.0 mg/L	97	±25	105	±15	6	≤20	7.2	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	10	≤28	≤0.01 mg/L 0.01 mg/L	109	±25	95	±20	1	≤20	1.5	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	12-20	≤28	≤0.1 mg/L 0.1 mg/L	76-125	±25	96-104	±20	0-12	≤20	7.1	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 6/16/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials

Sample Date/Sample ID: 5/21/2016 / All sites, 1 FD (QA6) at SEIMN

date _____

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	4	≤180	≤1.0 µg/L 1.0 µg/L	95,93	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	4	≤180	≤5.0 µg/L 5.0 µg/L	101,101	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	4	≤180	≤1.0 µg/L 1.0 µg/L	93,97	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	4	≤180	≤5.0 µg/L 5.0 µg/L	101,104	±25	NR	±15	8	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	22,9.8	≤35	74	≤50	OK	FLAG - SEIMN AND QA6 "J" DUE TO FIELD DUPLICATE RPD EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 17, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1606-006

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on June 1, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 17, 2016
Samples Submitted: June 1, 2016
Laboratory Reference: 1606-006
Project: 14-05806-000

Case Narrative

Samples were collected on June 1, 2016 and received by the laboratory on June 1, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160601					
Laboratory ID:	06-006-01					
Total Suspended Solids	1.4	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	COUMI-20160601					
Laboratory ID:	06-006-02					
Total Suspended Solids	14	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	COUMO-20160601					
Laboratory ID:	06-006-03					
Total Suspended Solids	6.0	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	EVAMS-20160601					
Laboratory ID:	06-006-04					
Total Suspended Solids	8.2	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	EVALSS-20160601					
Laboratory ID:	06-006-05					
Total Suspended Solids	7.4	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	MONMN-20160601					
Laboratory ID:	06-006-06					
Total Suspended Solids	9.0	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	MONMS-20160601					
Laboratory ID:	06-006-07					
Total Suspended Solids	7.8	1.0	SM 2540D	6-7-16	6-8-16	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160601					
Laboratory ID:	06-006-08					
Total Suspended Solids	8.8	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	SEIMN-20160601					
Laboratory ID:	06-006-09					
Total Suspended Solids	6.6	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	SEIMS-20160601					
Laboratory ID:	06-006-10					
Total Suspended Solids	13	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	TOSMI-20160601					
Laboratory ID:	06-006-11					
Total Suspended Solids	11	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	TOSMO-20160601					
Laboratory ID:	06-006-12					
Total Suspended Solids	4.4	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	TYLMI-20160601					
Laboratory ID:	06-006-13					
Total Suspended Solids	3.6	1.0	SM 2540D	6-7-16	6-8-16	

Client ID:	TYLMO-20160601					
Laboratory ID:	06-006-14					
Total Suspended Solids	2.6	1.0	SM 2540D	6-7-16	6-8-16	



Date of Report: June 17, 2016
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Project: 14-05806-000

TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA7-20160601					
Laboratory ID:	06-006-15					
Total Suspended Solids	1.2	1.0	SM 2540D	6-7-16	6-8-16	



Date of Report: June 17, 2016
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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0607W1					
Total Suspended Solids	ND	1.0	SM 2540D	6-7-16	6-8-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-006-10							
	ORIG	DUP						
Total Suspended Solids	13.4	12.4	NA	NA	NA	8	17	

SPIKE BLANK

Laboratory ID:	SB0607W1							
	SB	SB		SB				
Total Suspended Solids	99.0	100	NA	99	75-114	NA	NA	



Date of Report: June 17, 2016
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 Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160601					
Laboratory ID:	06-006-01					
Turbidity	1.6	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	COUMI-20160601					
Laboratory ID:	06-006-02					
Turbidity	5.5	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	COUMO-20160601					
Laboratory ID:	06-006-03					
Turbidity	3.0	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	EVAMS-20160601					
Laboratory ID:	06-006-04					
Turbidity	1.9	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	EVALSS-20160601					
Laboratory ID:	06-006-05					
Turbidity	1.9	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	MONMN-20160601					
Laboratory ID:	06-006-06					
Turbidity	2.3	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	MONMS-20160601					
Laboratory ID:	06-006-07					
Turbidity	4.2	0.10	EPA 180.1	6-2-16	6-2-16	



Date of Report: June 17, 2016
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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160601					
Laboratory ID:	06-006-08					
Turbidity	2.5	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	SEIMN-20160601					
Laboratory ID:	06-006-09					
Turbidity	1.1	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	SEIMS-20160601					
Laboratory ID:	06-006-10					
Turbidity	3.0	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	TOSMI-20160601					
Laboratory ID:	06-006-11					
Turbidity	1.3	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	TOSMO-20160601					
Laboratory ID:	06-006-12					
Turbidity	2.0	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	TYLMI-20160601					
Laboratory ID:	06-006-13					
Turbidity	1.4	0.10	EPA 180.1	6-2-16	6-2-16	

Client ID:	TYLMO-20160601					
Laboratory ID:	06-006-14					
Turbidity	1.8	0.10	EPA 180.1	6-2-16	6-2-16	



Date of Report: June 17, 2016
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Project: 14-05806-000

TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA7-20160601					
Laboratory ID:	06-006-15					
Turbidity	1.2	0.10	EPA 180.1	6-2-16	6-2-16	



Date of Report: June 17, 2016
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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0602W1					
Turbidity	ND	0.10	EPA 180.1	6-2-16	6-2-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-006-01							
	ORIG	DUP						
Turbidity	1.55	1.56	NA	NA	NA	NA	1	15



Date of Report: June 17, 2016
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 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160601					
Laboratory ID:	06-006-01					
Hardness	13	1.0	200.7/SM 2340B		6-3-16	
Client ID:	COUMI-20160601					
Laboratory ID:	06-006-02					
Hardness	84	1.0	200.7/SM 2340B		6-3-16	
Client ID:	COUMO-20160601					
Laboratory ID:	06-006-03					
Hardness	74	1.0	200.7/SM 2340B		6-3-16	
Client ID:	EVAMS-20160601					
Laboratory ID:	06-006-04					
Hardness	110	1.0	200.7/SM 2340B		6-3-16	
Client ID:	EVALSS-20160601					
Laboratory ID:	06-006-05					
Hardness	100	1.0	200.7/SM 2340B		6-3-16	
Client ID:	MONMN-20160601					
Laboratory ID:	06-006-06					
Hardness	86	1.0	200.7/SM 2340B		6-3-16	
Client ID:	MONMS-20160601					
Laboratory ID:	06-006-07					
Hardness	150	1.0	200.7/SM 2340B		6-3-16	



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 Project: 14-05806-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160601					
Laboratory ID:	06-006-08					
Hardness	100	1.0	200.7/SM 2340B		6-3-16	

Client ID:	SEIMN-20160601					
Laboratory ID:	06-006-09					
Hardness	47	1.0	200.7/SM 2340B		6-3-16	

Client ID:	SEIMS-20160601					
Laboratory ID:	06-006-10					
Hardness	56	1.0	200.7/SM 2340B		6-3-16	

Client ID:	TOSMI-20160601					
Laboratory ID:	06-006-11					
Hardness	140	1.0	200.7/SM 2340B		6-3-16	

Client ID:	TOSMO-20160601					
Laboratory ID:	06-006-12					
Hardness	120	1.0	200.7/SM 2340B		6-3-16	

Client ID:	TYLMI-20160601					
Laboratory ID:	06-006-13					
Hardness	91	1.0	200.7/SM 2340B		6-3-16	

Client ID:	TYLMO-20160601					
Laboratory ID:	06-006-14					
Hardness	84	1.0	200.7/SM 2340B		6-7-16	



Date of Report: June 17, 2016
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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA7-20160601					
Laboratory ID:	06-006-15					
Hardness	12	1.0	200.7/SM 2340B		6-7-16	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0603WH2					
Hardness	ND	1.0	200.7/SM 2340B		6-3-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-006-01							
	ORIG	DUP						
Hardness	12.7	13.1	NA	NA	NA	3	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	06-006-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	152	151	132	132	12.7	106	105	75-125	1	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0603WH2							
	SB	SB			SB			
Hardness	134	132	NA	102	80-120	NA	NA	



Date of Report: June 17, 2016
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 Project: 14-05806-000

**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160601					
Laboratory ID:	06-006-01					
Dissolved Organic Carbon	11	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	COUMI-20160601					
Laboratory ID:	06-006-02					
Dissolved Organic Carbon	3.2	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	COUMO-20160601					
Laboratory ID:	06-006-03					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	EVAMS-20160601					
Laboratory ID:	06-006-04					
Dissolved Organic Carbon	3.8	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	EVALSS-20160601					
Laboratory ID:	06-006-05					
Dissolved Organic Carbon	2.6	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	MONMN-20160601					
Laboratory ID:	06-006-06					
Dissolved Organic Carbon	3.8	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	MONMS-20160601					
Laboratory ID:	06-006-07					
Dissolved Organic Carbon	5.2	1.0	SM 5310B	6-4-16	6-4-16	



Date of Report: June 17, 2016
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 Laboratory Reference: 1606-006
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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160601					
Laboratory ID:	06-006-08					
Dissolved Organic Carbon	2.9	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	SEIMN-20160601					
Laboratory ID:	06-006-09					
Dissolved Organic Carbon	2.2	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	SEIMS-20160601					
Laboratory ID:	06-006-10					
Dissolved Organic Carbon	2.9	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	TOSMI-20160601					
Laboratory ID:	06-006-11					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	TOSMO-20160601					
Laboratory ID:	06-006-12					
Dissolved Organic Carbon	2.3	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	TYLMI-20160601					
Laboratory ID:	06-006-13					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	6-4-16	6-4-16	
Client ID:	TYLMO-20160601					
Laboratory ID:	06-006-14					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	6-4-16	6-4-16	



Date of Report: June 17, 2016
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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA7-20160601					
Laboratory ID:	06-006-15					
Dissolved Organic Carbon	12	1.0	SM 5310B	6-4-16	6-4-16	



Date of Report: June 17, 2016
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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0604D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	6-4-16	6-4-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-006-03							
	ORIG	DUP						
Dissolved Organic Carbon	2.83	2.91	NA	NA	NA	3	20	

MATRIX SPIKE

Laboratory ID:	06-006-03							
	MS	MS		MS				
Dissolved Organic Carbon	14.2	10.0	2.83	114	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0604D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.9	10.0	NA	109	75-125	NA	NA	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
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 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160601					
Laboratory ID:	06-006-01					
Total Phosphorus	0.022	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	COUMI-20160601					
Laboratory ID:	06-006-02					
Total Phosphorus	0.083	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	COUMO-20160601					
Laboratory ID:	06-006-03					
Total Phosphorus	0.065	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	EVAMS-20160601					
Laboratory ID:	06-006-04					
Total Phosphorus	0.011	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	EVALSS-20160601					
Laboratory ID:	06-006-05					
Total Phosphorus	0.012	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	MONMN-20160601					
Laboratory ID:	06-006-06					
Total Phosphorus	0.060	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	MONMS-20160601					
Laboratory ID:	06-006-07					
Total Phosphorus	0.033	0.010	EPA 365.1	6-13-16	6-13-16	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160601					
Laboratory ID:	06-006-08					
Total Phosphorus	0.054	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	SEIMN-20160601					
Laboratory ID:	06-006-09					
Total Phosphorus	0.021	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	SEIMS-20160601					
Laboratory ID:	06-006-10					
Total Phosphorus	0.10	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	TOSMI-20160601					
Laboratory ID:	06-006-11					
Total Phosphorus	0.067	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	TOSMO-20160601					
Laboratory ID:	06-006-12					
Total Phosphorus	0.067	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	TYLMI-20160601					
Laboratory ID:	06-006-13					
Total Phosphorus	0.038	0.010	EPA 365.1	6-13-16	6-13-16	

Client ID:	TYLMO-20160601					
Laboratory ID:	06-006-14					
Total Phosphorus	0.063	0.010	EPA 365.1	6-13-16	6-13-16	



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Samples Submitted: June 1, 2016
Laboratory Reference: 1606-006
Project: 14-05806-000

TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA7-20160601					
Laboratory ID:	06-006-15					
Total Phosphorus	0.026	0.010	EPA 365.1	6-13-16	6-13-16	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0613W1					
Total Phosphorus	ND	0.010	EPA 365.1	6-13-16	6-13-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-006-01							
	ORIG	DUP						
Total Phosphorus	0.0222	0.0222	NA	NA	NA	0	10	

MATRIX SPIKE								
Laboratory ID:	06-006-01							
	MS	MS		MS				
Total Phosphorus	0.281	0.250	0.0222	104	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0613W1							
	SB	SB		SB				
Total Phosphorus	0.250	0.250	NA	100	86-112	NA	NA	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-006-01						
Client ID: COLM-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	ND	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-02						
Client ID: COUMI-20160601						
Copper	1.2	1.0	200.8	6-3-16	6-3-16	
Zinc	18	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-03						
Client ID: COUMO-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	6.6	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-04						
Client ID: EVAMS-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	ND	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-05						
Client ID: EVALSS-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	ND	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-06						
Client ID: MONMN-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	ND	5.0	200.8	6-3-16	6-3-16	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-006-07						
Client ID: MONMS-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	ND	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-08						
Client ID: MONM-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	16	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-09						
Client ID: SEIMN-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	ND	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-10						
Client ID: SEIMS-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	ND	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-11						
Client ID: TOSMI-20160601						
Copper	1.5	1.0	200.8	6-3-16	6-3-16	
Zinc	23	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-12						
Client ID: TOSMO-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	8.9	5.0	200.8	6-3-16	6-3-16	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-006-13 Client ID: TYLMI-20160601						
Copper	3.0	1.0	200.8	6-3-16	6-3-16	
Zinc	17	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-14 Client ID: TYLMO-20160601						
Copper	1.1	1.0	200.8	6-3-16	6-3-16	
Zinc	ND	5.0	200.8	6-3-16	6-3-16	
Lab ID: 06-006-15 Client ID: QA7-20160601						
Copper	ND	1.0	200.8	6-3-16	6-3-16	
Zinc	ND	5.0	200.8	6-3-16	6-3-16	



Date of Report: June 17, 2016
Samples Submitted: June 1, 2016
Laboratory Reference: 1606-006
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 6-3-16
Date Analyzed: 6-3-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0603WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 DUPLICATE QUALITY CONTROL**

Date Extracted: 6-3-16

Date Analyzed: 6-3-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 06-017-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	50.8	53.8	6	5	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 6-3-16

Date Analyzed: 6-3-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 06-017-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	92.7	93	96.3	96	4	
Zinc	100	163	112	174	123	6	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-006-01						
Client ID: COLM-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	
Lab ID: 06-006-02						
Client ID: COUMI-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	7.4	5.0	200.8		6-3-16	
Lab ID: 06-006-03						
Client ID: COUMO-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	
Lab ID: 06-006-04						
Client ID: EVAMS-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	
Lab ID: 06-006-05						
Client ID: EVALSS-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	
Lab ID: 06-006-06						
Client ID: MONMN-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-006-07						
Client ID: MONMS-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	
Lab ID: 06-006-08						
Client ID: MONM-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	8.1	5.0	200.8		6-3-16	
Lab ID: 06-006-09						
Client ID: SEIMN-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	
Lab ID: 06-006-10						
Client ID: SEIMS-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	
Lab ID: 06-006-11						
Client ID: TOSMI-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	18	5.0	200.8		6-3-16	
Lab ID: 06-006-12						
Client ID: TOSMO-20160601						
Copper	ND	1.0	200.8		6-3-16	
Zinc	8.1	5.0	200.8		6-3-16	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
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 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-006-13					
Client ID:	TYLMI-20160601					
Copper	2.2	1.0	200.8		6-3-16	
Zinc	12	5.0	200.8		6-3-16	
Lab ID:	06-006-14					
Client ID:	TYLMO-20160601					
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	
Lab ID:	06-006-15					
Client ID:	QA7-20160601					
Copper	ND	1.0	200.8		6-3-16	
Zinc	ND	5.0	200.8		6-3-16	



Date of Report: June 17, 2016
Samples Submitted: June 1, 2016
Laboratory Reference: 1606-006
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 6-3-16
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0603D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: June 17, 2016
Samples Submitted: June 1, 2016
Laboratory Reference: 1606-006
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 6-3-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-006-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: June 17, 2016
 Samples Submitted: June 1, 2016
 Laboratory Reference: 1606-006
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 6-3-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 06-006-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	71.4	89	73.8	92	3	
Zinc	80.0	75.1	94	80.8	101	7	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Jun 17 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20160601	Water	16-A011828	Micro, NUT
COUMI-20160601	Water	16-A011829	Micro, NUT
COUMO-20160601	Water	16-A011830	Micro, NUT
EVAMS-20160601	Water	16-A011831	Micro, NUT
EVALSS-20160601	Water	16-A011832	Micro, NUT
MONMN-20160601	Water	16-A011833	Micro, NUT
MONMS-20160601	Water	16-A011834	Micro, NUT
MONM-20160601	Water	16-A011835	Micro, NUT
SEIMN-20160601	Water	16-A011836	Micro, NUT
SEIMS-20160601	Water	16-A011837	Micro, NUT
TOSMI-20160601	Water	16-A011838	Micro, NUT
TOSMO-20160601	Water	16-A011839	Micro, NUT
TYLMI-20160601	Water	16-A011840	Micro, NUT
TYLMO-20160601	Water	16-A011841	Micro, NUT
QA7-20160601	Water	16-A011842	Micro, NUT

Your samples were received on Thursday, June 2, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
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Services**

Jun 17 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 06-006

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 06-006
All results reported on an as received basis.

Date Received: 06/02/16
Date Reported: 6/17/16

AMTEST Identification Number 16-A011828
Client Identification COLM-20160601
Sampling Date 06/01/16, 15:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	280	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.29	mg/l		0.1			
Total Nitrogen (TKN)	0.250	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.038	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011829**
Client Identification **COUMI-20160601**
Sampling Date **06/01/16, 08:20**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	160	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.62	mg/l		0.1			
Total Nitrogen (TKN)	0.283	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.34	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011830**
Client Identification **COUMO-20160601**
Sampling Date **06/01/16, 08:55**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	130	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.90	mg/l		0.1			
Total Nitrogen (TKN)	0.356	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.54	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011831**
Client Identification **EVAMS-20160601**
Sampling Date **06/01/16, 11:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	70.	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	1.83	mg/l		0.1			
Total Nitrogen (TKN)	0.231	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	1.6	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011832**
Client Identification **EVALSS-20160601**
Sampling Date **06/01/16, 11:10**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	25.	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	1.35	mg/l		0.1			
Total Nitrogen (TKN)	0.153	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	1.2	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011833**
Client Identification **MONMN-20160601**
Sampling Date **06/01/16, 12:50**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	590	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.32	mg/l		0.1			
Total Nitrogen (TKN)	0.165	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.15	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011834**
Client Identification **MONMS-20160601**
Sampling Date **06/01/16, 13:05**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	120	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.50	mg/l		0.1			
Total Nitrogen (TKN)	0.234	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011835**
Client Identification **MONM-20160601**
Sampling Date **06/01/16, 13:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	90.	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.56	mg/l		0.1			
Total Nitrogen (TKN)	0.204	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.36	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011836**
Client Identification **SEIMN-20160601**
Sampling Date **06/01/16, 15:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	15.	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.26	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.26	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011837**
Client Identification **SEIMS-20160601**
Sampling Date **06/01/16, 16:45**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	25.	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.46	mg/l		0.1			
Total Nitrogen (TKN)	0.155	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.30	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011838**
Client Identification **TOSMI-20160601**
Sampling Date **06/01/16, 10:10**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	530	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.93	mg/l		0.1			
Total Nitrogen (TKN)	0.164	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.77	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011839**
Client Identification **TOSMO-20160601**
Sampling Date **06/01/16, 10:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	240	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.62	mg/l		0.1			
Total Nitrogen (TKN)	0.135	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.48	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number **16-A011840**
Client Identification **TYLMI-20160601**
Sampling Date **06/01/16, 14:15**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	240	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	1.01	mg/l		0.1			
Total Nitrogen (TKN)	0.226	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.78	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number 16-A011841
Client Identification TYLMO-20160601
Sampling Date 06/01/16, 14:00

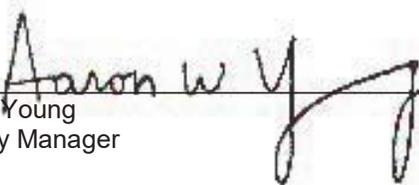
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	100	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.51	mg/l		0.1			
Total Nitrogen (TKN)	0.174	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.34	mg/l		0.01	SM4500NO3	JR	06/02/16

AMTEST Identification Number 16-A011842
Client Identification QA7-20160601
Sampling Date 06/01/16, 15:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	200	CFU/100 ml		1	SM 9222D	NG	06/02/16
Total Nitrogen (NOX&TKN)	0.29	mg/l		0.1			
Total Nitrogen (TKN)	0.261	mg/l		0.1	SM4500N	MJ	06/17/16
Nitrate + Nitrite	0.030	mg/l		0.01	SM4500NO3	JR	06/02/16


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A011828 to 16-A011842

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A011825	Fecal Coliform	CFU/100 ml	20.	30.	40.
16-A011828	Fecal Coliform	CFU/100 ml	280	260	7.4
16-A011829	Fecal Coliform	CFU/100 ml	160	160	0.00
16-A010003	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A010398	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A010820	Total Nitrogen (TKN)	mg/l	0.207	0.206	0.48
16-A011834	Total Nitrogen (TKN)	mg/l	0.234	0.238	1.7
16-A011842	Total Nitrogen (TKN)	mg/l	0.261	0.261	0.00
16-A014800	Total Nitrogen (TKN)	mg/l	0.137	0.143	4.3
16-A009622	Nitrate + Nitrite	mg/l	0.27	0.30	11.
16-A009998	Nitrate + Nitrite	mg/l	0.38	0.38	0.00
16-A010349	Nitrate + Nitrite	mg/l	0.67	0.60	11.
16-A010395	Nitrate + Nitrite	mg/l	1.8	1.7	5.7
16-A010740	Nitrate + Nitrite	mg/l	1.0	0.99	1.0
16-A010817	Nitrate + Nitrite	mg/l	1.4	1.4	0.00
16-A011830	Nitrate + Nitrite	mg/l	0.54	0.55	1.8
16-A011840	Nitrate + Nitrite	mg/l	0.78	0.73	6.6

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A010003	Total Nitrogen (TKN)	mg/l	< 0.1	0.587	0.500	117.40 %
16-A010398	Total Nitrogen (TKN)	mg/l	< 0.1	0.562	0.500	112.40 %
16-A010820	Total Nitrogen (TKN)	mg/l	0.207	0.734	0.500	105.40 %
16-A011834	Total Nitrogen (TKN)	mg/l	0.234	0.728	0.500	98.80 %
16-A011842	Total Nitrogen (TKN)	mg/l	0.261	0.814	0.500	110.60 %
16-A014800	Total Nitrogen (TKN)	mg/l	0.137	0.615	0.500	95.60 %
16-A009622	Nitrate + Nitrite	mg/l	0.27	0.65	0.50	76.00 %
16-A009998	Nitrate + Nitrite	mg/l	0.38	0.82	0.50	88.00 %
16-A010349	Nitrate + Nitrite	mg/l	0.67	3.1	2.5	97.20 %
16-A010395	Nitrate + Nitrite	mg/l	1.8	2.8	1.0	100.00 %
16-A010740	Nitrate + Nitrite	mg/l	1.0	2.0	1.0	100.00 %
16-A010817	Nitrate + Nitrite	mg/l	1.4	2.0	0.50	120.00 %
16-A011830	Nitrate + Nitrite	mg/l	0.54	1.0	0.50	92.00 %
16-A011840	Nitrate + Nitrite	mg/l	0.78	1.2	0.50	84.00 %

QC Summary for sample numbers: 16-A011828 to 16-A011842...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.493	98.6 %
Total Nitrogen (TKN)	mg/l	0.500	0.496	99.2 %
Total Nitrogen (TKN)	mg/l	0.500	0.488	97.6 %
Nitrate + Nitrite	mg/l	0.50	0.48	96.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %
Nitrate + Nitrite	mg/l	0.50	0.50	100. %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	2.0
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3381

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 06-006

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20160601 11828	6/1/16	15:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20160601 29	6/1/16	8:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20160601 30	6/1/16	8:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20160601 31	6/1/16	11:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20160601 32	6/1/16	11:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20160601 33	6/1/16	12:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20160601 34	6/1/16	13:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20160601 35	6/1/16	13:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20160601 36	6/1/16	15:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20160601 37	6/1/16	16:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by:		OnSite Env		6/2/16	7:08	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:		AmTest		6/2/16	7:08	
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						

T=3.4°C



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 06-006

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20160601 11838	6/1/16	10:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20160601 39	6/1/16	10:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20160601 40	6/1/16	14:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20160601 41	6/1/16	14:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA7-20160601 42	6/1/16	15:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by: <i>[Signature]</i>	<i>AmTest</i>	<i>6/2/16</i>	<i>7:08</i>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by: <i>[Signature]</i>				
Relinquished by:				
Received by:				

T=3.4°C



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000,
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:
 _____ 1 Day
 _____ 2 Day
 _____ 3 Day
 Standard

Laboratory No. **06-006**

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *								
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *						
1	COLM-2016 0601	6/1/16	15:45	Water	7	X	X	X	X	X	X	X	X	X						
2	COUMI-2016 0601	6/1/16	8:20	Water	7	X	X	X	X	X	X	X	X	X						
3	COUMO-2016 0601	6/1/16	8:55	Water	7	X	X	X	X	X	X	X	X	X						
4	EVAMS-2016 0601	6/1/16	11:35	Water	7	X	X	X	X	X	X	X	X	X						
5	EVALSS-2016 0601	6/1/16	11:10	Water	7	X	X	X	X	X	X	X	X	X						
6	MONMN-2016 0601	6/1/16	12:50	Water	7	X	X	X	X	X	X	X	X	X						
7	MONMS-2016 0601	6/1/16	13:05	Water	7	X	X	X	X	X	X	X	X	X						
8	MONM-2016 0601	6/1/16	13:40	Water	7	X	X	X	X	X	X	X	X	X						
9	SEIMN-2016 0601	6/1/16	15:00	Water	7	X	X	X	X	X	X	X	X	X						
10	SEIMS-2016 0601	6/1/16	10:45	Water	7	X	X	X	X	X	X	X	X	X						
11	TOSMI-2016 0601	6/1/16	10:00	Water	7	X	X	X	X	X	X	X	X	X						
12	TOSMO-2016 0601	6/1/16	16:35	Water	7	X	X	X	X	X	X	X	X	X						
13	TYLMI-2016 0601	6/1/16	14:15	Water	7	X	X	X	X	X	X	X	X	X						
14	TYLMO-2016 0601	6/1/16	14:00	Water	7	X	X	X	X	X	X	X	X	X						
15	QA 0601 7-20110601	6/1/16	15:45	Water	7	X	X	X	X	X	X	X	X	X						

Relinquished by Miriam Date 6/1/16 Received by [Signature] Date 6/1/16
 Firm Herrera Time 5:21p Firm ORE Time 1721
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

06-006

Page of

Requested Analyses

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses											
						Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *			
1	COLM-2016 0601	6/1/16	15:45	Water	7	X	X	X	X	X	X	X	X	X			
2	COUMI-2016 0601	6/1/16	8:20	Water	7	X	X	X	X	X	X	X	X	X			
3	COUMO-2016 0601	6/1/16	8:55	Water	7	X	X	X	X	X	X	X	X	X			
4	EVAMS-2016 0601	6/1/16	11:35	Water	7	X	X	X	X	X	X	X	X	X			
5	EVALSS-2016 0601	6/1/16	11:10	Water	7	X	X	X	X	X	X	X	X	X			
6	MONMN-2016 0601	6/1/16	12:50	Water	7	X	X	X	X	X	X	X	X	X			
7	MONMS-2016 0601	6/1/16	13:05	Water	7	X	X	X	X	X	X	X	X	X			
8	MONM-2016 0601	6/1/16	13:40	Water	7	X	X	X	X	X	X	X	X	X			
9	SEIMN-2016 0601	6/1/16	15:00	Water	7	X	X	X	X	X	X	X	X	X			
10	SEIMS-2016 0601	6/1/16	10:45	Water	7	X	X	X	X	X	X	X	X	X			
11	TOSMI-2016 0601	6/1/16	10:00	Water	7	X	X	X	X	X	X	X	X	X			
12	TOSMO-2016 0601	6/1/16	10:35	Water	7	X	X	X	X	X	X	X	X	X			
13	TYLMI-2016 0601	6/1/16	14:15	Water	7	X	X	X	X	X	X	X	X	X			
14	TYLMO-2016 0601	6/1/16	14:00	Water	7	X	X	X	X	X	X	X	X	X			
15	QA 0601 7-2016 0601	6/1/16	15:45	Water	7	X	X	X	X	X	X	X	X	X			

Relinquished by Miriam Date 6/1/16 Received by [Signature] Date 6/1/16
 Firm HERRERA Time 5:21P Firm OSE Time 1721
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: Brianna Bland
Meter: YSI 550
Date/Time: 10/11/2010 8am
Barometric Pressure Start of Day: Inches Hg: 758.2 Time: 8:10
Barometric Pressure End of Day: Inches Hg: 756.2 Time: 12:30

Calibration Procedures:
 Rinse Multimeter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	0	0	17.52	
Conductivity (µS/cm)	1000	1000	17.58	
DO % Saturation	100.9	100	18.01	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	7	0	25.4	
Conductivity (µS/cm)	824	1000	24.9	
DO % Saturation	92.8	100	26.7	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®).
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup to within a centimeter of the top of the calibration cup with dilute standard (100 µS) so that the probes are covered.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate value for the standard into SpCond.

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB+OS
 Sample Date: 6/1/16 Sample Time: 15:45 PDT:
 Base Flow or Storm Event? BASE Field Filtered Time: 15:45/15:58 PST: X
 (Must filter within 15 minutes of collection)

SITE ID: COLM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: PARTIALLY CLOUDY + 76

Water Quality Sampling

Sample ID: COLM - 2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	Y
Focal Col. Bact.	HDPE	250 ml	1	EDTA	Y
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	Y
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	Y
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	Y
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QAT-20160601
 Filter blank sample ID:
 Transfer blank sample ID:

Visual and Olfactory Conditions:
 Clarity: CLEAR
 Color: YELLOWISH/BROWNISH
 Odor: ODORLESS
 Sheen: NONE
 Floatables: NONE

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sohn Lerner Signature: [Signature]
 Date Checked: 6-17-16 Time: 13:00
 Data Entered into Database? YES NO Initials:
 Date Entered: _____ Time: _____
 Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466) X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): N/A
 Reference Point (description): N/A

Water Quality Measurements

Temperature (°C) 13.77
 Conductivity (µs/cm) 28
 Dissolved Oxygen (mg/L) 6.03

*Filtered DOC sample 12 min after collection,
 filtered dissolved metals @ time of sample*

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BOS

Sample Date: 6/11/10

Sample Time: 8:20

PWT:

SITE

ID: COUMI

Base Flow or Storm Event? Base

Field Filtered Time: 8:20

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY 304°F

Water Quality Sampling

Sample ID: COUMI-2010

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear

Color: colorless

Odor: odorless

Sheen: none

Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth

Signature: [Signature]

Date Checked: 6-17-10

Time: 13:00

Data Entered into Database?

YES NO initials: _____

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.105 or 0.11

Reference Point (description): staff gage by culvert, from pin

Water Quality Measurements

Temperature (°C) 12.22

Conductivity (µs/cm) 278

Dissolved Oxygen (mg/L) ~~9.77~~ 9.77

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & OS

Sample Date: 10/11/16

Sample Time: 8:55

PIYT:

SITE

ID:

LOUMO

Base Flow or Storm Event? Base

Field Filtered Time: 8:55

IPST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: sunny 10°F

Water Quality Sampling

Sample ID: LOUMO-2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: Sarah Leitch

Signature:

Date Checked: 10-17-16

Time:

1:00

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) ✓

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.13

Reference Point (description): along pin

Water Quality Measurements

Temperature (°C) 13.42

Conductivity (µs/cm) 252

Dissolved Oxygen (mg/L) 8.77

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BOS

SITE ID: EVAMS

Sample Date: 11/11/10

Sample Time: 11:35

PDT:

Base Flow or Storm Event? BASE

Field Filtered Time: 11:35

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY AND 70°

Water Quality Sampling

Sample ID: EVAMS-2010

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: 100000
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: [Signature] Signature: [Signature]
 Date Checked: 10-17-10 Time: 13:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.25'

Reference Point (description): TOP OF STEEL PILE TO WSEL

Water Quality Measurements

Temperature (°C) 12.84°
 Conductivity (µs/cm) 184
 Dissolved Oxygen (mg/L) 9.63

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BOS
 Sample Date: 6/11/16 Sample Time: 11:10 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 11:10 PST: X
(Must filter within 15 minutes of collection)

SITE ID: EVALSS

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY AND 70° F

Water Quality Sampling

Sample ID: EVALSS-2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leitch Signature: [Signature]
 Date Checked: 6-17-16 Time: 13:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) X
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): ~~0.17~~ 0.17

Reference Point (description): PVC PIPE W/O LED

Water Quality Measurements

Temperature (°C) ~~12.750~~ 12.750

Conductivity (µs/cm) 172

Dissolved Oxygen (mg/L) ~~9.54~~ 9.54

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: B/B BOS

SITE ID: MONMN

Sample Date: 01/11/10 Sample Time: 12:50 PDT:

Base Flow or Storm Event? Base Field Filtered Time: 12:50 PST
(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY 87°F

Water Quality Sampling

Sample ID: MONMN-2010

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Z. L. Leuth Signature: [Signature]
 Date Checked: 6-17-16 Time: 13:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466) X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.110
 Reference Point (description): from bottom of pin

Water Quality Measurements

Temperature (°C) 14.02
 Conductivity (µs/cm) 153
 Dissolved Oxygen (mg/L) 8.53

saw a sculpin by pin in pool

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BOS

SITE

ID:

MONMS

Sample Date: 10/11/10

Sample Time: 13:05

PDT:

Base Flow or Storm Event? Base

Field Filtered Time: 13:05

PST:

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: MONMS-20110

Current Weather and Temp: SUNNY, 73°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: whiteness

Odor: odorless

Sheen: none

Floatables: some

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: [Signature] Signature: [Signature]

Date Checked: 6-17-10 Time: 13:00

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.84

Reference Point (description): ACCESS PIPE

Water Quality Measurements

Temperature (°C) 14.03

Conductivity (µs/cm) 281

Dissolved Oxygen (mg/L) 6.36

choked w/ plants

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BBBOS
 Sample Date: 01/1/2016 Sample Time: 13:40 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 13:40 PST:
(Must filter within 15 minutes of collection)

SITE ID: MONM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: SUNNY B 75°F

Water Quality Sampling

Sample ID: MONM-2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:
 Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: slight filmy sheen
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leach Signature: [Signature]
 Date Checked: 0-17-16 Time: 13:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466) X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 4.80
 Reference Point (description): from top of culvert down

Water Quality Measurements

Temperature (°C) 13.36
 Conductivity (µs/cm) 186
 Dissolved Oxygen (mg/L) 9.24

no flow over bog weir

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: SB BB BOS

Sample Date: 6/11/16

Sample Time: 13:00

PDT:

SITE ID: SEIMN

Base Flow or Storm Event? Base

Field Filtered Time: 15:00

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 73°F

Water Quality Sampling

Sample ID: SEIMN-90110

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: colorless

Odor: odorless

Sheen: none

Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]

Date Checked: 6-17-16 Time: 13:00

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) X

YSI Pro Plus (15D100020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.78

Reference Point (description): bottom of bolt down

Water Quality Measurements

Temperature (°C) 12.61

Conductivity (µs/cm) 93

Dissolved Oxygen (mg/L) 9.84

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BOS

SITE ID: SEIMS

Sample Date: 6/11/16

Sample Time: 11:45

PDT:

Base Flow or Storm Event? Base

Field Filtered Time: 11:45

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Water Quality Sampling

Sample ID: SEIMS-2016

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: ~~dry~~ cloudy 74°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.32

Reference Point (description): pin down to H₂O

Water Quality Measurements

Temperature (°C) 13.24

Conductivity (µs/cm) 11.81

Dissolved Oxygen (mg/L) 10.20

Quality Assurance

Checked By: John Lenth Signature: [Signature]

Date Checked: 6-17-16 Time: 13:00

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BOS

SITE ID: TOSMI

Sample Date: 6/11/16 Sample Time: 10:00 PDT: _____

Base Flow or Storm Event? Base Field Filtered Time: 10:00 PST:
(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY 86.0°F

Water Quality Sampling

Sample ID: TOSMI-206

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 6-19-16 Time: 13:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.00
 Reference Point (description): dry @ pin

Water Quality Measurements

Temperature (°C) 13.00
 Conductivity (µs/cm) 240
 Dissolved Oxygen (mg/L) 8.50

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BOS

Sample Date: 10/1/16

Sample Time: 10:35

PDT:

SITE ID: TOSMO

Base Flow or Storm Event? BASE

Field Filtered Time: 10:35

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny, 68°F

Water Quality Sampling

Sample ID: TOSMO-1016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear

Color: colorless

Odor: odorless

Sheen: none

Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leath Signature: [Signature]

Date Checked: 10-17-16 Time: 13:00

Data Entered into Database? YES NO initials: _____

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.44

Reference Point (description): top of pin down

Water Quality Measurements

Temperature (°C) 12.42

Conductivity (µs/cm) 215

Dissolved Oxygen (mg/L) 9.74

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BOS

Sample Date: 6/17/16

Sample Time: 14:15

PDT:

SITE ID: TYLMI

Base Flow or Storm Event? Base

Field Filtered Time: 14:15

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 87°F

Water Quality Sampling

Sample ID: TYLMI-2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 6-17-16 Time: 13:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.12
 Reference Point (description): from top of culvert down

Water Quality Measurements

Temperature (°C) 15.07
 Conductivity (µs/cm) 172
 Dissolved Oxygen (mg/L) 7.39

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & OS
 Sample Date: 10/11/10 Sample Time: 14:00 PDT: _____
 Base Flow or Storm Event? BASE Field Filtered Time: 14:00 PST: X
(Must filter within 15 minutes of collection)

SITE ID: TYLMO

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SUNNY & 75°F

Water Quality Sampling

Sample ID: TYLMO-2010

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: whitish
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leitch Signature: [Signature]
 Date Checked: 10-17-10 Time: 15:00
 Data Entered into Database? YES X NO _____ initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.91

Reference Point (description): from top of culvert

Water Quality Measurements

Temperature (°C) 13.91

Conductivity (µs/cm) 170

Dissolved Oxygen (mg/L) 8.99



Data Quality Assurance Worksheet

G

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria
 Sample Date/Sample ID: 6/1/2016 / All sites, 1 FD (QA7) at COLM

By G. Catarra
 Date 6/27/2016 Page 1 of 2
 Checked: initials JL
 date 7/25/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	7	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	99	±20	8	≤25	D=0.2	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	29	≤25	OK	"J" COLM & QA7 DUE TO FD RPD EXCEEDANCE.
Hardness	OK / SM 2340B	NA	NA	2	≤180	≤1.0 mg/L 1.0 mg/L	106,105	±25	102	±15	3	≤20	8.0	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	3	≤28	≤1.0 mg/L 1.0 mg/L	114	±25	109	±15	3	≤20	8.7	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	12	≤28	≤0.01 mg/L 0.01 mg/L	104	±25	100	±20	0	≤20	D=0.004	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	1,16	≤28	≤0.1 mg/L 0.1 mg/L	76-120	±25	96-104	±20	0-11	≤20	0	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 6/27/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 6/1/2016 / All sites, 1 FD (QA7) at COLM

date 7/25/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	2	≤180	≤1.0 µg/L 1.0 µg/L	93,96	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	2	≤180	≤5.0 µg/L 5.0 µg/L	112,123	±25	NR	±15	6	≤20	NC	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	2	≤180	≤1.0 µg/L 1.0 µg/L	89,92	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	2	≤180	≤5.0 µg/L 5.0 µg/L	94,101	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	0,7.4	≤35	33	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

July 7, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1606-193

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on June 18, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 7, 2016
Samples Submitted: June 18, 2016
Laboratory Reference: 1606-193
Project: 14-05806-000

Case Narrative

Samples were collected on June 18, 2016 and received by the laboratory on June 18, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: July 7, 2016
 Samples Submitted: June 18, 2016
 Laboratory Reference: 1606-193
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160618					
Laboratory ID:	06-193-01					
Total Suspended Solids	1.6	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	COUMI-20160618					
Laboratory ID:	06-193-02					
Total Suspended Solids	24	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	COUMO-20160618					
Laboratory ID:	06-193-03					
Total Suspended Solids	11	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	EVAMS-20160618					
Laboratory ID:	06-193-04					
Total Suspended Solids	32	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	EVALSS-20160618					
Laboratory ID:	06-193-05					
Total Suspended Solids	45	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	MONMN-20160618					
Laboratory ID:	06-193-06					
Total Suspended Solids	7.8	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	MONMS-20160618					
Laboratory ID:	06-193-07					
Total Suspended Solids	7.6	1.0	SM 2540D	6-20-16	6-21-16	



Date of Report: July 7, 2016
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**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160618					
Laboratory ID:	06-193-08					
Total Suspended Solids	15	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	SEIMN-20160618					
Laboratory ID:	06-193-09					
Total Suspended Solids	6.4	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	SEIMS-20160618					
Laboratory ID:	06-193-10					
Total Suspended Solids	25	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	TOSMI-20160618					
Laboratory ID:	06-193-11					
Total Suspended Solids	32	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	TOSMO-20160618					
Laboratory ID:	06-193-12					
Total Suspended Solids	43	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	TYLMI-20160618					
Laboratory ID:	06-193-13					
Total Suspended Solids	7.6	1.0	SM 2540D	6-20-16	6-21-16	

Client ID:	TYLMO-20160618					
Laboratory ID:	06-193-14					
Total Suspended Solids	5.4	1.0	SM 2540D	6-20-16	6-21-16	



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**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-8-20160618					
Laboratory ID:	06-193-15					
Total Suspended Solids	6.6	1.0	SM 2540D	6-20-16	6-21-16	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0620W2					
Total Suspended Solids	ND	1.0	SM 2540D	6-20-16	6-21-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-193-13							
	ORIG	DUP						
Total Suspended Solids	7.60	7.00	NA	NA	NA	8	17	

SPIKE BLANK								
Laboratory ID:	SB0620W2							
	SB	SB		SB				
Total Suspended Solids	95.0	100	NA	95	75-114	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160618					
Laboratory ID:	06-193-01					
Turbidity	1.7	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	COUMI-20160618					
Laboratory ID:	06-193-02					
Turbidity	8.7	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	COUMO-20160618					
Laboratory ID:	06-193-03					
Turbidity	5.7	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	EVAMS-20160618					
Laboratory ID:	06-193-04					
Turbidity	8.7	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	EVALSS-20160618					
Laboratory ID:	06-193-05					
Turbidity	6.5	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	MONMN-20160618					
Laboratory ID:	06-193-06					
Turbidity	3.8	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	MONMS-20160618					
Laboratory ID:	06-193-07					
Turbidity	1.8	0.10	EPA 180.1	6-20-16	6-20-16	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160618					
Laboratory ID:	06-193-08					
Turbidity	4.8	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	SEIMN-20160618					
Laboratory ID:	06-193-09					
Turbidity	2.3	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	SEIMS-20160618					
Laboratory ID:	06-193-10					
Turbidity	4.2	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	TOSMI-20160618					
Laboratory ID:	06-193-11					
Turbidity	5.8	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	TOSMO-20160618					
Laboratory ID:	06-193-12					
Turbidity	10	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	TYLMI-20160618					
Laboratory ID:	06-193-13					
Turbidity	1.3	0.10	EPA 180.1	6-20-16	6-20-16	

Client ID:	TYLMO-20160618					
Laboratory ID:	06-193-14					
Turbidity	2.3	0.10	EPA 180.1	6-20-16	6-20-16	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-8-20160618					
Laboratory ID:	06-193-15					
Turbidity	3.0	0.10	EPA 180.1	6-20-16	6-20-16	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0620W1					
Turbidity	ND	0.10	EPA 180.1	6-20-16	6-20-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-188-01							
	ORIG	DUP						
Turbidity	1.45	1.46	NA	NA	NA	NA	1	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160618					
Laboratory ID:	06-193-01					
Hardness	13	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	COUMI-20160618					
Laboratory ID:	06-193-02					
Hardness	120	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	COUMO-20160618					
Laboratory ID:	06-193-03					
Hardness	98	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	EVAMS-20160618					
Laboratory ID:	06-193-04					
Hardness	94	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	EVALSS-20160618					
Laboratory ID:	06-193-05					
Hardness	86	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	MONMN-20160618					
Laboratory ID:	06-193-06					
Hardness	70	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	MONMS-20160618					
Laboratory ID:	06-193-07					
Hardness	130	1.0	200.7/SM 2340B	6-21-16	6-21-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160618					
Laboratory ID:	06-193-08					
Hardness	86	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	SEIMN-20160618					
Laboratory ID:	06-193-09					
Hardness	43	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	SEIMS-20160618					
Laboratory ID:	06-193-10					
Hardness	53	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	TOSMI-20160618					
Laboratory ID:	06-193-11					
Hardness	37	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	TOSMO-20160618					
Laboratory ID:	06-193-12					
Hardness	52	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	TYLMI-20160618					
Laboratory ID:	06-193-13					
Hardness	99	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Client ID:	TYLMO-20160618					
Laboratory ID:	06-193-14					
Hardness	70	1.0	200.7/SM 2340B	6-21-16	6-21-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-8-20160618					
Laboratory ID:	06-193-15					
Hardness	72	1.0	200.7/SM 2340B	6-21-16	6-21-16	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0621WH2					
Hardness	ND	1.0	200.7/SM 2340B	6-21-16	6-21-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-193-01							
	ORIG	DUP						
Hardness	13.2	13.3	NA	NA	NA	1	20	

MATRIX SPIKES

Laboratory ID:	06-193-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	150	149	132	132	13.2	104	103	75-125	1	20

SPIKE BLANK

Laboratory ID:	SB0621WH2									
	SB		SB		SB					
Hardness	132		132		100			80-120	NA	NA



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160618					
Laboratory ID:	06-193-01					
Dissolved Organic Carbon	13	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	COUMI-20160618					
Laboratory ID:	06-193-02					
Dissolved Organic Carbon	6.0	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	COUMO-20160618					
Laboratory ID:	06-193-03					
Dissolved Organic Carbon	5.5	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	EVAMS-20160618					
Laboratory ID:	06-193-04					
Dissolved Organic Carbon	4.3	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	EVALSS-20160618					
Laboratory ID:	06-193-05					
Dissolved Organic Carbon	4.1	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	MONMN-20160618					
Laboratory ID:	06-193-06					
Dissolved Organic Carbon	6.3	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	MONMS-20160618					
Laboratory ID:	06-193-07					
Dissolved Organic Carbon	5.8	1.0	SM 5310B	6-23-16	6-23-16	



Date of Report: July 7, 2016
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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160618					
Laboratory ID:	06-193-08					
Dissolved Organic Carbon	4.9	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	SEIMN-20160618					
Laboratory ID:	06-193-09					
Dissolved Organic Carbon	2.5	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	SEIMS-20160618					
Laboratory ID:	06-193-10					
Dissolved Organic Carbon	5.2	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	TOSMI-20160618					
Laboratory ID:	06-193-11					
Dissolved Organic Carbon	7.4	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	TOSMO-20160618					
Laboratory ID:	06-193-12					
Dissolved Organic Carbon	6.3	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	TYLMI-20160618					
Laboratory ID:	06-193-13					
Dissolved Organic Carbon	3.5	1.0	SM 5310B	6-23-16	6-23-16	
Client ID:	TYLMO-20160618					
Laboratory ID:	06-193-14					
Dissolved Organic Carbon	4.3	1.0	SM 5310B	6-23-16	6-23-16	



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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-8-20160618					
Laboratory ID:	06-193-15					
Dissolved Organic Carbon	5.7	1.0	SM 5310B	6-23-16	6-23-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0623D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	6-23-16	6-23-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-193-05							
	ORIG	DUP						
Dissolved Organic Carbon	4.09	3.99	NA	NA	NA	2	20	

MATRIX SPIKE

Laboratory ID:	06-193-05							
	MS	MS		MS				
Dissolved Organic Carbon	14.1	10.0	4.09	100	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0623D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.8	10.0	NA	108	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160618					
Laboratory ID:	06-193-01					
Total Phosphorus	0.030	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	COUMI-20160618					
Laboratory ID:	06-193-02					
Total Phosphorus	0.15	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	COUMO-20160618					
Laboratory ID:	06-193-03					
Total Phosphorus	0.072	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	EVAMS-20160618					
Laboratory ID:	06-193-04					
Total Phosphorus	0.046	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	EVALSS-20160618					
Laboratory ID:	06-193-05					
Total Phosphorus	0.068	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	MONMN-20160618					
Laboratory ID:	06-193-06					
Total Phosphorus	0.071	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	MONMS-20160618					
Laboratory ID:	06-193-07					
Total Phosphorus	0.035	0.010	EPA 365.1	6-24-16	6-24-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160618					
Laboratory ID:	06-193-08					
Total Phosphorus	0.073	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	SEIMN-20160618					
Laboratory ID:	06-193-09					
Total Phosphorus	0.056	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	SEIMS-20160618					
Laboratory ID:	06-193-10					
Total Phosphorus	0.067	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	TOSMI-20160618					
Laboratory ID:	06-193-11					
Total Phosphorus	0.071	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	TOSMO-20160618					
Laboratory ID:	06-193-12					
Total Phosphorus	0.087	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	TYLMI-20160618					
Laboratory ID:	06-193-13					
Total Phosphorus	0.031	0.010	EPA 365.1	6-24-16	6-24-16	

Client ID:	TYLMO-20160618					
Laboratory ID:	06-193-14					
Total Phosphorus	0.051	0.010	EPA 365.1	6-24-16	6-24-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA-8-20160618					
Laboratory ID:	06-193-15					
Total Phosphorus	0.069	0.010	EPA 365.1	6-24-16	6-24-16	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0624W1					
Total Phosphorus	ND	0.010	EPA 365.1	6-24-16	6-24-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	06-193-01							
	ORIG	DUP						
Total Phosphorus	0.0304	0.0315	NA	NA	NA	4	10	

MATRIX SPIKE								
Laboratory ID:	06-193-01							
	MS	MS		MS				
Total Phosphorus	0.291	0.250	0.0304	104	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0624W1							
	SB	SB		SB				
Total Phosphorus	0.261	0.250	NA	104	86-112	NA	NA	



Date of Report: July 7, 2016
 Samples Submitted: June 18, 2016
 Laboratory Reference: 1606-193
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-193-01						
Client ID: COLM-20160618						
Copper	ND	1.0	200.8	6-22-16	6-22-16	
Zinc	ND	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-02						
Client ID: COUMI-20160618						
Copper	3.6	1.0	200.8	6-22-16	6-22-16	
Zinc	30	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-03						
Client ID: COUMO-20160618						
Copper	3.0	1.0	200.8	6-22-16	6-22-16	
Zinc	70	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-04						
Client ID: EVAMS-20160618						
Copper	1.1	1.0	200.8	6-22-16	6-22-16	
Zinc	ND	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-05						
Client ID: EVALSS-20160618						
Copper	2.1	1.0	200.8	6-22-16	6-22-16	
Zinc	11	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-06						
Client ID: MONMN-20160618						
Copper	ND	1.0	200.8	6-22-16	6-22-16	
Zinc	8.8	5.0	200.8	6-22-16	6-22-16	



Date of Report: July 7, 2016
 Samples Submitted: June 18, 2016
 Laboratory Reference: 1606-193
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-193-07						
Client ID: MONMS-20160618						
Copper	1.9	1.0	200.8	6-22-16	6-22-16	
Zinc	ND	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-08						
Client ID: MONM-20160618						
Copper	1.4	1.0	200.8	6-22-16	6-22-16	
Zinc	18	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-09						
Client ID: SEIMN-20160618						
Copper	ND	1.0	200.8	6-22-16	6-22-16	
Zinc	ND	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-10						
Client ID: SEIMS-20160618						
Copper	ND	1.0	200.8	6-22-16	6-22-16	
Zinc	ND	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-11						
Client ID: TOSMI-20160618						
Copper	8.3	1.0	200.8	6-22-16	6-22-16	
Zinc	56	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-12						
Client ID: TOSMO-20160618						
Copper	7.3	1.0	200.8	6-22-16	6-22-16	
Zinc	46	5.0	200.8	6-22-16	6-22-16	



Date of Report: July 7, 2016
 Samples Submitted: June 18, 2016
 Laboratory Reference: 1606-193
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-193-13 Client ID: TYLMI-20160618						
Copper	4.1	1.0	200.8	6-22-16	6-22-16	
Zinc	20	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-14 Client ID: TYLMO-20160618						
Copper	5.7	1.0	200.8	6-22-16	6-22-16	
Zinc	15	5.0	200.8	6-22-16	6-22-16	
Lab ID: 06-193-15 Client ID: QA-8-20160618						
Copper	ND	1.0	200.8	6-22-16	6-22-16	
Zinc	8.6	5.0	200.8	6-22-16	6-22-16	



Date of Report: July 7, 2016
Samples Submitted: June 18, 2016
Laboratory Reference: 1606-193
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 6-22-16
Date Analyzed: 6-22-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0622WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: July 7, 2016
Samples Submitted: June 18, 2016
Laboratory Reference: 1606-193
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 6-22-16
Date Analyzed: 6-22-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-193-07

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.88	1.88	0	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: July 7, 2016
 Samples Submitted: June 18, 2016
 Laboratory Reference: 1606-193
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 6-22-16

Date Analyzed: 6-22-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 06-193-07

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	104	102	103	102	1	
Zinc	100	105	105	106	106	1	



Date of Report: July 7, 2016
 Samples Submitted: June 18, 2016
 Laboratory Reference: 1606-193
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 06-193-01						
Client ID: COLM-20160618						
Copper	ND	1.0	200.8		6-22-16	
Zinc	ND	5.0	200.8		6-22-16	
Lab ID: 06-193-02						
Client ID: COUMI-20160618						
Copper	1.3	1.0	200.8		6-22-16	
Zinc	12	5.0	200.8		6-22-16	
Lab ID: 06-193-03						
Client ID: COUMO-20160618						
Copper	1.6	1.0	200.8		6-22-16	
Zinc	79	5.0	200.8		6-22-16	
Lab ID: 06-193-04						
Client ID: EVAMS-20160618						
Copper	ND	1.0	200.8		6-22-16	
Zinc	ND	5.0	200.8		6-22-16	
Lab ID: 06-193-05						
Client ID: EVALSS-20160618						
Copper	ND	1.0	200.8		6-22-16	
Zinc	ND	5.0	200.8		6-22-16	
Lab ID: 06-193-06						
Client ID: MONMN-20160618						
Copper	ND	1.0	200.8		6-22-16	
Zinc	5.6	5.0	200.8		6-22-16	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: July 7, 2016
 Samples Submitted: June 18, 2016
 Laboratory Reference: 1606-193
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-193-07					
Client ID:	MONMS-20160618					
Copper	1.0	1.0	200.8		6-22-16	
Zinc	ND	5.0	200.8		6-22-16	
Lab ID:	06-193-08					
Client ID:	MONM-20160618					
Copper	ND	1.0	200.8		6-22-16	
Zinc	8.4	5.0	200.8		6-22-16	
Lab ID:	06-193-09					
Client ID:	SEIMN-20160618					
Copper	ND	1.0	200.8		6-22-16	
Zinc	ND	5.0	200.8		6-22-16	
Lab ID:	06-193-10					
Client ID:	SEIMS-20160618					
Copper	ND	1.0	200.8		6-22-16	
Zinc	ND	5.0	200.8		6-22-16	
Lab ID:	06-193-11					
Client ID:	TOSMI-20160618					
Copper	4.3	1.0	200.8		6-22-16	
Zinc	23	5.0	200.8		6-22-16	
Lab ID:	06-193-12					
Client ID:	TOSMO-20160618					
Copper	2.7	1.0	200.8		6-22-16	
Zinc	9.4	5.0	200.8		6-22-16	



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Date of Report: July 7, 2016
 Samples Submitted: June 18, 2016
 Laboratory Reference: 1606-193
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	06-193-13					
Client ID:	TYLMI-20160618					
Copper	2.2	1.0	200.8		6-22-16	
Zinc	12	5.0	200.8		6-22-16	
Lab ID:	06-193-14					
Client ID:	TYLMO-20160618					
Copper	4.4	1.0	200.8		6-22-16	
Zinc	12	5.0	200.8		6-22-16	
Lab ID:	06-193-15					
Client ID:	QA-8-20160618					
Copper	ND	1.0	200.8		6-22-16	
Zinc	ND	5.0	200.8		6-22-16	



Date of Report: July 7, 2016
Samples Submitted: June 18, 2016
Laboratory Reference: 1606-193
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 6-22-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0622D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: July 7, 2016
Samples Submitted: June 18, 2016
Laboratory Reference: 1606-193
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 6-22-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 16-193-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: July 7, 2016
 Samples Submitted: June 18, 2016
 Laboratory Reference: 1606-193
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 6-22-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 16-193-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	79.3	99	77.9	97	2	
Zinc	80.0	85.0	106	83.3	104	2	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Jul 7 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your Redmond Paired Watershed Study project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20160618	Water	16-A015063	Micro, NUT
COUMI-20160618	Water	16-A015064	Micro, NUT
COUMO-20160618	Water	16-A015065	Micro, NUT
EVAMS-20160618	Water	16-A015066	Micro, NUT
EVALSS-20160618	Water	16-A015067	Micro, NUT
MONMN-20160618	Water	16-A015068	Micro, NUT
MONMS-20160618	Water	16-A015069	Micro, NUT
MONM-20160618	Water	16-A015070	Micro, NUT
SEIMN-20160618	Water	16-A015071	Micro, NUT
SEIMS-20160618	Water	16-A015072	Micro, NUT
TOSMI-20160618	Water	16-A015073	Micro, NUT
TOSMO-20160618	Water	16-A015074	Micro, NUT
TYLMI-20160618	Water	16-A015075	Micro, NUT
TYLMO-20160618	Water	16-A015076	Micro, NUT
QA8-20160618	Water	16-A015077	Micro, NUT

Your samples were received on Saturday, June 18, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
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Jul 7 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 06-193

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Redmond Paired Watershed Study
Project #: 14-05806-000
PO Number: 06-193
All results reported on an as received basis.

Date Received: 06/18/16
Date Reported: 7/ 7/16

AMTEST Identification Number 16-A015063
Client Identification COLM-20160618
Sampling Date 06/18/16, 12:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	150	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	0.65	mg/l		0.1			
Total Nitrogen (TKN)	0.608	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.043	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015064**
Client Identification **COUMI-20160618**
Sampling Date **06/18/16, 10:50**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2100	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	1.13	mg/l		0.1			
Total Nitrogen (TKN)	0.709	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.42	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015065**
Client Identification **COUMO-20160618**
Sampling Date **06/18/16, 11:20**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1500	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	1.26	mg/l		0.1			
Total Nitrogen (TKN)	0.678	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.58	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number 16-A015066
Client Identification EVAMS-20160618
Sampling Date 06/18/16, 08:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1500	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	5.64	mg/l		0.1			
Total Nitrogen (TKN)	3.14	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	2.5	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number 16-A015067
Client Identification EVALSS-20160618
Sampling Date 06/18/16, 09:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2500	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	3.44	mg/l		0.1			
Total Nitrogen (TKN)	1.54	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	1.9	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015068**
Client Identification **MONMN-20160618**
Sampling Date **06/18/16, 10:05**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1100	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	1.03	mg/l		0.1			
Total Nitrogen (TKN)	0.888	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.14	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015069**
Client Identification **MONMS-20160618**
Sampling Date **06/18/16, 10:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	130	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	0.83	mg/l		0.1			
Total Nitrogen (TKN)	0.648	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.18	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015070**
Client Identification **MONM-20160618**
Sampling Date **06/18/16, 09:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	160	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	1.08	mg/l		0.1			
Total Nitrogen (TKN)	0.781	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.30	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015071**
Client Identification **SEIMN-20160618**
Sampling Date **06/18/16, 12:15**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	72.	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	0.60	mg/l		0.1			
Total Nitrogen (TKN)	0.345	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.26	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015072**
Client Identification **SEIMS-20160618**
Sampling Date **06/18/16, 11:20**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	400	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	0.88	mg/l		0.1			
Total Nitrogen (TKN)	0.652	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.23	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015073**
Client Identification **TOSMI-20160618**
Sampling Date **06/18/16, 09:50**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1700	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	1.57	mg/l		0.1			
Total Nitrogen (TKN)	0.973	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.60	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015074**
Client Identification **TOSMO-20160618**
Sampling Date **06/18/16, 10:30**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	5100	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	1.60	mg/l		0.1			
Total Nitrogen (TKN)	0.985	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.61	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number **16-A015075**
Client Identification **TYLMI-20160618**
Sampling Date **06/18/16, 09:45**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	600	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	1.45	mg/l		0.1			
Total Nitrogen (TKN)	0.679	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.77	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number 16-A015076
Client Identification TYLMO-20160618
Sampling Date 06/18/16, 09:15

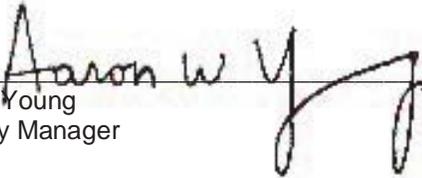
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2100	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	1.29	mg/l		0.1			
Total Nitrogen (TKN)	0.709	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.58	mg/l		0.01	SM4500NO3	MJ	06/29/16

AMTEST Identification Number 16-A015077
Client Identification QA8-20160618
Sampling Date 06/18/16, 10:05

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1300	CFU/100 ml		1	SM 9222D	KF	06/18/16
Total Nitrogen (NOX&TKN)	0.82	mg/l		0.1			
Total Nitrogen (TKN)	0.702	mg/l		0.1	SM4500N	MJ	07/06/16
Nitrate + Nitrite	0.12	mg/l		0.01	SM4500NO3	MJ	06/29/16


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A015063 to 16-A015077

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A015068	Fecal Coliform	CFU/100 ml	1100	1000	9.5
16-A015075	Fecal Coliform	CFU/100 ml	600	700	15.
16-A015017	Total Nitrogen (TKN)	mg/l	2.14	2.13	0.47
16-A015041	Total Nitrogen (TKN)	mg/l	0.176	0.163	7.7
16-A015072	Total Nitrogen (TKN)	mg/l	0.652	0.612	6.3
16-A015321	Total Nitrogen (TKN)	mg/l	0.354	0.342	3.4
16-A014421	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
16-A014734	Nitrate + Nitrite	mg/l	1.9	1.9	0.00
16-A014736	Nitrate + Nitrite	mg/l	2.0	2.2	9.5
16-A015033	Nitrate + Nitrite	mg/l	0.50	0.47	6.2
16-A015070	Nitrate + Nitrite	mg/l	0.30	0.30	0.00
16-A015470	Nitrate + Nitrite	mg/l	0.27	0.27	0.00
16-A015589	Nitrate + Nitrite	mg/l	0.063	0.063	0.00
16-A015599	Nitrate + Nitrite	mg/l	0.050	0.049	2.0

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A015017	Total Nitrogen (TKN)	mg/l	2.14	3.36	1.00	122.00 %
16-A015041	Total Nitrogen (TKN)	mg/l	0.176	1.25	1.00	107.40 %
16-A015072	Total Nitrogen (TKN)	mg/l	0.652	1.89	1.00	123.80 %
16-A015321	Total Nitrogen (TKN)	mg/l	0.354	1.50	1.00	114.60 %
16-A014421	Nitrate + Nitrite	mg/l	< 0.01	0.48	0.50	96.00 %
16-A014734	Nitrate + Nitrite	mg/l	1.9	6.7	5.0	96.00 %
16-A015033	Nitrate + Nitrite	mg/l	0.50	1.0	0.50	100.00 %
16-A015070	Nitrate + Nitrite	mg/l	0.30	0.82	0.50	104.00 %
16-A015470	Nitrate + Nitrite	mg/l	0.27	0.82	0.50	110.00 %
16-A015589	Nitrate + Nitrite	mg/l	0.063	0.54	0.50	95.40 %
16-A015599	Nitrate + Nitrite	mg/l	0.050	0.50	0.50	90.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.556	111. %
Total Nitrogen (TKN)	mg/l	0.500	0.547	109. %
Total Nitrogen (TKN)	mg/l	0.500	0.547	109. %
Nitrate + Nitrite	mg/l	0.50	0.51	102. %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %
Nitrate + Nitrite	mg/l	0.50	0.54	108. %
Nitrate + Nitrite	mg/l	0.50	0.53	106. %

QC Summary for sample numbers: 16-A015063 to 16-A015077...

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 - (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th Pl Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 06-193

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20160618 15063	6/18/16	12:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20160618 64	6/18/16	10:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20160618 65	6/18/16	11:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20160618 66	6/18/16	8:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20160618 67	6/18/16	9:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20160618 68	6/18/16	10:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20160618 69	6/18/16	10:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20160618 70	6/18/16	9:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20160618 71	6/18/16	12:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20160618 15072	6/18/16	11:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by:		OnSite Env		6/18/16	1352	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L 9.9°C x4 6/18/16
Received by:		AmTest		6/18/16	1352	
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request
 1 Day 2 Day 3 Day
 Standard
 Other: _____

Laboratory Reference #: 06-193
 Project Manager: David Baumeister
 email: dbaumeister@onsite-env.com
 Project Number: 14-05806-000
 Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20160618 15073	6/18/16	9:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20160618 74	6/18/16	10:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20160618 75	6/18/16	9:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20160618 76	6/18/16	9:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA8-20160618 15077	6/18/16	10:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by:	OnSite Env	6/18/16	1357	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L 9.9°C 84 6/18/16
Received by:	AmTest	6/18/16	1352	
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

06-193

Requested Analyses

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 0618	6/18/16	12:45	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0618	6/18/16	10:50	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0618	6/18/16	11:20	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0618	6/18/16	8:50	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0618	6/18/16	9:15	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 0618	6/18/16	10:05	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0618	6/18/16	10:35	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0618	6/18/16	9:00	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0618	6/18/16	12:15	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0618	6/18/16	11:20	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0618	6/18/16	9:50	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0618	6/18/16	10:30	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0618	6/18/16	09:45	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0618	6/18/16	09:15	Water	7	X	X	X	X	X	X	X	X	X
15	QA-8-20160618	6/18/16	10:05	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by George Iftner Date 6/18/16 Received by [Signature] Date 6/18/16
 Firm Herrera Time 12:25 Firm [Signature] Time 12:25 2-5, 11, 12

Relinquished by Bianna Blaud Date 6/18/16 Received by [Signature] Date 6/18/16
 Firm Herrera Time 13:30 Firm [Signature] Time 1330 1, 6-10, 13-15

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	Valerie Wu		
Meter:	YSI PRODS		
Date/Time:	2016/07/13		
Barometric Pressure Start of Day:	mm Hg:	712.1	Time: 8:15 am
Barometric Pressure End of Day:	mm Hg:	714.5	Time: 1:35 pm

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	2	0	15.3	
Conductivity (µS/cm)	987	1,000	21.8	
Conductivity (µS/cm)	115.0	100	19.3	
DO % Saturation	100	100	17.1	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	5.7	0	23.3	
Conductivity (µS/cm)	1004	1000	21.8	
DO % Saturation	104.1	100	21.8	

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	Bhanna Bl...		
Meter:	VSI PROPLUS		
Date/Time:	2010/06/18 8:15 a		
Barometric Pressure Start of Day: mm Hg:	302.6	Time:	8:15 a
Barometric Pressure End of Day: inches Hg:	745.0	Time:	1335

Calibration Procedures:
Rinse Multimter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	0.4	0	15.0	
Conductivity (µS/cm)	995	1,000	21.7	
Conductivity (µS/cm)	113.8	100	20.0	
DO % Saturation	103.6	100	15.5	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.1	0	23.9	
Conductivity (µS/cm)	987	1000	16.9	
DO % Saturation	99.1	100	16.6	

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Itfner

CHAIN OF CUSTODY

Turnaround Requested:

1 Day

2 Day

3 Day

Standard

Laboratory No.

06-193

Requested Analyses

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.B)	Dissolved Cu and Zn (EPA 200.B) *
1	COLM-2016 0618	6/18/16	12:45	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0618	6/18/16	10:50	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0618	6/18/16	11:20	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0618	6/18/16	8:50	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0618	6/18/16	9:15	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 0618	6/18/16	10:05	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0618	6/18/16	10:35	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0618	6/18/16	9:00	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0618	6/18/16	12:15	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0618	6/18/16	11:20	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0618	6/18/16	9:50	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0618	6/18/16	10:30	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0618	6/18/16	09:45	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0618	6/18/16	09:15	Water	7	X	X	X	X	X	X	X	X	X
15	QA-8-20160618	6/18/16	10:05	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by George Itfner Date 6/18/16 Received by [Signature] Date 6/18/16
 Firm Herrera Time 12:25 Firm [Signature] Time 12:25 2-5
11,12

Relinquished by Brianna Blaud Date 6/18/16 Received by [Signature] Date 6/18/16
 Firm Herrera Time 13:30 Firm [Signature] Time 13:30 1

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BBB BJB

SITE ID: COLM

Sample Date: 10/18/2010 Sample Time: 12:45

PDT:

Base Flow or Storm Event? STORM Field Filtered Time: 12:45

PST:

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy 35°F

Water Quality Sampling

Sample ID: COLM-2010

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: yellow tanins clear
 Color: odorless
 Odor: none
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Saman Leach Signature: [Signature]
 Date Checked: 7/25/10 Time: 11:00
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): NA
 Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 12.1
 Conductivity (µs/cm) 35.0
 Dissolved Oxygen (mg/L) 7.100

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: GI, JVN

Sample Date: 6/18/2016

Sample Time: 10:50

PVT:

SITE

ID: COUMI

Base Flow or Storm Event? storm

Field Filtered Time: 10:50

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54°F + rain

Water Quality Sampling

Sample ID: COUMI/20160618

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: slightly turbid
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: [Signature] Signature: [Signature]

Date Checked: 7/25/16 Time: 11:00

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.1

Reference Point (description): top of stake down.

Water Quality Measurements

Temperature (°C) 12.4

Conductivity (µs/cm) 260.5

Dissolved Oxygen (mg/L) 10.5

1.1 stake

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: GI, VW

Sample Date: 06/18/2016

Sample Time: 11:20

PDT:

SITE

ID: COUMD

Base Flow or Storm Event? Storm

Field Filtered Time: 11:20

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54°F sprinkling

Water Quality Sampling

Sample ID: COUMD20160618

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: Clear

Color: NO

Odor: NO

Sheen: NO

Floatables: NO

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: S. Lynn Smith Signature: [Signature]

Date Checked: 7/25/16 Time: 11:00

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.99

Reference Point (description): top of pin to WSG

Water Quality Measurements

Temperature (°C) 13.6

Conductivity (µs/cm) 224.1

Dissolved Oxygen (mg/L) 10.06

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: GI, VW

Sample Date: 6/18/2016

Sample Time: 8:50

SITE ID: EVANCO EVAMS20160618

Base Flow or Storm Event? Storm

Field Filtered Time:
(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54°F + rain

Water Quality Sampling

Sample ID: EVAMS20160618

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: No
 Odor: No
 Sheen: No
 Floatables: No

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sarah Lenth Signature: _____
 Date Checked: 7/25/16 Time: 11:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.15 from top of fence

Reference Point (description): top of fence to WSE

Water Quality Measurements

Temperature (°C) 11.9
 Conductivity (µs/cm) 2050
 Dissolved Oxygen (mg/L) 10.61

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: GI, VW

Sample Date: 6/18/2016

Base Flow or Storm Event? Storm

Sample Time: 9:15

Field Filtered Time: 9:15

(Must filter within 15 minutes of collection)

SITE ID: EVALSS

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54° F + rain



HERRERA

Water Quality Sampling

Sample ID: EVALSS20160618

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____

Filter blank sample ID: _____

Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: Very light turbidity
 Odor: None
 Sheen: None
 Floatables: No

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sarah Leath Signature: _____
 Date Checked: 7/29/16 Time: 11:00
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.70

Reference Point (description): inside of PVC pipe w/out cap

Water Quality Measurements

Temperature (°C) 12.0

Conductivity (µs/cm) 198.8

Dissolved Oxygen (mg/L) 10.77

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BJB

Sample Date: 02/18/16

Sample Time: 10:05

PDT:

SITE ID: MONMN

Base Flow or Storm Event? Storm

Field Filtered Time: 10:15

PSTX

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rainy 85°F

Water Quality Sampling

Sample ID: MONMN-2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA 8-2016 0218

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Johnny Leuth Signature: [Signature]

Date Checked: 2/25/16 Time: 11:00

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.02

Reference Point (description): From bolt down to water

Water Quality Measurements

Temperature (°C) 13.5

Conductivity (µs/cm) 143.10

Dissolved Oxygen (mg/L) 8.79

Saw fish in sample collection pool

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & JB

Sample Date: 01/18/16

Sample Time: 10:35

PDT:

SITE ID: MONMS

Base Flow or Storm Event? Storm

Field Filtered Time: 10:35

PST: X

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: rainy & 55°F

Water Quality Sampling

Sample ID: MONMS-2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: Z. Smith Signature: [Signature]

Date Checked: 7/25/16 Time: 11:00

Data Entered into Database? YES NO Initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 1/10th of a foot)

Stream Stage (ft): 6.81

Reference Point (description): down the minhole

Water Quality Measurements

Temperature (°C) 13.0

Conductivity (µs/cm) ~~214.0~~ (242.0)

Dissolved Oxygen (mg/L) 6.37

*choked w/ need
canarygrass*

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB B JB

Sample Date: 6/18/10

Sample Time: 0900

SITE ID: MONM

Base Flow or Storm Event? Storm

Field Filtered Time: 0900

PDT:

PST: X

Project Number: 14-05806-000



Water Quality Sampling

Sample ID: MONM-2016

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: drizzling @ 55°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: [Signature]

Date Checked: 7/25/10 Time: 1200

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.63

Reference Point (description): top of culvert down

Water Quality Measurements

Temperature (°C) 13.1

Conductivity (µs/cm) 201.1

Dissolved Oxygen (mg/L) 9.34

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BJB

Sample Date: 6/18/16

Sample Time: 12:15

PDT:

SITE ID: SEIMN

Base Flow or Storm Event? STORM

Field Filtered Time: 12:15

PST: X

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy 85°F

Water Quality Sampling

Sample ID: SEIMN-2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: [Signature] Signature: [Signature]

Date Checked: 7/25/16 Time: 11:00

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.70

Reference Point (description): top of bolt to water

Water Quality Measurements

Temperature (°C) 11.0

Conductivity (µs/cm) 113.6

Dissolved Oxygen (mg/L) 10.37

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB BJB

Sample Date: 10/18/10

Sample Time: 11:20

PDT:

SITE

ID:

SEIMS

Base Flow or Storm Event? storm

Field Filtered Time: 11:20

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Raining, 57°F

Water Quality Sampling

Sample ID: SEIMS-2010

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: yellow tinge
 Odor: odorless
 Sheen: none
 Floatables: sediment

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: [Signature] Signature: [Signature]

Date Checked: 7/25/10 Time: 12:00

Data Entered into Database? YES NO Initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.745 ft

Reference Point (description): top of bank to H₂O

Water Quality Measurements

Temperature (°C) 11.3

Conductivity (µs/cm) 118.4

Dissolved Oxygen (mg/L) 9.99

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: GI, VW

Sample Date: 6/18/2016

Sample Time: 9:50

PDT:

SITE ID: TOSMI

Base Flow or Storm Event? Storm

Field Filtered Time: 9:50

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54°F and rain

Water Quality Sampling

Sample ID: TOSMI 20160618

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: light turbidity
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 7/25/16 Time: 11:00
 Data Entered into Database? YES NO Initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 19.00' - .15'
 Reference Point (description): Bottom of stake down

Water Quality Measurements

Temperature (°C) 14.3
 Conductivity (µs/cm) 84.4
 Dissolved Oxygen (mg/L) 10.14

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: GI, VW

Sample Date: 06/18/2016

Sample Time: 10:30

PDT:

SITE ID: TOSMO

Base Flow or Storm Event? Storm

Field Filtered Time: 10:30

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 54°F + rain

Water Quality Sampling

Sample ID: TOSMO 20160618

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear
 Color: slight turbidity
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Lenth Signature:

Date Checked: 7/25/16 Time: 14:00

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.33

Reference Point (description): top of stake down

Water Quality Measurements

Temperature (°C) 13.5

Conductivity (µs/cm) 111.7

Dissolved Oxygen (mg/L) 10.35

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: BBB JB

 Sample Date: 6/18/16

 Sample Time: 0945

PDT:

SITE

 ID: TYLMI

 Base Flow or Storm Event? storm

 Field Filtered Time: 0945

 PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)


 Project Name: Redmond Paired Watershed Study

 Current Weather and Temp: Raining @ 55°F

Water Quality Sampling

 Sample ID: TYLMI-2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

 Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

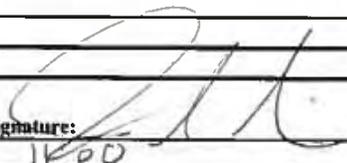
LABORATORY DELIVERY

Date:

Time:

Quality Assurance

 Checked By: John Genth

 Signature: 

 Date Checked: 7/25/16

 Time: 1:00

Data Entered into Database:

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

 YSI Pro Plus (15D100020) X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): 4.856

 Reference Point (description): from top of culvert down

Water Quality Measurements

 Temperature (°C) 12.9

 Conductivity (µs/cm) 209.0

 Dissolved Oxygen (mg/L) 9.29

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB & JB

Sample Date: 12/18/16

Sample Time: 0915

PDT:

SITE

ID:

TYLMO

Base Flow or Storm Event? STORM

Field Filtered Time: 0915

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TYLMO-2016

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: clear

Color: colorless

Odor: odorous

Sheen: none

Floatables: none

LABORATORY DELIVERY

Date:

Time:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.82

Reference Point (description): from top of weir down

Water Quality Measurements

Temperature (°C) 13.6

Conductivity (µs/cm) 156.4

Dissolved Oxygen (mg/L) 9.1010

Quality Assurance

Checked By: John Leuth

Signature: [Signature]

Date Checked: 7/25/16

Time: 1100

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:



Data Quality Assurance Worksheet

G

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria
 Sample Date/Sample ID: 6/18/2016 / All sites, 1 FD (QA8) at MONMN

By G. Catarra
 Date 7/18/2016 Page 1 of 2
 Checked: initials JL
 date 7/25/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	3	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	95	±20	8	≤25	11	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	2	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	24	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	3	≤180	≤1.0 mg/L 1.0 mg/L	104,103	±25	100	±15	1	≤20	2.8	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	5	≤28	≤1.0 mg/L 1.0 mg/L	104	±25	104	±15	4	≤20	10	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	6	≤28	≤0.01 mg/L 0.01 mg/L	104	±25	100	±20	0	≤20	4.2	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	11,19	≤28	≤0.1 mg/L 0.1 mg/L	124,104	±25	102-111	±20	6.3,0	≤20	23	≤20	OK	"J" MONMN & QA8 DUE TO FD RPD EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 7/18/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 6/18/2016 / All sites, 1 FD (QA8) at MONMN

date 7/25/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	4	≤180	≤1.0 µg/L 1.0 µg/L	104,103	±25	NR	±15	0	≤20	NC	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	4	≤180	≤5.0 µg/L 5.0 µg/L	105,106	±25	NR	±15	NC	≤20	D=0.2	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	4	≤180	≤1.0 µg/L 1.0 µg/L	99,97	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	4	≤180	≤5.0 µg/L 5.0 µg/L	106,104	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	9.5,15	≤35	17	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 10, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1607-181

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on July 21, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: August 10, 2016
Samples Submitted: July 21, 2016
Laboratory Reference: 1607-181
Project: 14-05806-000

Case Narrative

Samples were collected on July 21, 2016 and received by the laboratory on July 21, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: August 10, 2016
 Samples Submitted: July 21, 2016
 Laboratory Reference: 1607-181
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160721					
Laboratory ID:	07-181-01					
Total Suspended Solids	1.6	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	COUMI-20160721					
Laboratory ID:	07-181-02					
Total Suspended Solids	8.0	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	COUMO-20160721					
Laboratory ID:	07-181-03					
Total Suspended Solids	4.8	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	EVAMS-20160721					
Laboratory ID:	07-181-04					
Total Suspended Solids	11	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	EVALSS-20160721					
Laboratory ID:	07-181-05					
Total Suspended Solids	6.8	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	MONMN-20160721					
Laboratory ID:	07-181-06					
Total Suspended Solids	6.8	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	MONMS-20160721					
Laboratory ID:	07-181-07					
Total Suspended Solids	1.4	1.0	SM 2540D	7-22-16	7-25-16	



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**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160721					
Laboratory ID:	07-181-08					
Total Suspended Solids	3.8	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	SEIMN-20160721					
Laboratory ID:	07-181-09					
Total Suspended Solids	5.0	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	SEIMS-20160721					
Laboratory ID:	07-181-10					
Total Suspended Solids	11	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	TOSMI-20160721					
Laboratory ID:	07-181-11					
Total Suspended Solids	2.0	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	TOSMO-20160721					
Laboratory ID:	07-181-12					
Total Suspended Solids	3.4	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	TYLMI-20160721					
Laboratory ID:	07-181-13					
Total Suspended Solids	1.6	1.0	SM 2540D	7-22-16	7-25-16	

Client ID:	TYLMO-20160721					
Laboratory ID:	07-181-14					
Total Suspended Solids	2.0	1.0	SM 2540D	7-22-16	7-25-16	



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**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA9-20160721					
Laboratory ID:	07-181-15					
Total Suspended Solids	7.0	1.0	SM 2540D	7-22-16	7-25-16	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0722W1					
Total Suspended Solids	ND	1.0	SM 2540D	7-22-16	7-25-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	07-181-08							
	ORIG	DUP						
Total Suspended Solids	3.80	3.80	NA	NA	NA	0	17	

SPIKE BLANK								
Laboratory ID:	SB0722W1							
	SB	SB		SB				
Total Suspended Solids	98.0	100	NA	98	75-114	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160721					
Laboratory ID:	07-181-01					
Turbidity	1.8	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	COUMI-20160721					
Laboratory ID:	07-181-02					
Turbidity	3.9	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	COUMO-20160721					
Laboratory ID:	07-181-03					
Turbidity	2.4	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	EVAMS-20160721					
Laboratory ID:	07-181-04					
Turbidity	1.8	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	EVALSS-20160721					
Laboratory ID:	07-181-05					
Turbidity	1.1	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	MONMN-20160721					
Laboratory ID:	07-181-06					
Turbidity	1.2	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	MONMS-20160721					
Laboratory ID:	07-181-07					
Turbidity	0.91	0.10	EPA 180.1	7-22-16	7-22-16	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160721					
Laboratory ID:	07-181-08					
Turbidity	1.6	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	SEIMN-20160721					
Laboratory ID:	07-181-09					
Turbidity	1.1	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	SEIMS-20160721					
Laboratory ID:	07-181-10					
Turbidity	1.1	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	TOSMI-20160721					
Laboratory ID:	07-181-11					
Turbidity	0.73	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	TOSMO-20160721					
Laboratory ID:	07-181-12					
Turbidity	0.84	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	TYLMI-20160721					
Laboratory ID:	07-181-13					
Turbidity	0.74	0.10	EPA 180.1	7-22-16	7-22-16	

Client ID:	TYLMO-20160721					
Laboratory ID:	07-181-14					
Turbidity	1.3	0.10	EPA 180.1	7-22-16	7-22-16	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA9-20160721					
Laboratory ID:	07-181-15					
Turbidity	1.1	0.10	EPA 180.1	7-22-16	7-22-16	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0722W1					
Turbidity	ND	0.10	EPA 180.1	7-22-16	7-22-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	07-181-01							
	ORIG	DUP						
Turbidity	1.75	1.76	NA	NA	NA	NA	1	15



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HARDNESS
EPA 200.7/SM2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160721					
Laboratory ID:	07-181-01					
Hardness	15	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	COUMI-20160721					
Laboratory ID:	07-181-02					
Hardness	150	5.0	200.7/SM 2340B	7-22-16	7-27-16	

Client ID:	COUMO-20160721					
Laboratory ID:	07-181-03					
Hardness	130	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	EVAMS-20160721					
Laboratory ID:	07-181-04					
Hardness	99	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	EVALSS-20160721					
Laboratory ID:	07-181-05					
Hardness	95	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	MONMN-20160721					
Laboratory ID:	07-181-06					
Hardness	90	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	MONMS-20160721					
Laboratory ID:	07-181-07					
Hardness	180	1.0	200.7/SM 2340B	7-22-16	7-22-16	



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HARDNESS
EPA 200.7/SM2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160721					
Laboratory ID:	07-181-08					
Hardness	100	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	SEIMN-20160721					
Laboratory ID:	07-181-09					
Hardness	48	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	SEIMS-20160721					
Laboratory ID:	07-181-10					
Hardness	59	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	TOSMI-20160721					
Laboratory ID:	07-181-11					
Hardness	140	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	TOSMO-20160721					
Laboratory ID:	07-181-12					
Hardness	120	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	TYLMI-20160721					
Laboratory ID:	07-181-13					
Hardness	110	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Client ID:	TYLMO-20160721					
Laboratory ID:	07-181-14					
Hardness	99	1.0	200.7/SM 2340B	7-22-16	7-22-16	



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HARDNESS
EPA 200.7/SM2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA9-20160721					
Laboratory ID:	07-181-15					
Hardness	97	1.0	200.7/SM 2340B	7-22-16	7-22-16	



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**HARDNESS
 EPA 200.7/SM2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0722WH1					
Hardness	ND	1.0	200.7/SM 2340B	7-22-16	7-22-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	07-181-02							
	ORIG	DUP						
Hardness	154	154	NA	NA	NA	0	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	07-181-02									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	290	290	132	132	154	103	103	75-125	0	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags	
SPIKE BLANK									
Laboratory ID:	SB0722WH1								
	SB		SB		SB				
Hardness	130		132		NA	98	80-120	NA	NA



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160721					
Laboratory ID:	07-181-01					
Dissolved Organic Carbon	12	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	COUMI-20160721					
Laboratory ID:	07-181-02					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	COUMO-20160721					
Laboratory ID:	07-181-03					
Dissolved Organic Carbon	2.6	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	EVAMS-20160721					
Laboratory ID:	07-181-04					
Dissolved Organic Carbon	2.3	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	EVALSS-20160721					
Laboratory ID:	07-181-05					
Dissolved Organic Carbon	2.2	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	MONMN-20160721					
Laboratory ID:	07-181-06					
Dissolved Organic Carbon	3.3	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	MONMS-20160721					
Laboratory ID:	07-181-07					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	7-26-16	7-26-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160721					
Laboratory ID:	07-181-08					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	SEIMN-20160721					
Laboratory ID:	07-181-09					
Dissolved Organic Carbon	2.0	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	SEIMS-20160721					
Laboratory ID:	07-181-10					
Dissolved Organic Carbon	3.3	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	TOSMI-20160721					
Laboratory ID:	07-181-11					
Dissolved Organic Carbon	2.3	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	TOSMO-20160721					
Laboratory ID:	07-181-12					
Dissolved Organic Carbon	1.7	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	TYLMI-20160721					
Laboratory ID:	07-181-13					
Dissolved Organic Carbon	2.5	1.0	SM 5310B	7-26-16	7-26-16	

Client ID:	TYLMO-20160721					
Laboratory ID:	07-181-14					
Dissolved Organic Carbon	3.4	1.0	SM 5310B	7-26-16	7-26-16	



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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA9-20160721					
Laboratory ID:	07-181-15					
Dissolved Organic Carbon	2.4	1.0	SM 5310B	7-26-16	7-26-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0726D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	7-26-16	7-26-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	07-181-02							
	ORIG	DUP						
Dissolved Organic Carbon	2.76	2.85	NA	NA	NA	3	20	

MATRIX SPIKE

Laboratory ID:	07-181-02							
	MS	MS		MS				
Dissolved Organic Carbon	13.4	10.0	2.76	106	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0726D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.6	10.0	NA	106	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160721					
Laboratory ID:	07-181-01					
Total Phosphorus	0.024	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	COUMI-20160721					
Laboratory ID:	07-181-02					
Total Phosphorus	0.13	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	COUMO-20160721					
Laboratory ID:	07-181-03					
Total Phosphorus	0.076	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	EVAMS-20160721					
Laboratory ID:	07-181-04					
Total Phosphorus	0.023	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	EVALSS-20160721					
Laboratory ID:	07-181-05					
Total Phosphorus	0.031	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	MONMN-20160721					
Laboratory ID:	07-181-06					
Total Phosphorus	0.092	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	MONMS-20160721					
Laboratory ID:	07-181-07					
Total Phosphorus	0.021	0.010	EPA 365.1	7-28-16	7-29-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160721					
Laboratory ID:	07-181-08					
Total Phosphorus	0.058	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	SEIMN-20160721					
Laboratory ID:	07-181-09					
Total Phosphorus	0.041	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	SEIMS-20160721					
Laboratory ID:	07-181-10					
Total Phosphorus	0.052	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	TOSMI-20160721					
Laboratory ID:	07-181-11					
Total Phosphorus	0.081	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	TOSMO-20160721					
Laboratory ID:	07-181-12					
Total Phosphorus	0.079	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	TYLMI-20160721					
Laboratory ID:	07-181-13					
Total Phosphorus	0.024	0.010	EPA 365.1	7-28-16	7-29-16	

Client ID:	TYLMO-20160721					
Laboratory ID:	07-181-14					
Total Phosphorus	0.072	0.010	EPA 365.1	7-28-16	7-29-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA9-20160721					
Laboratory ID:	07-181-15					
Total Phosphorus	0.035	0.010	EPA 365.1	7-28-16	7-29-16	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0728W1					
Total Phosphorus	ND	0.010	EPA 365.1	7-28-16	7-29-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	07-181-01							
	ORIG	DUP						
Total Phosphorus	0.0238	0.0246	NA	NA	NA	3	10	

MATRIX SPIKE								
Laboratory ID:	07-181-01							
	MS	MS		MS				
Total Phosphorus	0.280	0.250	0.0238	102	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0728W1							
	SB	SB		SB				
Total Phosphorus	0.247	0.250	NA	99	86-112	NA	NA	



Date of Report: August 10, 2016
 Samples Submitted: July 21, 2016
 Laboratory Reference: 1607-181
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 07-181-01						
Client ID: COLM-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-02						
Client ID: COUMI-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	6.0	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-03						
Client ID: COUMO-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	5.3	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-04						
Client ID: EVAMS-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-05						
Client ID: EVALSS-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-06						
Client ID: MONMN-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	5.7	5.0	200.8	7-26-16	7-26-16	



Date of Report: August 10, 2016
 Samples Submitted: July 21, 2016
 Laboratory Reference: 1607-181
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 07-181-07						
Client ID: MONMS-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-08						
Client ID: MONM-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	7.8	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-09						
Client ID: SEIMN-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-10						
Client ID: SEIMS-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-11						
Client ID: TOSMI-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	12	5.0	200.8	7-26-16	7-26-16	
Lab ID: 07-181-12						
Client ID: TOSMO-20160721						
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	



Date of Report: August 10, 2016
 Samples Submitted: July 21, 2016
 Laboratory Reference: 1607-181
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	07-181-13					
Client ID:	TYLMI-20160721					
Copper	1.6	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	

Lab ID:	07-181-14					
Client ID:	TYLMO-20160721					
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	

Lab ID:	07-181-15					
Client ID:	QA9-20160721					
Copper	ND	1.0	200.8	7-26-16	7-26-16	
Zinc	ND	5.0	200.8	7-26-16	7-26-16	



Date of Report: August 10, 2016
Samples Submitted: July 21, 2016
Laboratory Reference: 1607-181
Project: 14-05806-000

TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted: 7-26-16
Date Analyzed: 7-26-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0726WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: August 10, 2016
 Samples Submitted: July 21, 2016
 Laboratory Reference: 1607-181
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 DUPLICATE QUALITY CONTROL**

Date Extracted: 7-26-16

Date Analyzed: 7-26-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 07-181-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	5.29	5.37	1	5	



Date of Report: August 10, 2016
 Samples Submitted: July 21, 2016
 Laboratory Reference: 1607-181
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 7-26-16

Date Analyzed: 7-26-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 07-181-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	99.2	99	97.8	98	1	
Zinc	100	107	102	106	101	1	



Date of Report: August 10, 2016
 Samples Submitted: July 21, 2016
 Laboratory Reference: 1607-181
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 07-181-01						
Client ID: COLM-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID: 07-181-02						
Client ID: COUMI-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID: 07-181-03						
Client ID: COUMO-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID: 07-181-04						
Client ID: EVAMS-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID: 07-181-05						
Client ID: EVALSS-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID: 07-181-06						
Client ID: MONMN-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: August 10, 2016
 Samples Submitted: July 21, 2016
 Laboratory Reference: 1607-181
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 07-181-07						
Client ID: MONMS-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID: 07-181-08						
Client ID: MONM-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID: 07-181-09						
Client ID: SEIMN-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID: 07-181-10						
Client ID: SEIMS-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID: 07-181-11						
Client ID: TOSMI-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	7.9	5.0	200.8		7-26-16	
Lab ID: 07-181-12						
Client ID: TOSMO-20160721						
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	



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Date of Report: August 10, 2016
 Samples Submitted: July 21, 2016
 Laboratory Reference: 1607-181
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	07-181-13					
Client ID:	TYLMI-20160721					
Copper	1.1	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID:	07-181-14					
Client ID:	TYLMO-20160721					
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	
Lab ID:	07-181-15					
Client ID:	QA9-20160721					
Copper	ND	1.0	200.8		7-26-16	
Zinc	ND	5.0	200.8		7-26-16	



Date of Report: August 10, 2016
Samples Submitted: July 21, 2016
Laboratory Reference: 1607-181
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 7-26-16
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0726D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: August 10, 2016
Samples Submitted: July 21, 2016
Laboratory Reference: 1607-181
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 7-26-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 07-181-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: August 10, 2016
Samples Submitted: July 21, 2016
Laboratory Reference: 1607-181
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
MS/MSD QUALITY CONTROL**

Date Analyzed: 7-26-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 07-181-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	75.0	94	73.1	91	3	
Zinc	80.0	84.9	106	83.9	105	1	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Aug 10 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20160721	Water	16-A018948	Micro, NUT
COUMI-20160721	Water	16-A018949	Micro, NUT
COUMO-20160721	Water	16-A018950	Micro, NUT
EVAMS-20160721	Water	16-A018951	Micro, NUT
EVALSS-20160721	Water	16-A018952	Micro, NUT
MONMN-20160721	Water	16-A018953	Micro, NUT
MONMS-20160721	Water	16-A018954	Micro, NUT
MONM-20160721	Water	16-A018955	Micro, NUT
SEIMN-20160721	Water	16-A018956	Micro, NUT
SEIMS-20160721	Water	16-A018957	Micro, NUT
TOSMI-20160721	Water	16-A018958	Micro, NUT
TOSMO-20160721	Water	16-A018959	Micro, NUT
TYLMI-20160721	Water	16-A018960	Micro, NUT
TYLMO-20160721	Water	16-A018961	Micro, NUT
QA9-20160721	Water	16-A018962	Micro, NUT

Your samples were received on Thursday, July 21, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Aug 10 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 07-181

BACT = Bacteriological
CONV = Conventional

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 07-181
All results reported on an as received basis.

Date Received: 07/21/16
Date Reported: 8/10/16

AMTEST Identification Number 16-A018948
Client Identification COLM-20160721
Sampling Date 07/21/16, 08:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	20.	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	2.98	mg/l		0.1			
Total Nitrogen (TKN)	2.88	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.096	mg/l		0.01	SM4500NO3	CO	07/27/16

On-Site Environmental
Project Name: REDMOND PAIRED WATERSHED STUDY
AmTest ID: 16-A018949

AMTEST Identification Number 16-A018949
Client Identification COUMI-20160721
Sampling Date 07/21/16, 14:00

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	440	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	0.33	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.33	mg/l		0.01	SM4500NO3	CO	07/27/16

AMTEST Identification Number 16-A018950
Client Identification COUMO-20160721
Sampling Date 07/21/16, 13:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	400	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	0.44	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.44	mg/l		0.01	SM4500NO3	CO	07/27/16

On-Site Environmental
Project Name: REDMOND PAIRED WATERSHED STUDY
AmTest ID: 16-A018951

AMTEST Identification Number 16-A018951
Client Identification EVAMS-20160721
Sampling Date 07/21/16, 12:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	430	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	1.90	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	1.9	mg/l		0.01	SM4500NO3	CO	07/27/16

AMTEST Identification Number 16-A018952
Client Identification EVALSS-20160721
Sampling Date 07/21/16, 13:10

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	200	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	1.40	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	1.4	mg/l		0.01	SM4500NO3	CO	07/27/16

On-Site Environmental
Project Name: REDMOND PAIRED WATERSHED STUDY
AmTest ID: 16-A018953

AMTEST Identification Number 16-A018953
Client Identification MONMN-20160721
Sampling Date 07/21/16, 10:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	960	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	0.17	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.17	mg/l		0.01	SM4500NO3	CO	07/27/16

AMTEST Identification Number 16-A018954
Client Identification MONMS-20160721
Sampling Date 07/21/16, 10:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	50.	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	< 0.1	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.013	mg/l		0.01	SM4500NO3	CO	07/27/16

On-Site Environmental
Project Name: REDMOND PAIRED WATERSHED STUDY
AmTest ID: 16-A018955

AMTEST Identification Number 16-A018955
Client Identification MONM-20160721
Sampling Date 07/21/16, 10:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1500	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	0.26	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.26	mg/l		0.01	SM4500NO3	CO	07/27/16

AMTEST Identification Number 16-A018956
Client Identification SEIMN-20160721
Sampling Date 07/21/16, 08:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	100	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	0.41	mg/l		0.1			
Total Nitrogen (TKN)	0.141	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.27	mg/l		0.01	SM4500NO3	CO	07/27/16

On-Site Environmental
Project Name: REDMOND PAIRED WATERSHED STUDY
AmTest ID: 16-A018957

AMTEST Identification Number 16-A018957
Client Identification SEIMS-20160721
Sampling Date 07/21/16, 09:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	120	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	0.40	mg/l		0.1			
Total Nitrogen (TKN)	0.140	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.26	mg/l		0.01	SM4500NO3	CO	07/27/16

AMTEST Identification Number 16-A018958
Client Identification TOSMI-20160721
Sampling Date 07/21/16, 14:35

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	300	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	0.74	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.74	mg/l		0.01	SM4500NO3	CO	07/27/16

On-Site Environmental
Project Name: REDMOND PAIRED WATERSHED STUDY
AmTest ID: 16-A018959

AMTEST Identification Number 16-A018959
Client Identification TOSMO-20160721
Sampling Date 07/21/16, 14:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	560	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	0.55	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.55	mg/l		0.01	SM4500NO3	CO	07/27/16

AMTEST Identification Number 16-A018960
Client Identification TYLMI-20160721
Sampling Date 07/21/16, 11:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	100	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	1.00	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	1.0	mg/l		0.01	SM4500NO3	CO	07/27/16

AMTEST Identification Number 16-A018961
Client Identification TYLMO-20160721
Sampling Date 07/21/16, 11:40

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	370	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	0.37	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	0.37	mg/l		0.01	SM4500NO3	CO	07/27/16

AMTEST Identification Number 16-A018962
Client Identification QA9-20160721
Sampling Date 07/21/16, 13:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	75.	CFU/100 ml		1	SM 9222D	JM	07/21/16
Total Nitrogen (NOX&TKN)	1.40	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	MJ	07/28/16
Nitrate + Nitrite	1.4	mg/l		0.01	SM4500NO3	CO	07/27/16



Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A018948 to 16-A018962

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A018951	Fecal Coliform	CFU/100 ml	430	380	12.
16-A018962	Fecal Coliform	CFU/100 ml	75.	80.	6.5
16-A018613	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A018623	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A018960	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A018957	Nitrate + Nitrite	mg/l	0.26	0.24	8.0
16-A018962	Nitrate + Nitrite	mg/l	1.4	1.4	0.00

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A018613	Total Nitrogen (TKN)	mg/l	< 0.1	0.400	0.500	80.00 %
16-A018623	Total Nitrogen (TKN)	mg/l	< 0.1	0.498	0.500	99.60 %
16-A018960	Total Nitrogen (TKN)	mg/l	< 0.1	1.37	1.50	91.33 %
16-A018957	Nitrate + Nitrite	mg/l	0.26	0.73	0.50	94.00 %
16-A018962	Nitrate + Nitrite	mg/l	1.4	1.8	0.50	80.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.486	97.2 %
Total Nitrogen (TKN)	mg/l	0.500	0.515	103. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 07-181

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20160721 18948	7/21/16	8:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20160721 49	7/21/16	14:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20160721 50	7/21/16	13:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20160721 51	7/21/16	12:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20160721 52	7/21/16	13:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20160721 53	7/21/16	10:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20160721 54	7/21/16	10:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20160721 55	7/21/16	10:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20160721 50	7/21/16	8:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20160721 57	7/21/16	9:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by:		OnSite Env		7/21/16	1604	
Received by:		T=15.3		7/21/16	1604	
Relinquished by:						
Received by:						
Relinquished by:						EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:						



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 07-181

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20160721 <i>18958</i>	7/21/16	14:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
12	TOSMO-20160721 <i>59</i>	7/21/16	14:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
13	TYLMI-20160721 <i>60</i>	7/21/16	11:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
14	TYLMO-20160721 <i>61</i>	7/21/16	11:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
15	QA9-20160721 <i>62</i>	7/21/16	13:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by: <i>[Signature]</i>	<i>OnSite Env</i>	<i>7/21/16</i>	<i>16:04</i>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:				
Relinquished by: <i>RA</i>	<i>T=15.5</i>	<i>7/21/16</i>	<i>16:04</i>	
Received by:				
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Itfner

CHAIN OF CUSTODY

07-181

Turnaround Requested:

_____ 1 Day

_____ 2 Day

_____ 3 Day

Standard

Laboratory No. _____

Requested Analyses

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 0721	7/21/16	08:15	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0721	7/21/16	14:00	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0721	7/21/16	13:40	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0721	7/21/16	12:45	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0721	7/21/16	13:10	Water	7	X	X	X	X	X	X	X	X	X
10	MONMN-2016 0721	7/21/16	10:35	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0721	7/21/16	10:55	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0721	7/21/16	10:15	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0721	7/21/16	08:55	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0721	7/21/16	09:50	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0721	7/21/16	14:35	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0721	7/21/16	14:15	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0721	7/21/16	11:25	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0721	7/21/16	11:40	Water	7	X	X	X	X	X	X	X	X	X
15	QA 9-2016 0721	7/21/16	13:15	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miriam Herrera Date 7/21/16 Received by [Signature] Date 7/21/16

Firm Herrera Time 15:08 Firm OBE Time 1508

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Iftner

CHAIN OF CUSTODY

07-181

Page ___ of ___

Turnaround Requested:

_____ 1 Day

_____ 2 Day

_____ 3 Day

X Standard

Laboratory No. _____

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 0721	7/21/16	08:15	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0721	7/21/16	14:00	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0721	7/21/16	13:40	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0721	7/21/16	12:45	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0721	7/21/16	13:10	Water	7	X	X	X	X	X	X	X	X	X
10	MONMN-2016 0721	7/21/16	10:35	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0721	7/21/16	10:55	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0721	7/21/16	10:15	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0721	7/21/16	08:55	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0721	7/21/16	09:50	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0721	7/21/16	14:35	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0721	7/21/16	14:15	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0721	7/21/16	11:25	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0721	7/21/16	11:40	Water	7	X	X	X	X	X	X	X	X	X
15	QA 9-2016 0721	7/21/16	13:15	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miriam Date 7/21/16 Received by [Signature] Date 7/21/16

Firm Herrera Time 15:08 Firm O&E Time 1508

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	VW/BB		
Meter:	YSI Pro Plus		
Date/Time:	7/21/2016		
Barometric Pressure Start of Day:	Inches Hg: 751.1	Time:	7:47
Barometric Pressure End of Day:	Inches Hg: 7	Time:	15:08

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	2.4	0	23.9	
Conductivity (µS/cm)	1000	1,000	24.2	
Conductivity (µS/cm)	105	100	24.3	
DO % Saturation	98.2	100	22.9	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	3.3	0	30.8	
Conductivity (µS/cm)	101.1	100	30.8	
DO % Saturation	100.3	100	30.8	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB / VW
 Sample Date: 7/21/2016 Sample Time: 8:15 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 8:15 PST:
(Must filter within 15 minutes of collection)

SITE ID: COLM

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 65

Water Quality Sampling

Sample ID: COLM 20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: light brown/orange color
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: S. Lee Signature: [Signature]
 Date Checked: 7-25-16 Time: _____
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): N/A
 Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 14.1
 Conductivity (µs/cm) 39.7
 Dissolved Oxygen (mg/L) 5.06

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/vw
 Sample Date: 7/21/2016 Sample Time: 14:00 PDT
 Base Flow or Storm Event? Base Field Filtered Time: 14:00 PST:
(Must filter within 15 minutes of collection)

SITE ID: COUMI
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: COUMI20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: No
 Sheen: No
 Floatables: No

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Leuth Signature: [Signature]
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 83° F Sunny

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 1.12
 Reference Point (description): top of stake to W/S

Water Quality Measurements

Temperature (°C) 15.8
 Conductivity (µs/cm) 353.3
 Dissolved Oxygen (mg/L) 9.47

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/W
 Sample Date: 7/21/2016 Sample Time: 13:40 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 13:40 PST:
(Must filter within 15 minutes of collection)

SITE ID: COUMO
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: COUMO20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: No
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 83°F Sunny

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 1.02
 Reference Point (description): top of stake to WS

Water Quality Measurements

Temperature (°C) 16.7
 Conductivity (µs/cm) 311.5
 Dissolved Oxygen (mg/L) 8.71

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW
 Sample Date: 7/21/2016 Sample Time: 12:45 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 12:45 PST: X
(Must filter within 15 minutes of collection)

SITE ID: EVAMS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: EVAMS20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: None
 Odor: no
 Sheen: No
 Floatables: No

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Susan Leuth Signature: [Signature]
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 82°F Sunny

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.21 / 0.41

Reference Point (description): top of stake to WS / top of PVC pipe to WS

Water Quality Measurements

Temperature (°C) 14.7
 Conductivity (µs/cm) 240.7
 Dissolved Oxygen (mg/L) 9.47

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW
 Sample Date: 7/21/2016 Sample Time: 13:10 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 13:10/13:15 PST:
(Must filter within 15 minutes of collection)

SITE ID: EVALSS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: EVALSS20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	yes
DOC *	HDPE	250 ml	1	HCL	yes
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	yes
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	yes
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	yes
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	yes
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	yes.

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QAQ - 21160721
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 83° F Sunny

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.73
 Reference Point (description): PVC^{inside} Pipe to WS

Water Quality Measurements

Temperature (°C) 14.8
 Conductivity (µs/cm) 216.5
 Dissolved Oxygen (mg/L) 9.77

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW

Sample Date: 07/21/2016

Sample Time: 10:35

PDT:

SITE ID: MONMN

Base Flow or Storm Event? Base

Field Filtered Time: 10:35

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 70°F Sunny

Water Quality Sampling

Sample ID: MONMN20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	
Filter blank sample ID:	
Transfer blank sample ID:	

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: No
 Sheen: No
 Floatables: No

LABORATORY DELIVERY

Date:	Time:

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.09

Reference Point (description): bottom of stake down to water surface.

Water Quality Measurements

Temperature (°C) 15.4

Conductivity (µs/cm) 216.7

Dissolved Oxygen (mg/L) 8.09

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: VN & BB
 Sample Date: 7-21-16 Sample Time: 10:55 PDT:
 Base Flow or Storm Event? BASE FLOW Field Filtered Time: 10:55 PST: X
(Must filter within 15 minutes of collection)

SITE ID: MONMS
 Project Number: 14-05806-000



Water Quality Sampling

Sample ID: MONMS-10160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: clear w/ pollen/turbidity
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: SUNNY 87°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020) X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 12.88
 Reference Point (description): in tube in manhole

Water Quality Measurements

Temperature (°C) 16.3
 Conductivity (µs/cm) ~~417~~ No reading (417)
 Dissolved Oxygen (mg/L) 5.85

Water too shallow for good readings
 Reading conductivity at 400. Read recorded
~~reading~~ from water in a clean bottle
~~also was~~ also above 400. Tested in 100 µs/cm
 @ car, and meter recorded @ 102 ∴
 no reading for conductivity

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB / VW
 Sample Date: 7/21/2016 Sample Time: 10:15 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 10:15 PST: >
(Must filter within 15 minutes of collection)

SITE ID: MONM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 75°F Sunny

Water Quality Sampling

Sample ID: MONM20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	IL	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: No
 Sheen: No
 Floatables: No

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Zelma Lenth Signature: [Signature]
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.90

Reference Point (description): top of culvert to water surface

Water Quality Measurements

Temperature (°C) 14.1

Conductivity (µs/cm) 233.2

Dissolved Oxygen (mg/L) 9.59

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: BB/VW
 Sample Date: 7/21/2016 Sample Time: 8:55 PDT
 Base Flow or Storm Event? Base Field Filtered Time: 8:55 PST
(Must filter within 15 minutes of collection)

SITE ID: SEIMN
 Project Number: 14-05806-000

Water Quality Sampling

Sample ID: SEIMN20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Felicia Lenth Signature: [Signature]
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Sunny 65°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.75
 Reference Point (description): bottom of bolt to water surface

Water Quality Measurements

Temperature (°C) 12.5
 Conductivity (µs/cm) 124.7
 Dissolved Oxygen (mg/L) 9.55

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: BB/VW
 Sample Date: 07/21/2016 Sample Time: 09:50 PDT:
 Base Flow or Storm Event? Base Field Filtered Time: 09:50 PST:
(Must filter within 15 minutes of collection)

SITE ID: SEIMS
 Project Number: 14-05806-000

Water Quality Sampling

Sample ID: SEIMS20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: No
 Sheen: No
 Floatables: No

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: R. Ben Lenth Signature: [Signature]
 Date Checked: 7-25-16 Time: 70:50
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 72°F Sunny

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.78

Reference Point (description): bottom top of bolt to water surface

Water Quality Measurements

Temperature (°C) 12.9
 Conductivity (µs/cm) 131.4
 Dissolved Oxygen (mg/L) 9.61

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB/VW

Sample Date:

Sample Time: 14:35

PDT:

SITE

ID:

TOSMI

Base Flow or Storm Event?

Field Filtered Time: 14:35

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 83°F Sunny

Water Quality Sampling

Sample ID: TOSMI20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: Clear

Color: None

Odor: No

Sheen: No

Floatables: No

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Lentz

Signature: [Signature]

Date Checked: 7-25-16

Time: 10:50

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.29

Reference Point (description): bottom of stake to WS

Water Quality Measurements

Temperature (°C) 16.4

Conductivity (µs/cm) 312.4

Dissolved Oxygen (mg/L) 8.76

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



Field Personnel: BB/NW
 Sample Date: 7/21/2016 Sample Time: 14:15 PDT
 Base Flow or Storm Event? Base Field Filtered Time: 14:15 PST: X
(Must filter within 15 minutes of collection)

SITE ID: TOSHMO
 Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 83°F Sunny

Water Quality Sampling

Sample ID: TOSHMO20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: No
 Sheen: No
 Floatables: No

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.48

Reference Point (description): top of stake to WS

Water Quality Measurements

Temperature (°C) 15.3
 Conductivity (µs/cm) 272.2
 Dissolved Oxygen (mg/L) 8.80

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: B3/VW

Sample Date: 7/21/2010

Sample Time: 11:25

PDT:

SITE ID: TYLMI

Base Flow or Storm Event? Base

Field Filtered Time: 11:25

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TYLMI20100721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

Filter blank sample ID:

Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: Clear

Color: None

Odor: No

Sheen: No

Floatables: No

LABORATORY DELIVERY

Date:

Time:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.06

Reference Point (description): top of culvert to water surface

Water Quality Measurements

Temperature (°C) 15.9

Conductivity (µs/cm) 244.1

Dissolved Oxygen (mg/L) 8.61

Quality Assurance

Checked By: John Leuth Signature: [Signature]

Date Checked: 7-25-10 Time: 10:50

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study



HERRERA

Field Personnel: BB/VW

Sample Date: 7/21/2016

Sample Time: 11:40

PDT: _____

SITE ID: TYLMO

Base Flow or Storm Event? Base

Field Filtered Time: 11:40

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 80°f Sunny

Water Quality Sampling

Sample ID: TYLMO 20160721

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: No
 Sheen: No
 Floatables: No

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Louth Signature: _____
 Date Checked: 7-25-16 Time: 10:50
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.93

Reference Point (description): top of culvert to water surface

Water Quality Measurements

Temperature (°C) 15.2

Conductivity (µs/cm) 228.2

Dissolved Oxygen (mg/L) 9.34



Data Quality Assurance Worksheet

G

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 8/17/2016 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 7/21/2016 / All sites, 1 FD (QA9) at EVALSS

date 8/31/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	4	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	98	±20	0	≤25	2.9	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	0	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	1	≤180	≤1.0 mg/L 1.0 mg/L	103,103	±25	98	±15	0	≤20	2.1	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	5	≤28	≤1.0 mg/L 1.0 mg/L	106	±25	106	±15	3	≤20	8.7	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	8	≤28	≤0.01 mg/L 0.01 mg/L	102	±25	99	±20	3	≤20	D=0.004	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	6,7	≤28	≤0.1 mg/L 0.1 mg/L	80-94	±25	97-103	±20	8,0	≤20	0	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 8/17/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 7/21/2016 / All sites, 1 FD (QA9) at EVALSS

date 8/31/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	5	≤180	≤1.0 µg/L 1.0 µg/L	99,98	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	5	≤180	≤5.0 µg/L 5.0 µg/L	102,101	±25	NR	±15	1	≤20	NC	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	5	≤180	≤1.0 µg/L 1.0 µg/L	94,91	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	5	≤180	≤5.0 µg/L 5.0 µg/L	106,105	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	12,6.5	≤35	91	≤50	OK	"J" EVALSS & QA9 DUE TO FD RPD EXCEEDANCE.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 22, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1609-030

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on September 2, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy circular flourish.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 22, 2016
Samples Submitted: September 2, 2016
Laboratory Reference: 1609-030
Project: 14-05806-000

Case Narrative

Samples were collected on September 2, 2016 and received by the laboratory on September 2, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: September 22, 2016
 Samples Submitted: September 2, 2016
 Laboratory Reference: 1609-030
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160902					
Laboratory ID:	09-030-01					
Total Suspended Solids	3.0	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	COUMI-20160902					
Laboratory ID:	09-030-02					
Total Suspended Solids	170	1.6	SM 2540D	9-7-16	9-8-16	

Client ID:	COUMO-20160902					
Laboratory ID:	09-030-03					
Total Suspended Solids	140	2.7	SM 2540D	9-7-16	9-8-16	

Client ID:	EVAMS-20160902					
Laboratory ID:	09-030-04					
Total Suspended Solids	180	2.0	SM 2540D	9-7-16	9-8-16	

Client ID:	EVALSS-20160902					
Laboratory ID:	09-030-05					
Total Suspended Solids	200	4.0	SM 2540D	9-7-16	9-8-16	

Client ID:	MONMN-20160902					
Laboratory ID:	09-030-06					
Total Suspended Solids	22	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	MONMS-20160902					
Laboratory ID:	09-030-07					
Total Suspended Solids	3.8	1.0	SM 2540D	9-7-16	9-8-16	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160902					
Laboratory ID:	09-030-08					
Total Suspended Solids	37	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	SEIMN-20160902					
Laboratory ID:	09-030-09					
Total Suspended Solids	28	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	SEIMS-20160902					
Laboratory ID:	09-030-10					
Total Suspended Solids	74	2.0	SM 2540D	9-7-16	9-8-16	

Client ID:	TOSMI-20160902					
Laboratory ID:	09-030-11					
Total Suspended Solids	110	1.3	SM 2540D	9-7-16	9-8-16	

Client ID:	TOSMO-20160902					
Laboratory ID:	09-030-12					
Total Suspended Solids	400	4.0	SM 2540D	9-7-16	9-8-16	

Client ID:	TYLMI-20160902					
Laboratory ID:	09-030-13					
Total Suspended Solids	54	1.3	SM 2540D	9-7-16	9-8-16	

Client ID:	TYLMO-20160902					
Laboratory ID:	09-030-14					
Total Suspended Solids	45	1.3	SM 2540D	9-7-16	9-8-16	



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TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA10-20160902					
Laboratory ID:	09-030-15					
Total Suspended Solids	130	4.0	SM 2540D	9-7-16	9-8-16	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0907W1					
Total Suspended Solids	ND	1.0	SM 2540D	9-7-16	9-8-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-030-04							
	ORIG	DUP						
Total Suspended Solids	179	183	NA	NA	NA	2	17	

SPIKE BLANK								
Laboratory ID:	SB0907W1							
	SB	SB		SB				
Total Suspended Solids	96.0	100	NA	96	75-114	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160902					
Laboratory ID:	09-030-01					
Turbidity	1.2	0.10	EPA 180.1	9-2-16	9-2-16	

Client ID:	COUMI-20160902					
Laboratory ID:	09-030-02					
Turbidity	56	0.50	EPA 180.1	9-2-16	9-2-16	

Client ID:	COUMO-20160902					
Laboratory ID:	09-030-03					
Turbidity	46	0.50	EPA 180.1	9-2-16	9-2-16	

Client ID:	EVAMS-20160902					
Laboratory ID:	09-030-04					
Turbidity	51	0.50	EPA 180.1	9-2-16	9-2-16	

Client ID:	EVALSS-20160902					
Laboratory ID:	09-030-05					
Turbidity	49	0.50	EPA 180.1	9-2-16	9-2-16	

Client ID:	MONMN-20160902					
Laboratory ID:	09-030-06					
Turbidity	6.2	0.10	EPA 180.1	9-2-16	9-2-16	

Client ID:	MONMS-20160902					
Laboratory ID:	09-030-07					
Turbidity	2.6	0.10	EPA 180.1	9-2-16	9-2-16	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160902					
Laboratory ID:	09-030-08					
Turbidity	9.3	0.10	EPA 180.1	9-2-16	9-2-16	

Client ID:	SEIMN-20160902					
Laboratory ID:	09-030-09					
Turbidity	8.5	0.10	EPA 180.1	9-2-16	9-2-16	

Client ID:	SEIMS-20160902					
Laboratory ID:	09-030-10					
Turbidity	18	0.10	EPA 180.1	9-2-16	9-2-16	

Client ID:	TOSMI-20160902					
Laboratory ID:	09-030-11					
Turbidity	19	0.10	EPA 180.1	9-2-16	9-2-16	

Client ID:	TOSMO-20160902					
Laboratory ID:	09-030-12					
Turbidity	96	0.50	EPA 180.1	9-2-16	9-2-16	

Client ID:	TYLMI-20160902					
Laboratory ID:	09-030-13					
Turbidity	9.6	0.10	EPA 180.1	9-2-16	9-2-16	

Client ID:	TYLMO-20160902					
Laboratory ID:	09-030-14					
Turbidity	11	0.10	EPA 180.1	9-2-16	9-2-16	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA10-20160902					
Laboratory ID:	09-030-15					
Turbidity	37	0.20	EPA 180.1	9-2-16	9-2-16	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0902W2					
Turbidity	ND	0.10	EPA 180.1	9-2-16	9-2-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-030-01							
	ORIG	DUP						
Turbidity	1.21	1.19	NA	NA	NA	NA	2	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160902					
Laboratory ID:	09-030-01					
Hardness	13	1.0	200.7/SM 2340B	9-8-16	9-8-16	

Client ID:	COUMI-20160902					
Laboratory ID:	09-030-02					
Hardness	110	5.0	200.7/SM 2340B	9-8-16	9-9-16	

Client ID:	COUMO-20160902					
Laboratory ID:	09-030-03					
Hardness	44	1.0	200.7/SM 2340B	9-8-16	9-8-16	

Client ID:	EVAMS-20160902					
Laboratory ID:	09-030-04					
Hardness	100	5.0	200.7/SM 2340B	9-8-16	9-9-16	

Client ID:	EVALSS-20160902					
Laboratory ID:	09-030-05					
Hardness	88	5.0	200.7/SM 2340B	9-8-16	9-9-16	

Client ID:	MONMN-20160902					
Laboratory ID:	09-030-06					
Hardness	90	5.0	200.7/SM 2340B	9-8-16	9-9-16	

Client ID:	MONMS-20160902					
Laboratory ID:	09-030-07					
Hardness	66	5.0	200.7/SM 2340B	9-8-16	9-9-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160902					
Laboratory ID:	09-030-08					
Hardness	82	5.0	200.7/SM 2340B	9-8-16	9-9-16	

Client ID:	SEIMN-20160902					
Laboratory ID:	09-030-09					
Hardness	45	1.0	200.7/SM 2340B	9-8-16	9-8-16	

Client ID:	SEIMS-20160902					
Laboratory ID:	09-030-10					
Hardness	48	1.0	200.7/SM 2340B	9-8-16	9-8-16	

Client ID:	TOSMI-20160902					
Laboratory ID:	09-030-11					
Hardness	23	1.0	200.7/SM 2340B	9-8-16	9-8-16	

Client ID:	TOSMO-20160902					
Laboratory ID:	09-030-12					
Hardness	46	1.0	200.7/SM 2340B	9-8-16	9-8-16	

Client ID:	TYLMI-20160902					
Laboratory ID:	09-030-13					
Hardness	34	1.0	200.7/SM 2340B	9-8-16	9-8-16	

Client ID:	TYLMO-20160902					
Laboratory ID:	09-030-14					
Hardness	23	1.0	200.7/SM 2340B	9-8-16	9-8-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA10-20160902					
Laboratory ID:	09-030-15					
Hardness	43	1.0	200.7/SM 2340B	9-8-16	9-8-16	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0908WH2					
Hardness	ND	1.0	200.7/SM 2340B	9-8-16	9-8-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-030-06							
	ORIG	DUP						
Hardness	89.5	93.4	NA	NA	NA	4	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	09-030-06									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	231	235	132	132	89.5	107	110	75-125	2	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0908WH2							
	SB	SB			SB			
Hardness	143	132	NA	108	80-120	NA	NA	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160902					
Laboratory ID:	09-030-01					
Dissolved Organic Carbon	12	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	COUMI-20160902					
Laboratory ID:	09-030-02					
Dissolved Organic Carbon	17	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	COUMO-20160902					
Laboratory ID:	09-030-03					
Dissolved Organic Carbon	13	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	EVAMS-20160902					
Laboratory ID:	09-030-04					
Dissolved Organic Carbon	14	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	EVALSS-20160902					
Laboratory ID:	09-030-05					
Dissolved Organic Carbon	10	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	MONMN-20160902					
Laboratory ID:	09-030-06					
Dissolved Organic Carbon	12	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	MONMS-20160902					
Laboratory ID:	09-030-07					
Dissolved Organic Carbon	10	1.0	SM 5310B	9-13-16	9-13-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160902					
Laboratory ID:	09-030-08					
Dissolved Organic Carbon	9.6	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	SEIMN-20160902					
Laboratory ID:	09-030-09					
Dissolved Organic Carbon	5.5	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	SEIMS-20160902					
Laboratory ID:	09-030-10					
Dissolved Organic Carbon	18	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	TOSMI-20160902					
Laboratory ID:	09-030-11					
Dissolved Organic Carbon	11	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	TOSMO-20160902					
Laboratory ID:	09-030-12					
Dissolved Organic Carbon	15	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	TYLMI-20160902					
Laboratory ID:	09-030-13					
Dissolved Organic Carbon	6.7	1.0	SM 5310B	9-13-16	9-13-16	
Client ID:	TYLMO-20160902					
Laboratory ID:	09-030-14					
Dissolved Organic Carbon	9.6	1.0	SM 5310B	9-13-16	9-13-16	



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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA10-20160902					
Laboratory ID:	09-030-15					
Dissolved Organic Carbon	13	1.0	SM 5310B	9-13-16	9-13-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0913D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	9-13-16	9-13-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-030-01							
	ORIG	DUP						
Dissolved Organic Carbon	11.7	11.4	NA	NA	NA	3	20	

MATRIX SPIKE

Laboratory ID:	09-030-01							
	MS	MS		MS				
Dissolved Organic Carbon	21.4	10.0	11.7	97	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0913D1							
	SB	SB		SB				
Dissolved Organic Carbon	11.2	10.0	NA	112	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160902					
Laboratory ID:	09-030-01					
Total Phosphorus	0.036	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	COUMI-20160902					
Laboratory ID:	09-030-02					
Total Phosphorus	0.46	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	COUMO-20160902					
Laboratory ID:	09-030-03					
Total Phosphorus	0.36	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	EVAMS-20160902					
Laboratory ID:	09-030-04					
Total Phosphorus	0.29	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	EVALSS-20160902					
Laboratory ID:	09-030-05					
Total Phosphorus	0.28	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	MONMN-20160902					
Laboratory ID:	09-030-06					
Total Phosphorus	0.10	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	MONMS-20160902					
Laboratory ID:	09-030-07					
Total Phosphorus	0.088	0.010	EPA 365.1	9-9-16	9-12-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160902					
Laboratory ID:	09-030-08					
Total Phosphorus	0.14	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	SEIMN-20160902					
Laboratory ID:	09-030-09					
Total Phosphorus	0.10	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	SEIMS-20160902					
Laboratory ID:	09-030-10					
Total Phosphorus	0.26	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	TOSMI-20160902					
Laboratory ID:	09-030-11					
Total Phosphorus	0.22	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	TOSMO-20160902					
Laboratory ID:	09-030-12					
Total Phosphorus	0.55	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	TYLMI-20160902					
Laboratory ID:	09-030-13					
Total Phosphorus	0.13	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	TYLMO-20160902					
Laboratory ID:	09-030-14					
Total Phosphorus	0.17	0.010	EPA 365.1	9-9-16	9-12-16	



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TOTAL PHOSPHORUS
EPA 365.1
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA10-20160902					
Laboratory ID:	09-030-15					
Total Phosphorus	0.33	0.010	EPA 365.1	9-9-16	9-12-16	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0909W1					
Total Phosphorus	ND	0.010	EPA 365.1	9-9-16	9-12-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-030-01							
	ORIG	DUP						
Total Phosphorus	0.0355	0.0349	NA	NA	NA	2	10	

MATRIX SPIKE								
Laboratory ID:	09-030-01							
	MS	MS		MS				
Total Phosphorus	0.293	0.250	0.0355	103	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0909W1							
	SB	SB		SB				
Total Phosphorus	0.251	0.250	NA	100	86-112	NA	NA	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-030-01						
Client ID: COLM-20160902						
Copper	1.2	1.0	200.8	9-8-16	9-8-16	
Zinc	ND	5.0	200.8	9-8-16	9-8-16	
Lab ID: 09-030-02						
Client ID: COUMI-20160902						
Copper	9.2	1.0	200.8	9-8-16	9-8-16	
Zinc	55	5.0	200.8	9-8-16	9-8-16	
Lab ID: 09-030-03						
Client ID: COUMO-20160902						
Copper	8.8	1.0	200.8	9-8-16	9-8-16	
Zinc	50	5.0	200.8	9-8-16	9-8-16	
Lab ID: 09-030-04						
Client ID: EVAMS-20160902						
Copper	3.4	1.0	200.8	9-8-16	9-8-16	
Zinc	11	5.0	200.8	9-8-16	9-8-16	
Lab ID: 09-030-05						
Client ID: EVALSS-20160902						
Copper	5.6	1.0	200.8	9-8-16	9-8-16	
Zinc	16	5.0	200.8	9-8-16	9-8-16	
Lab ID: 09-030-06						
Client ID: MONMN-20160902						
Copper	1.2	1.0	200.8	9-8-16	9-8-16	
Zinc	14	5.0	200.8	9-8-16	9-8-16	



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**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-030-07					
Client ID:	MONMS-20160902					
Copper	3.3	1.0	200.8	9-8-16	9-8-16	
Zinc	ND	5.0	200.8	9-8-16	9-8-16	
Lab ID:	09-030-08					
Client ID:	MONM-20160902					
Copper	2.6	1.0	200.8	9-8-16	9-8-16	
Zinc	29	5.0	200.8	9-8-16	9-8-16	
Lab ID:	09-030-09					
Client ID:	SEIMN-20160902					
Copper	ND	1.0	200.8	9-8-16	9-8-16	
Zinc	ND	5.0	200.8	9-8-16	9-8-16	
Lab ID:	09-030-10					
Client ID:	SEIMS-20160902					
Copper	2.8	1.0	200.8	9-8-16	9-8-16	
Zinc	8.3	5.0	200.8	9-8-16	9-8-16	
Lab ID:	09-030-11					
Client ID:	TOSMI-20160902					
Copper	11	1.0	200.8	9-8-16	9-8-16	
Zinc	77	5.0	200.8	9-8-16	9-8-16	
Lab ID:	09-030-12					
Client ID:	TOSMO-20160902					
Copper	19	1.0	200.8	9-8-16	9-8-16	
Zinc	140	5.0	200.8	9-8-16	9-8-16	



Date of Report: September 22, 2016
 Samples Submitted: September 2, 2016
 Laboratory Reference: 1609-030
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-030-13					
Client ID:	TYLMI-20160902					
Copper	8.5	1.0	200.8	9-8-16	9-8-16	
Zinc	21	5.0	200.8	9-8-16	9-8-16	
Lab ID:	09-030-14					
Client ID:	TYLMO-20160902					
Copper	9.3	1.0	200.8	9-8-16	9-8-16	
Zinc	27	5.0	200.8	9-8-16	9-8-16	
Lab ID:	09-030-15					
Client ID:	QA10-20160902					
Copper	9.2	1.0	200.8	9-8-16	9-8-16	
Zinc	48	5.0	200.8	9-8-16	9-8-16	



Date of Report: September 22, 2016
Samples Submitted: September 2, 2016
Laboratory Reference: 1609-030
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-8-16
Date Analyzed: 9-8-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0908WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: September 22, 2016
Samples Submitted: September 2, 2016
Laboratory Reference: 1609-030
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 9-8-16
Date Analyzed: 9-8-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-030-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	1.23	1.43	15	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: September 22, 2016
 Samples Submitted: September 2, 2016
 Laboratory Reference: 1609-030
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-8-16

Date Analyzed: 9-8-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 09-030-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	68.2	84	76.5	94	11	
Zinc	80.0	70.4	88	79.3	99	12	



Date of Report: September 22, 2016
 Samples Submitted: September 2, 2016
 Laboratory Reference: 1609-030
 Project: 14-05806-000

DISSOLVED METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-030-01						
Client ID: COLM-20160902						
Copper	ND	1.0	200.8		9-8-16	
Zinc	ND	5.0	200.8		9-8-16	
Lab ID: 09-030-02						
Client ID: COUMI-20160902						
Copper	2.9	1.0	200.8		9-8-16	
Zinc	9.0	5.0	200.8		9-8-16	
Lab ID: 09-030-03						
Client ID: COUMO-20160902						
Copper	3.6	1.0	200.8		9-8-16	
Zinc	10	5.0	200.8		9-8-16	
Lab ID: 09-030-04						
Client ID: EVAMS-20160902						
Copper	ND	1.0	200.8		9-8-16	
Zinc	ND	5.0	200.8		9-8-16	
Lab ID: 09-030-05						
Client ID: EVALSS-20160902						
Copper	ND	1.0	200.8		9-8-16	
Zinc	ND	5.0	200.8		9-8-16	
Lab ID: 09-030-06						
Client ID: MONMN-20160902						
Copper	ND	1.0	200.8		9-8-16	
Zinc	ND	5.0	200.8		9-8-16	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 22, 2016
 Samples Submitted: September 2, 2016
 Laboratory Reference: 1609-030
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-030-07					
Client ID:	MONMS-20160902					
Copper	2.3	1.0	200.8		9-8-16	
Zinc	ND	5.0	200.8		9-8-16	
Lab ID:	09-030-08					
Client ID:	MONM-20160902					
Copper	ND	1.0	200.8		9-8-16	
Zinc	7.5	5.0	200.8		9-8-16	
Lab ID:	09-030-09					
Client ID:	SEIMN-20160902					
Copper	ND	1.0	200.8		9-8-16	
Zinc	ND	5.0	200.8		9-8-16	
Lab ID:	09-030-10					
Client ID:	SEIMS-20160902					
Copper	ND	1.0	200.8		9-8-16	
Zinc	ND	5.0	200.8		9-8-16	
Lab ID:	09-030-11					
Client ID:	TOSMI-20160902					
Copper	4.1	1.0	200.8		9-8-16	
Zinc	28	5.0	200.8		9-8-16	
Lab ID:	09-030-12					
Client ID:	TOSMO-20160902					
Copper	3.6	1.0	200.8		9-8-16	
Zinc	11	5.0	200.8		9-8-16	



Date of Report: September 22, 2016
 Samples Submitted: September 2, 2016
 Laboratory Reference: 1609-030
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-030-13					
Client ID:	TYLMI-20160902					
Copper	4.5	1.0	200.8		9-8-16	
Zinc	ND	5.0	200.8		9-8-16	

Lab ID:	09-030-14					
Client ID:	TYLMO-20160902					
Copper	6.4	1.0	200.8		9-8-16	
Zinc	11	5.0	200.8		9-8-16	

Lab ID:	09-030-15					
Client ID:	QA10-20160902					
Copper	4.6	1.0	200.8		9-8-16	
Zinc	9.8	5.0	200.8		9-8-16	



Date of Report: September 22, 2016
Samples Submitted: September 2, 2016
Laboratory Reference: 1609-030
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 9-8-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0908D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: September 22, 2016
Samples Submitted: September 2, 2016
Laboratory Reference: 1609-030
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 9-8-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-030-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: September 22, 2016
 Samples Submitted: September 2, 2016
 Laboratory Reference: 1609-030
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 9-8-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 09-030-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	73.2	92	78.5	98	7	
Zinc	80.0	72.6	91	77.9	97	7	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Sep 20 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20160902	Water	16-A023788	Micro, NUT
COUMI-20160902	Water	16-A023789	Micro, NUT
COUMO-20160902	Water	16-A023790	Micro, NUT
EVAMS-20160902	Water	16-A023791	Micro, NUT
EVALSS-20160902	Water	16-A023792	Micro, NUT
MONMN-20160902	Water	16-A023793	Micro, NUT
MONMS-20160902	Water	16-A023794	Micro, NUT
MONM-20160902	Water	16-A023795	Micro, NUT
SEIMN-20160902	Water	16-A023796	Micro, NUT
SEIMS-20160902	Water	16-A023797	Micro, NUT
TOSMI-20160902	Water	16-A023798	Micro, NUT
TOSMO-20160902	Water	16-A023799	Micro, NUT
TYLMI-20160902	Water	16-A023800	Micro, NUT
TYLMO-20160902	Water	16-A023801	Micro, NUT
QA10-20160902	Water	16-A023802	Micro, NUT

Your samples were received on Friday, September 2, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
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Services**

Sep 20 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 09-030

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
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Suite C
Kirkland, WA 98034
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www.amtestlab.com



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ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 09-030
All results reported on an as received basis.

Date Received: 09/02/16
Date Reported: 9/20/16

AMTEST Identification Number 16-A023788
Client Identification COLM-20160902
Sampling Date 09/02/16, 14:15

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	2100	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	1.07	mg/l		0.1			
Total Nitrogen (TKN)	0.651	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.42	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023789**
Client Identification **COUMI-20160902**
Sampling Date **09/02/16, 11:25**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	13000	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	3.91	mg/l		0.1			
Total Nitrogen (TKN)	2.61	mg/l		0.1	SM4500N	MJ	09/16/16
Nitrate + Nitrite	1.3	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023790**
Client Identification **COUMO-20160902**
Sampling Date **09/02/16, 10:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	14000	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	3.08	mg/l		0.1			
Total Nitrogen (TKN)	2.33	mg/l		0.1	SM4500N	MJ	09/16/16
Nitrate + Nitrite	0.75	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023791**
Client Identification **EVAMS-20160902**
Sampling Date **09/02/16, 12:10**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	7200	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	4.64	mg/l		0.1			
Total Nitrogen (TKN)	3.34	mg/l		0.1	SM4500N	MJ	09/16/16
Nitrate + Nitrite	1.3	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023792**
Client Identification **EVALSS-20160902**
Sampling Date **09/02/16, 12:25**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	18000	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	4.56	mg/l		0.1			
Total Nitrogen (TKN)	3.26	mg/l		0.1	SM4500N	MJ	09/16/16
Nitrate + Nitrite	1.3	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023793**
Client Identification **MONMN-20160902**
Sampling Date **09/02/16, 12:50**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	5500	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	1.12	mg/l		0.1			
Total Nitrogen (TKN)	0.828	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.29	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023794**
Client Identification **MONMS-20160902**
Sampling Date **09/02/16, 13:10**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	6200	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	1.12	mg/l		0.1			
Total Nitrogen (TKN)	0.725	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.39	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023795**
Client Identification **MONM-20160902**
Sampling Date **09/02/16, 13:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	12000	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	1.68	mg/l		0.1			
Total Nitrogen (TKN)	1.30	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.38	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023796**
Client Identification **SEIMN-20160902**
Sampling Date **09/02/16, 13:30**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	710	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	1.05	mg/l		0.1			
Total Nitrogen (TKN)	0.389	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.66	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023797**
Client Identification **SEIMS-20160902**
Sampling Date **09/02/16, 13:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	16000	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	3.57	mg/l		0.1			
Total Nitrogen (TKN)	2.80	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.77	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023798**
Client Identification **TOSMI-20160902**
Sampling Date **09/02/16, 11:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4700	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	1.63	mg/l		0.1			
Total Nitrogen (TKN)	1.29	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.34	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023799**
Client Identification **TOSMO-20160902**
Sampling Date **09/02/16, 11:30**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	6300	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	6.03	mg/l		0.1			
Total Nitrogen (TKN)	5.60	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.43	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A023800**
Client Identification **TYLMI-20160902**
Sampling Date **09/02/16, 12:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	19000	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	1.02	mg/l		0.1			
Total Nitrogen (TKN)	0.409	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.61	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number 16-A023801
Client Identification TYLMO-20160902
Sampling Date 09/02/16, 12:15

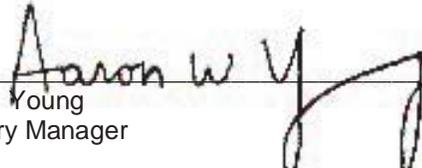
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	14000	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	1.88	mg/l		0.1			
Total Nitrogen (TKN)	1.39	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.49	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number 16-A023802
Client Identification QA10-20160902
Sampling Date 09/02/16, 10:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	14000	CFU/100 ml		1	SM 9222D	JM	09/02/16
Total Nitrogen (NOX&TKN)	3.35	mg/l		0.1			
Total Nitrogen (TKN)	2.63	mg/l		0.1	SM4500N	MJ	09/08/16
Nitrate + Nitrite	0.72	mg/l		0.01	SM4500NO3	MJ	09/15/16


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A023788 to 16-A023802

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A023795	Fecal Coliform	CFU/100 ml	12000	14000	15.
16-A023799	Fecal Coliform	CFU/100 ml	6300	5700	10.
16-A023806	Fecal Coliform	CFU/100 ml	240	200	18.
16-A021920	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A023111	Total Nitrogen (TKN)	mg/l	0.243	0.309	24.
16-A023143	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A023344	Total Nitrogen (TKN)	mg/l	1.69	1.73	2.3
16-A023735	Total Nitrogen (TKN)	mg/l	0.775	0.770	0.65
16-A023745	Total Nitrogen (TKN)	mg/l	0.294	0.288	2.1
16-A023791	Total Nitrogen (TKN)	mg/l	8.41	8.41	0.00
16-A023801	Total Nitrogen (TKN)	mg/l	1.39	1.37	1.4
16-A023797	Nitrate + Nitrite	mg/l	0.77	0.76	1.3
16-A024004	Nitrate + Nitrite	mg/l	1.8	1.7	5.7
16-A024014	Nitrate + Nitrite	mg/l	0.25	0.24	4.1
16-A024083	Nitrate + Nitrite	mg/l	0.015	0.014	6.9
16-A024322	Nitrate + Nitrite	mg/l	0.46	0.47	2.2
16-A024330	Nitrate + Nitrite	mg/l	0.30	0.30	0.00

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A021920	Total Nitrogen (TKN)	mg/l	< 0.1	1.00	1.00	100.00 %
16-A023143	Total Nitrogen (TKN)	mg/l	< 0.1	0.911	1.00	91.10 %
16-A023344	Total Nitrogen (TKN)	mg/l	1.69	2.63	1.00	94.00 %
16-A023735	Total Nitrogen (TKN)	mg/l	0.775	1.84	1.00	106.50 %
16-A023745	Total Nitrogen (TKN)	mg/l	0.294	1.29	1.00	99.60 %
16-A023801	Total Nitrogen (TKN)	mg/l	1.39	2.44	1.00	105.00 %
16-A023797	Nitrate + Nitrite	mg/l	0.77	1.3	0.50	106.00 %
16-A024004	Nitrate + Nitrite	mg/l	1.8	6.6	5.0	96.00 %
16-A024014	Nitrate + Nitrite	mg/l	0.25	0.71	0.50	92.00 %
16-A024083	Nitrate + Nitrite	mg/l	0.015	0.48	0.50	93.00 %
16-A024322	Nitrate + Nitrite	mg/l	0.46	0.94	0.50	96.00 %
16-A024330	Nitrate + Nitrite	mg/l	0.30	0.76	0.50	92.00 %

QC Summary for sample numbers: 16-A023788 to 16-A023802...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.562	112. %
Total Nitrogen (TKN)	mg/l	0.500	0.501	100. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.46	92.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 09-030

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20160902 <i>23788</i>	9/2/16	14:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20160902 <i>89</i>	9/2/16	11:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20160902 <i>90</i>	9/2/16	10:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20160902 <i>91</i>	9/2/16	12:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20160902 <i>92</i>	9/2/16	12:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20160902 <i>93</i>	9/2/16	12:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20160902 <i>94</i>	9/2/16	13:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20160902 <i>95</i>	9/2/16	13:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20160902 <i>96</i>	9/2/16	13:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20160902 <i>97</i>	9/2/16	13:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by: <i>[Signature]</i>		<i>OST</i>		9-2-16	3:50	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by: <i>[Signature]</i>		AmTest T-9		9/2/16	1530	
Relinquished by:						
Received by:						
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052 - (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 09-030

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
11	TOSMI-20160902 <u>23798</u>	9/2/16	11:00	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N
12	TOSMO-20160902 <u>29</u>	9/2/16	11:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N
13	TYLMI-20160902 <u>23800</u>	9/2/16	12:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N
14	TYLMO-20160902 <u>01</u>	9/2/16	12:15	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N
15	QA10-20160902 <u>02</u>	9/2/16	10:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 450C-N

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by: <u>[Signature]</u>	<u>OSE</u>	<u>9/2/16</u>	<u>3:50</u>	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by: <u>[Signature]</u>	<u>Amtest T=9</u>	<u>9/2/16</u>	<u>1550</u>	
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Itfner

CHAIN OF CUSTODY

Turnaround Requested:
 _____ 1 Day
 _____ 2 Day
 _____ 3 Day
 Standard

Laboratory No. **09-030**
 Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 0902	9-2-16	14:15	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0902	9-2-16	11:25	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0902	9-2-16	10:40	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0902	9-2-16	12:10	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0902	9-2-16	12:25	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 0902	9-2-16	12:50	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0902	9-2-16	13:10	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0902	9-2-16	13:35	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0902	9-2-16	13:30	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0902	9-2-16	13:00	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0902	9-2-16	11:00	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0902	9-2-16	11:30	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0902	9-2-16	12:40	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0902	9-2-16	12:15	Water	7	X	X	X	X	X	X	X	X	X
15	QA 10-20160902	9-2-16	10:50	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Mammitt Date 9-2-16 Received by [Signature] Date 9/2/16
 Firm Herrera Env. Cons. Time 15:05 Firm QSE Time 1505
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



CHAIN OF CUSTODY

14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: George Ittner

Turnaround Requested:

1 Day

2 Day

3 Day

Standard

Laboratory No. **09-030**

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 922D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 0902	9.2.16	14:15	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0902	9.2.16	11:25	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0902	9.2.16	10:40	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0902	9.2.16	12:10	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0902	9.2.16	12:25	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 0902	9.2.16	12:50	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0902	9.2.16	13:10	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0902	9.2.16	13:35	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0902	9.2.16	13:30	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0902	9.2.16	13:00	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0902	9.2.16	11:00	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0902	9.2.16	11:30	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0902	9.2.16	12:40	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0902	9.2.16	12:15	Water	7	X	X	X	X	X	X	X	X	X
15	QA 10-20160902	9.2.16	10:50	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Mammitt Date 9.2.16 Received by [Signature] Date 9/2/16

Firm Herrera Env. Cons. Time 15:05 Firm [Signature] Time 15:05

Relinquished by _____ Date _____ Received by _____ Date _____

Firm _____ Time _____ Firm _____ Time _____

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: Bianca Bland
Meter: YSI 686 PRO PLUS
Date/Time: 9-1-2016 @ 11:40
Barometric Pressure Start of Day: mm Hg: 253.5 Time: 11:40
Barometric Pressure End of Day: mm Hg: 258.1 Time: 16:30

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	10.0	0	19.1	
Conductivity (µS/cm)	970	1,000	19.2	
Conductivity (µS/cm)	104.9	100	18.7	
DO % Saturation	92.6	100	17.7	

- Conductivity Calibration Notes:**
1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	7.8	0	21.5	
Conductivity (µS/cm)	102.3	100	21.9	
DO % Saturation	102.2	100	22.1	

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	Brianna Blaud		
Meter:	YSI Pro Plus DSS		
Date/Time:	9.1.2016 @ 11:40		
Barometric Pressure Start of Day:	mm Hg: 753.1	Time:	11:40
Barometric Pressure End of Day:	mm Hg: 753.9	Time:	11:30

Calibration Procedures:
Rinse Multimetric Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	13.8	0	19.4	
Conductivity (µS/cm)	977	1,000	19.3	
Conductivity (µS/cm)	102.5	100	18.7	
DO % Saturation	99.3	100	17.3	

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.8	0	21.2	
Conductivity (µS/cm)	90.9	100	21.3	
DO % Saturation	100.1	100	21.2	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

7

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Valerie and Rob
 Sample Date: 9/2/16 Sample Time: 1415 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 1415 PST
 (Must filter within 15 minutes of collection)

SITE ID: COLM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: partly cloudy, 65°F

Water Quality Sampling

Sample ID: COLM-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	No
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: ↓
 Sheen: ↓
 Floatables: ↓

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: JC Signature: [Signature]
 Date Checked: 9.13.16 Time: 9:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Calibration check at 1440
1,000 Cond. Std.
= 1,037 µs/cm
DO = 103% sat

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): _____

Reference Point (description): No gauge

Water Quality Measurements

Temperature (°C) 14.0
 Conductivity (µs/cm) SPC = ~~45.6~~^{R2} 42.6
 Dissolved Oxygen (mg/L) 7.5

20 ft down from footbridge and down from logs

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BPB

SITE ID:

COUM1

Sample Date: 9-2-2010

Sample Time: 11:25

PDT:

Base Flow or Storm Event? Storm

Field Filtered Time: 11:30

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study



HERRERA

Current Weather and Temp: Rain 35°F

Water Quality Sampling

Sample ID: COUM1-20100902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	<u>NA</u>
Filter blank sample ID:	<u>NA</u>
Transfer blank sample ID:	<u>NA</u>

Visual and Olfactory Conditions:

Clarity: opaque - cloudy
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: some detritus (turbidity)

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: SC Signature: [Signature]
 Date Checked: 9-13-10 Time: 9:25
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 1.00

Reference Point (description): top of bar w/ 5g down - couldn't find pin. Has new gauge

Water Quality Measurements

Temperature (°C) 14.3

Conductivity (µs/cm) 216.6

Dissolved Oxygen (mg/L) 9.87

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Brianna Blaud

SITE ID: COUMO

Sample Date: 9.2.2010

Sample Time: 10:34

PDT: _____

Base Flow or Storm Event? storm

Field Filtered Time: 10:45

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: COUMO-20100902

Current Weather and Temp: Rain @ 57°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	Y
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	Y
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	Y
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	Y
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	Y
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D10020) _____

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.8

Reference Point (description): top of steel pin down

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA10-20100902

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: opaque, cloudy
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: some debris

Water Quality Measurements

Temperature (°C) 15.4

Conductivity (µs/cm) 110.5

Dissolved Oxygen (mg/L) 9.41

Date: _____ Time: _____

Quality Assurance

Checked By: JL

Signature: [Signature]

Date Checked: 9.13.10

Time: 9:45

Data Entered into Database?

YES

NO

initials:

Date Entered: _____

Time: _____

Notes: _____

LABORATORY DELIVERY

3

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Valerie and Rob
 Sample Date: 9/2/16 Sample Time: 1210 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 1210 PST:
 (Must filter within 15 minutes of collection)

SITE ID: EVAMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Overcast, 65°F

Water Quality Sampling

Sample ID: EVAMS-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>No</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: slight turbidity
 Color: Brown - tannins
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: JL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): SG = 3.95 ft
-1.78 ft
 Reference Point (description): down from top of PVC pipe

Water Quality Measurements

Temperature (°C) 13.2
 Conductivity (µs/cm) SPC 202
 Dissolved Oxygen (mg/L) 10.7

50 ft down from gauge, below weir

4

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Valerie and Rob
 Sample Date: 9/2/16 Sample Time: 1225 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 1225 PST
 (Must filter within 15 minutes of collection)

SITE ID: EVALLSS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: overcast, 65°F

Water Quality Sampling

Sample ID: EVALLSS-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: turbid
 Color: brown tannin and silt
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: SL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:25
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): SG = 2.40 ft
 Reference Point (description): 2.06 ft Down from top of PVC pipe cap

Water Quality Measurements

Temperature (°C) 13.3
 Conductivity (µs/cm) 192
 Dissolved Oxygen (mg/L) 11.0

25 ft up from culvert

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB

Sample Date: 9-2-16

Sample Time: 12:50

PDT

SITE

ID: MONMN

Base Flow or Storm Event? Storm

Field Filtered Time: 12:55

PST X

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: partly cloudy 88°F

Water Quality Sampling

Sample ID: MONMN-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear

Color: colorless

Odor: odorless

Sheen: none

Floatables: none

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: JL

Signature: [Signature]

Date Checked: 9-15-16

Time: 9:45

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.05

Reference Point (description): top of batt. up to water

Water Quality Measurements

Temperature (°C) 15.8

Conductivity (µs/cm) 205.2

Dissolved Oxygen (mg/L) 9.04

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: PJB
 Sample Date: 9.2.16 Sample Time: 13:10 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 13:15 PST
 (Must filter within 15 minutes of collection)

SITE ID: MONMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: partly cloudy & 60°F

Water Quality Sampling

Sample ID: MONMS-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: JL Signature: [Signature]
 Date Checked: 9.13.16 Time: 9:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.65
 Reference Point (description): in vault

Water Quality Measurements

Temperature (°C) 15.1
 Conductivity (µs/cm) 183.0
 Dissolved Oxygen (mg/L) 7.24 IS

completely covered w/ reed canopy grass, lady fern, & horsetail and blackberry. was mowed along gravel trail, but not over mowed from over stream

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: MB

 Sample Date: 9.2.2016

 Sample Time: 13:35

PDT:

SITE ID:

MONM

 Base Flow or Storm Event? STORM

 Field Filtered Time: 13:40

 PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)


HERRERA

Project Name: Redmond Paired Watershed Study

Water Quality Sampling

 Sample ID: MONM-20160902

 Current Weather and Temp: partly cloudy 81.04°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

 Duplicate sample ID: NA

 Filter blank sample ID: NA

 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

 Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): 3.25

 Reference Point (description): top of culvert down

Water Quality Measurements

 Temperature (°C) 15.5

 Conductivity (µs/cm) 198.0

 Dissolved Oxygen (mg/L) 9.72

Quality Assurance

 Checked By: SL

 Signature: [Signature]

 Date Checked: 9.13.16

 Time: 9:45

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

6

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Valerie and Rob
 Sample Date: 9/2/16 Sample Time: 1330 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 1330 PST:
 (Must filter within 15 minutes of collection)

SITE ID: SEIMN



Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Ptly cloudy, 65°F

Water Quality Sampling

Sample ID: SEIMN-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>No</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	↓
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	↓
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	↓
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	↓
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: Clear
 Color: None
 Odor: None
 Sheen: None
 Floatables: None

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: SL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): -0.78
 Reference Point (description): down from top of bolt on side of stand pipe

Water Quality Measurements

Temperature (°C) 12.9
 Conductivity (µs/cm) SPC = 107
 Dissolved Oxygen (mg/L) 10.7

over weir @ 10ft down from foot bridge

5

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Valeria and Rob
 Sample Date: 9/12/16 Sample Time: 1300 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 1300 PST:
 (Must filter within 15 minutes of collection)

SITE ID: SEIMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Partly Cloudy, 65°F

Water Quality Sampling

Sample ID: SEIMS-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>NO</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: ↓
 Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: Slight turbid
 Color: Brown tannin and silt
 Odor: NO
 Sheen: NO
 Floatables: NO

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: JL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:45
 Data Entered into Database? YES NO Initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): SG = 0.87
 Reference Point (description): -0.63 ft down from bottom edge of steel spike in bank

Water Quality Measurements

Temperature (°C) 13.4
 Conductivity (µs/cm) SPC = 119
 Dissolved Oxygen (mg/L) 9.8

Weir overflow

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Valerie and Rob

Sample Date: 9/2/16

Sample Time: 1100

PMT:

SITE

ID: TOSMI

Base Flow or Storm Event? Storm

Field Filtered Time: 1100

PST:

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Mod. rain, 65°F

Water Quality Sampling

Sample ID: TOSMI-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	NO ↓
DOC *	HDPE	250 ml	1	HCL	
Focal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: ↓

Transfer blank sample ID: ↓

Visual and Olfactory Conditions:

Clarity: Turbid
 Color: Brown from silt
 Odor: None
 Sheen: None
 Floatables: None

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: JC Signature: [Signature]

Date Checked: 9-13-16 Time: 9:45

Data Entered into Database? YES NO initials:

Date Entered: _____ Time: _____

Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): +0.07

Reference Point (description): up from bolt

Water Quality Measurements

Temperature (°C) 15.4

Conductivity (µs/cm) SPC 50.3

Dissolved Oxygen (mg/L) 10.4

104% sat

pH = 7.52

5 ft up from gauge

2

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Valerie and Rob
 Sample Date: 9/2/16 Sample Time: 1130 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 1130 PST:
 (Must filter within 15 minutes of collection)

SITE ID: TOSMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: light rain, 65°F

Water Quality Sampling

Sample ID: TOSMO-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	No ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID:
 Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: Turbid
 Color: Brown
 Odor: No
 Sheen: No
 Floatables: No

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: SL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): -0.09

Reference Point (description): down from top of bolt in stream bed

Water Quality Measurements

Temperature (°C) 15.1

Conductivity (µs/cm) SPC 70.5

Dissolved Oxygen (mg/L) 10.5

wier overflow, 10 ft up of inlet

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: PHS

Sample Date: 9-2-2016

Sample Time: 12:35

PDT:

SITE ID: TYLMI

Base Flow or Storm Event? STORM

Field Filtered Time: 12:40

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy @ 57°F

Water Quality Sampling

Sample ID: TYLMI-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input checked="" type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input checked="" type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input checked="" type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input checked="" type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown colorless
 Odor: none
 Sheen: none
 Floatables: some detritus, turbidity

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: JK Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:45
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.5

Reference Point (description): top of culvert down

Water Quality Measurements

Temperature (°C) 16.1

Conductivity (µs/cm) 101.2

Dissolved Oxygen (mg/L) 3.86

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 9-2-16 Sample Time: 12:10 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 12:15 PST
 (Must filter within 15 minutes of collection)

SITE ID: TYLMO

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: cloudy 75°F

Water Quality Sampling

Sample ID: TYLMO-20160902

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: some debris, turbidity

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: BB Signature: [Signature]
 Date Checked: 9-13-16 Time: 19:45
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466) X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 2.65
 Reference Point (description): top of culvert down

Water Quality Measurements

Temperature (°C) 15.7
 Conductivity (µs/cm) 65.9
 Dissolved Oxygen (mg/L) 9.15



Data Quality Assurance Worksheet

G

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 9/29/2016 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 9/2/2016 / All sites, 1 FD (QA10) at COUMO

date 10/14/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	6	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	96	±20	2	≤25	7.4	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	<1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	2	≤25	22	≤25	OK	NONE
Hardness	OK / SM 2340B	NA	NA	7	≤180	≤1.0 mg/L 1.0 mg/L	107,110	±25	108	±15	4	≤20	2.3	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	11	≤28	≤1.0 mg/L 1.0 mg/L	97	±25	112	±15	3	≤20	0	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	10	≤28	≤0.01 mg/L 0.01 mg/L	103	±25	100	±20	2	≤20	8.7	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	6,13,14	≤28	≤0.1 mg/L 0.1 mg/L	105,106	±25	92-112	±20	0,1,4,1.3	≤20	8.4	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 9/29/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 9/2/2016 / All sites, 1 FD (QA10) at COUMO

date 10/14/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	6	≤180	≤1.0 µg/L 1.0 µg/L	84,94	±25	NR	±15	15	≤20	4.4	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	6	≤180	≤5.0 µg/L 5.0 µg/L	88,99	±25	NR	±15	NC	≤20	4.1	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	6	≤180	≤1.0 µg/L 1.0 µg/L	92,98	±25	NR	±15	NC	≤20	D=1.0	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	6	≤180	≤5.0 µg/L 5.0 µg/L	91,97	±25	NR	±15	NC	≤20	D=0.2	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	15,10	≤35	0	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 22, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1609-041

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on September 6, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 22, 2016
Samples Submitted: September 6, 2016
Laboratory Reference: 1609-041
Project: 14-05806-000

Case Narrative

Samples were collected on September 6, 2016 and received by the laboratory on September 6, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: September 22, 2016
 Samples Submitted: September 6, 2016
 Laboratory Reference: 1609-041
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160906					
Laboratory ID:	09-041-01					
Total Suspended Solids	3.0	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	COUMI-20160906					
Laboratory ID:	09-041-02					
Total Suspended Solids	21	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	COUMO-20160906					
Laboratory ID:	09-041-03					
Total Suspended Solids	4.4	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	EVAMS-20160906					
Laboratory ID:	09-041-04					
Total Suspended Solids	12	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	EVALSS-20160906					
Laboratory ID:	09-041-05					
Total Suspended Solids	11	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	MONMN-20160906					
Laboratory ID:	09-041-06					
Total Suspended Solids	130	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	MONMS-20160906					
Laboratory ID:	09-041-07					
Total Suspended Solids	1.0	1.0	SM 2540D	9-7-16	9-8-16	



Date of Report: September 22, 2016
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**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160906					
Laboratory ID:	09-041-08					
Total Suspended Solids	3.8	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	SEIMN-20160906					
Laboratory ID:	09-041-09					
Total Suspended Solids	15	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	SEIMS-20160906					
Laboratory ID:	09-041-10					
Total Suspended Solids	25	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	TOSMI-20160906					
Laboratory ID:	09-041-11					
Total Suspended Solids	3.6	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	TOSMO-20160906					
Laboratory ID:	09-041-12					
Total Suspended Solids	5.8	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	TYLMI-20160906					
Laboratory ID:	09-041-13					
Total Suspended Solids	13	1.0	SM 2540D	9-7-16	9-8-16	

Client ID:	TYLMO-20160906					
Laboratory ID:	09-041-14					
Total Suspended Solids	3.6	1.0	SM 2540D	9-7-16	9-8-16	



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TOTAL SUSPENDED SOLIDS
SM 2540D

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA11-20160906					
Laboratory ID:	09-041-15					
Total Suspended Solids	5.8	1.0	SM 2540D	9-7-16	9-8-16	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0907W3					
Total Suspended Solids	ND	1.0	SM 2540D	9-7-16	9-8-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-041-08							
	ORIG	DUP						
Total Suspended Solids	3.80	3.40	NA	NA	NA	11	17	

SPIKE BLANK								
Laboratory ID:	SB0907W2							
	SB	SB		SB				
Total Suspended Solids	92.0	100	NA	92	75-114	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160906					
Laboratory ID:	09-041-01					
Turbidity	1.0	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	COUMI-20160906					
Laboratory ID:	09-041-02					
Turbidity	5.3	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	COUMO-20160906					
Laboratory ID:	09-041-03					
Turbidity	1.9	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	EVAMS-20160906					
Laboratory ID:	09-041-04					
Turbidity	2.5	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	EVALSS-20160906					
Laboratory ID:	09-041-05					
Turbidity	2.7	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	MONMN-20160906					
Laboratory ID:	09-041-06					
Turbidity	9.7	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	MONMS-20160906					
Laboratory ID:	09-041-07					
Turbidity	0.70	0.10	EPA 180.1	9-7-16	9-7-16	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160906					
Laboratory ID:	09-041-08					
Turbidity	1.4	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	SEIMN-20160906					
Laboratory ID:	09-041-09					
Turbidity	3.7	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	SEIMS-20160906					
Laboratory ID:	09-041-10					
Turbidity	3.3	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	TOSMI-20160906					
Laboratory ID:	09-041-11					
Turbidity	1.4	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	TOSMO-20160906					
Laboratory ID:	09-041-12					
Turbidity	1.9	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	TYLMI-20160906					
Laboratory ID:	09-041-13					
Turbidity	2.1	0.10	EPA 180.1	9-7-16	9-7-16	

Client ID:	TYLMO-20160906					
Laboratory ID:	09-041-14					
Turbidity	1.8	0.10	EPA 180.1	9-7-16	9-7-16	



Date of Report: September 22, 2016
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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA11-20160906					
Laboratory ID:	09-041-15					
Turbidity	0.85	0.10	EPA 180.1	9-7-16	9-7-16	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0907W1					
Turbidity	ND	0.10	EPA 180.1	9-7-16	9-7-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-041-01							
	ORIG	DUP						
Turbidity	1.04	1.05	NA	NA	NA	NA	1	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160906					
Laboratory ID:	09-041-01					
Hardness	12	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	COUMI-20160906					
Laboratory ID:	09-041-02					
Hardness	180	5.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	COUMO-20160906					
Laboratory ID:	09-041-03					
Hardness	130	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	EVAMS-20160906					
Laboratory ID:	09-041-04					
Hardness	100	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	EVALSS-20160906					
Laboratory ID:	09-041-05					
Hardness	93	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	MONMN-20160906					
Laboratory ID:	09-041-06					
Hardness	86	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	MONMS-20160906					
Laboratory ID:	09-041-07					
Hardness	130	1.0	200.7/SM 2340B	9-9-16	9-12-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160906					
Laboratory ID:	09-041-08					
Hardness	95	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	SEIMN-20160906					
Laboratory ID:	09-041-09					
Hardness	50	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	SEIMS-20160906					
Laboratory ID:	09-041-10					
Hardness	54	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	TOSMI-20160906					
Laboratory ID:	09-041-11					
Hardness	140	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	TOSMO-20160906					
Laboratory ID:	09-041-12					
Hardness	110	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	TYLMI-20160906					
Laboratory ID:	09-041-13					
Hardness	76	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Client ID:	TYLMO-20160906					
Laboratory ID:	09-041-14					
Hardness	85	1.0	200.7/SM 2340B	9-9-16	9-12-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA11-20160906					
Laboratory ID:	09-041-15					
Hardness	130	1.0	200.7/SM 2340B	9-9-16	9-12-16	



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**HARDNESS
 EPA 200.7/SM 2340B
 QUALITY CONTROL**

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0909WH2					
Hardness	ND	1.0	200.7/SM 2340B	9-9-16	9-12-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-041-02							
	ORIG	DUP						
Hardness	175	182	NA	NA	NA	4	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	09-041-02									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	323	313	132	132	175	112	105	75-125	3	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK								
Laboratory ID:	SB0909WH2							
	SB	SB			SB			
Hardness	131	132	NA	99	80-120	NA	NA	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160906					
Laboratory ID:	09-041-01					
Dissolved Organic Carbon	7.7	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	COUMI-20160906					
Laboratory ID:	09-041-02					
Dissolved Organic Carbon	3.0	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	COUMO-20160906					
Laboratory ID:	09-041-03					
Dissolved Organic Carbon	2.3	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	EVAMS-20160906					
Laboratory ID:	09-041-04					
Dissolved Organic Carbon	2.7	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	EVALSS-20160906					
Laboratory ID:	09-041-05					
Dissolved Organic Carbon	2.1	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	MONMN-20160906					
Laboratory ID:	09-041-06					
Dissolved Organic Carbon	4.9	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	MONMS-20160906					
Laboratory ID:	09-041-07					
Dissolved Organic Carbon	6.2	1.0	SM 5310B	9-13-16	9-14-16	



Date of Report: September 22, 2016
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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160906					
Laboratory ID:	09-041-08					
Dissolved Organic Carbon	4.6	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	SEIMN-20160906					
Laboratory ID:	09-041-09					
Dissolved Organic Carbon	1.9	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	SEIMS-20160906					
Laboratory ID:	09-041-10					
Dissolved Organic Carbon	3.9	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	TOSMI-20160906					
Laboratory ID:	09-041-11					
Dissolved Organic Carbon	2.3	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	TOSMO-20160906					
Laboratory ID:	09-041-12					
Dissolved Organic Carbon	2.3	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	TYLMI-20160906					
Laboratory ID:	09-041-13					
Dissolved Organic Carbon	3.8	1.0	SM 5310B	9-13-16	9-14-16	
Client ID:	TYLMO-20160906					
Laboratory ID:	09-041-14					
Dissolved Organic Carbon	4.6	1.0	SM 5310B	9-13-16	9-14-16	



Date of Report: September 22, 2016
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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA11-20160906					
Laboratory ID:	09-041-15					
Dissolved Organic Carbon	2.3	1.0	SM 5310B	9-13-16	9-14-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0913D2					
Dissolved Organic Carbon	ND	1.0	SM 5310B	9-13-16	9-14-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-041-01							
	ORIG	DUP						
Dissolved Organic Carbon	7.65	7.44	NA	NA	NA	3	20	

MATRIX SPIKE

Laboratory ID:	09-041-01							
	MS	MS		MS				
Dissolved Organic Carbon	17.9	10.0	7.65	103	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0913D2							
	SB	SB		SB				
Dissolved Organic Carbon	11.3	10.0	NA	113	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160906					
Laboratory ID:	09-041-01					
Total Phosphorus	0.015	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	COUMI-20160906					
Laboratory ID:	09-041-02					
Total Phosphorus	0.17	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	COUMO-20160906					
Laboratory ID:	09-041-03					
Total Phosphorus	0.071	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	EVAMS-20160906					
Laboratory ID:	09-041-04					
Total Phosphorus	0.031	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	EVALSS-20160906					
Laboratory ID:	09-041-05					
Total Phosphorus	0.039	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	MONMN-20160906					
Laboratory ID:	09-041-06					
Total Phosphorus	0.36	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	MONMS-20160906					
Laboratory ID:	09-041-07					
Total Phosphorus	0.021	0.010	EPA 365.1	9-9-16	9-12-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160906					
Laboratory ID:	09-041-08					
Total Phosphorus	0.052	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	SEIMN-20160906					
Laboratory ID:	09-041-09					
Total Phosphorus	0.071	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	SEIMS-20160906					
Laboratory ID:	09-041-10					
Total Phosphorus	0.086	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	TOSMI-20160906					
Laboratory ID:	09-041-11					
Total Phosphorus	0.074	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	TOSMO-20160906					
Laboratory ID:	09-041-12					
Total Phosphorus	0.071	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	TYLMI-20160906					
Laboratory ID:	09-041-13					
Total Phosphorus	0.041	0.010	EPA 365.1	9-9-16	9-12-16	

Client ID:	TYLMO-20160906					
Laboratory ID:	09-041-14					
Total Phosphorus	0.065	0.010	EPA 365.1	9-9-16	9-12-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA11-20160906					
Laboratory ID:	09-041-15					
Total Phosphorus	0.074	0.010	EPA 365.1	9-9-16	9-12-16	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0909W2					
Total Phosphorus	ND	0.010	EPA 365.1	9-9-16	9-12-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-041-01							
	ORIG	DUP						
Total Phosphorus	0.0147	0.0143	NA	NA	NA	3	10	

MATRIX SPIKE								
Laboratory ID:	09-041-01							
	MS	MS		MS				
Total Phosphorus	0.285	0.250	0.0147	108	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0909W2							
	SB	SB		SB				
Total Phosphorus	0.248	0.250	NA	99	86-112	NA	NA	



Date of Report: September 22, 2016
 Samples Submitted: September 6, 2016
 Laboratory Reference: 1609-041
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-041-01						
Client ID: COLM-20160906						
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	ND	5.0	200.8	9-9-16	9-9-16	
Lab ID: 09-041-02						
Client ID: COUMI-20160906						
Copper	3.4	1.0	200.8	9-9-16	9-9-16	
Zinc	11	5.0	200.8	9-9-16	9-9-16	
Lab ID: 09-041-03						
Client ID: COUMO-20160906						
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	6.3	5.0	200.8	9-9-16	9-9-16	
Lab ID: 09-041-04						
Client ID: EVAMS-20160906						
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	ND	5.0	200.8	9-9-16	9-9-16	
Lab ID: 09-041-05						
Client ID: EVALSS-20160906						
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	ND	5.0	200.8	9-9-16	9-9-16	
Lab ID: 09-041-06						
Client ID: MONMN-20160906						
Copper	8.7	1.0	200.8	9-9-16	9-9-16	
Zinc	110	5.0	200.8	9-9-16	9-9-16	



Date of Report: September 22, 2016
 Samples Submitted: September 6, 2016
 Laboratory Reference: 1609-041
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-041-07					
Client ID:	MONMS-20160906					
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	ND	5.0	200.8	9-9-16	9-9-16	
Lab ID:	09-041-08					
Client ID:	MONM-20160906					
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	6.3	5.0	200.8	9-9-16	9-9-16	
Lab ID:	09-041-09					
Client ID:	SEIMN-20160906					
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	ND	5.0	200.8	9-9-16	9-9-16	
Lab ID:	09-041-10					
Client ID:	SEIMS-20160906					
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	ND	5.0	200.8	9-9-16	9-9-16	
Lab ID:	09-041-11					
Client ID:	TOSMI-20160906					
Copper	1.0	1.0	200.8	9-9-16	9-9-16	
Zinc	12	5.0	200.8	9-9-16	9-9-16	
Lab ID:	09-041-12					
Client ID:	TOSMO-20160906					
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	ND	5.0	200.8	9-9-16	9-9-16	



Date of Report: September 22, 2016
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 Laboratory Reference: 1609-041
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-041-13					
Client ID:	TYLMI-20160906					
Copper	5.5	1.0	200.8	9-9-16	9-9-16	
Zinc	12	5.0	200.8	9-9-16	9-9-16	
Lab ID:	09-041-14					
Client ID:	TYLMO-20160906					
Copper	1.5	1.0	200.8	9-9-16	9-9-16	
Zinc	7.0	5.0	200.8	9-9-16	9-9-16	
Lab ID:	09-041-15					
Client ID:	QA11-20160906					
Copper	ND	1.0	200.8	9-9-16	9-9-16	
Zinc	6.6	5.0	200.8	9-9-16	9-9-16	



Date of Report: September 22, 2016
Samples Submitted: September 6, 2016
Laboratory Reference: 1609-041
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-9-16
Date Analyzed: 9-9-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0909WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: September 22, 2016
 Samples Submitted: September 6, 2016
 Laboratory Reference: 1609-041
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 DUPLICATE QUALITY CONTROL**

Date Extracted: 9-9-16

Date Analyzed: 9-9-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 09-041-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: September 22, 2016
 Samples Submitted: September 6, 2016
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 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-9-16

Date Analyzed: 9-9-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 09-041-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	104	104	106	106	1	
Zinc	100	101	101	101	101	0	



Date of Report: September 22, 2016
 Samples Submitted: September 6, 2016
 Laboratory Reference: 1609-041
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-041-01						
Client ID: COLM-20160906						
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	
Lab ID: 09-041-02						
Client ID: COUMI-20160906						
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	
Lab ID: 09-041-03						
Client ID: COUMO-20160906						
Copper	ND	1.0	200.8		9-9-16	
Zinc	6.1	5.0	200.8		9-9-16	
Lab ID: 09-041-04						
Client ID: EVAMS-20160906						
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	
Lab ID: 09-041-05						
Client ID: EVALSS-20160906						
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	
Lab ID: 09-041-06						
Client ID: MONMN-20160906						
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 22, 2016
 Samples Submitted: September 6, 2016
 Laboratory Reference: 1609-041
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-041-07					
Client ID:	MONMS-20160906					
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	
Lab ID:	09-041-08					
Client ID:	MONM-20160906					
Copper	ND	1.0	200.8		9-9-16	
Zinc	6.6	5.0	200.8		9-9-16	
Lab ID:	09-041-09					
Client ID:	SEIMN-20160906					
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	
Lab ID:	09-041-10					
Client ID:	SEIMS-20160906					
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	
Lab ID:	09-041-11					
Client ID:	TOSMI-20160906					
Copper	ND	1.0	200.8		9-9-16	
Zinc	7.3	5.0	200.8		9-9-16	
Lab ID:	09-041-12					
Client ID:	TOSMO-20160906					
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	



Date of Report: September 22, 2016
 Samples Submitted: September 6, 2016
 Laboratory Reference: 1609-041
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-041-13					
Client ID:	TYLMI-20160906					
Copper	3.3	1.0	200.8		9-9-16	
Zinc	5.5	5.0	200.8		9-9-16	
Lab ID:	09-041-14					
Client ID:	TYLMO-20160906					
Copper	ND	1.0	200.8		9-9-16	
Zinc	ND	5.0	200.8		9-9-16	
Lab ID:	09-041-15					
Client ID:	QA11-20160906					
Copper	ND	1.0	200.8		9-9-16	
Zinc	6.1	5.0	200.8		9-9-16	



Date of Report: September 22, 2016
Samples Submitted: September 6, 2016
Laboratory Reference: 1609-041
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 9-9-16
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0909D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: September 22, 2016
Samples Submitted: September 6, 2016
Laboratory Reference: 1609-041
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 9-9-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-041-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5.0	



Date of Report: September 22, 2016
 Samples Submitted: September 6, 2016
 Laboratory Reference: 1609-041
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 9-9-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 09-041-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	74.2	93	75.5	94	2	
Zinc	80.0	75.0	94	76.4	96	2	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Sep 20 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20160906	Water	16-A024001	Micro, NUT
COUMI-20160906	Water	16-A024002	Micro, NUT
COUMO-20160906	Water	16-A024003	Micro, NUT
EVAMS-20160906	Water	16-A024004	Micro, NUT
EVALSS-20160906	Water	16-A024005	Micro, NUT
MONMN-20160906	Water	16-A024006	Micro, NUT
MONMS-20160906	Water	16-A024007	Micro, NUT
MONM-20160906	Water	16-A024008	Micro, NUT
SEIMN-20160906	Water	16-A024009	Micro, NUT
SEIMS-20160906	Water	16-A024010	Micro, NUT
TOSMI-20160906	Water	16-A024011	Micro, NUT
TOSMO-20160906	Water	16-A024012	Micro, NUT
TYLMI-20160906	Water	16-A024013	Micro, NUT
TYLMO-20160906	Water	16-A024014	Micro, NUT
QA11-20160906	Water	16-A024015	Micro, NUT

Your samples were received on Tuesday, September 6, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
Analytical
Services**

Sep 20 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-056806-000
PO Number: 09-041

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-056806-000
PO Number: 09-041
All results reported on an as received basis.

Date Received: 09/06/16
Date Reported: 9/20/16

AMTEST Identification Number 16-A024001
Client Identification COLM-20160906
Sampling Date 09/06/16, 03:45

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	30.	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.87	mg/l		0.1			
Total Nitrogen (TKN)	0.860	mg/l		0.1	SM4500N	CO	09/08/16
Nitrate + Nitrite	0.011	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024002**
Client Identification **COUMI-20160906**
Sampling Date **09/06/16, 01:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4100	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.82	mg/l		0.1			
Total Nitrogen (TKN)	0.487	mg/l		0.1	SM4500N	CO	09/08/16
Nitrate + Nitrite	0.33	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024003**
Client Identification **COUMO-20160906**
Sampling Date **09/06/16, 00:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	670	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.90	mg/l		0.1			
Total Nitrogen (TKN)	0.469	mg/l		0.1	SM4500N	CO	09/08/16
Nitrate + Nitrite	0.43	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024004**
Client Identification **EVAMS-20160906**
Sampling Date **09/06/16, 01:25**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	360	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	2.70	mg/l		0.1			
Total Nitrogen (TKN)	0.901	mg/l		0.1	SM4500N	CO	09/08/16
Nitrate + Nitrite	1.8	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024005**
Client Identification **EVALSS-20160906**
Sampling Date **09/06/16, 01:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	110	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	1.46	mg/l		0.1			
Total Nitrogen (TKN)	0.162	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	1.3	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number 16-A024006
Client Identification MONMN-20160906
Sampling Date 09/06/16, 02:50

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	770	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.38	mg/l		0.1			
Total Nitrogen (TKN)	0.292	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.093	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number 16-A024007
Client Identification MONMS-20160906
Sampling Date 09/06/16, 03:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	20.	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.46	mg/l		0.1			
Total Nitrogen (TKN)	0.289	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.17	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024008**
Client Identification **MONM-20160906**
Sampling Date **09/06/16, 03:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1700	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.57	mg/l		0.1			
Total Nitrogen (TKN)	0.353	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.22	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024009**
Client Identification **SEIMN-20160906**
Sampling Date **09/06/16, 03:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	13000	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.25	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.25	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024010**
Client Identification **SEIMS-20160906**
Sampling Date **09/06/16, 02:15**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	290	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.26	mg/l		0.1			
Total Nitrogen (TKN)	< 0.1	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.26	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024011**
Client Identification **TOSMI-20160906**
Sampling Date **09/06/16, 00:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	3200	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.77	mg/l		0.1			
Total Nitrogen (TKN)	0.110	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.66	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024012**
Client Identification **TOSMO-20160906**
Sampling Date **09/06/16, 01:30**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	380	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.59	mg/l		0.1			
Total Nitrogen (TKN)	0.121	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.47	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024013**
Client Identification **TYLMI-20160906**
Sampling Date **09/06/16, 02:25**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	710	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.90	mg/l		0.1			
Total Nitrogen (TKN)	0.261	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.64	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024014**
Client Identification **TYLMO-20160906**
Sampling Date **09/06/16, 02:00**

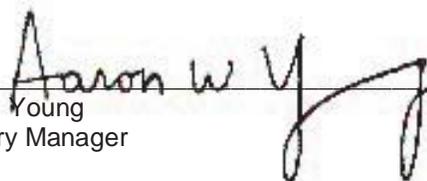
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	770	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.59	mg/l		0.1			
Total Nitrogen (TKN)	0.338	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.25	mg/l		0.01	SM4500NO3	MJ	09/15/16

AMTEST Identification Number **16-A024015**
Client Identification **QA11-20160906**
Sampling Date **09/06/16, 00:45**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	390	CFU/100 ml		1	SM 9222D	JM	09/06/16
Total Nitrogen (NOX&TKN)	0.82	mg/l		0.1			
Total Nitrogen (TKN)	0.167	mg/l		0.1	SM4500N	CO	09/16/16
Nitrate + Nitrite	0.65	mg/l		0.01	SM4500NO3	MJ	09/15/16


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A024001 to 16-A024015

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A024006	Fecal Coliform	CFU/100 ml	770	680	12.
16-A023987	Fecal Coliform	CFU/100 ml	5.	7.	33.
16-A024004	Total Nitrogen (TKN)	mg/l	0.901	0.896	0.56
16-A023338	Total Nitrogen (TKN)	mg/l	0.289	0.327	12.
16-A024009	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A024130	Total Nitrogen (TKN)	mg/l	0.574	0.557	3.0
16-A023797	Nitrate + Nitrite	mg/l	0.77	0.76	1.3
16-A024004	Nitrate + Nitrite	mg/l	1.8	1.7	5.7
16-A024014	Nitrate + Nitrite	mg/l	0.25	0.24	4.1
16-A024083	Nitrate + Nitrite	mg/l	0.015	0.014	6.9
16-A024322	Nitrate + Nitrite	mg/l	0.46	0.47	2.2
16-A024330	Nitrate + Nitrite	mg/l	0.30	0.30	0.00

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A024004	Total Nitrogen (TKN)	mg/l	0.901	1.96	1.00	105.90 %
16-A023338	Total Nitrogen (TKN)	mg/l	0.289	6.08	5.00	115.82 %
16-A024009	Total Nitrogen (TKN)	mg/l	< 0.1	5.84	5.00	116.80 %
16-A024130	Total Nitrogen (TKN)	mg/l	0.574	5.29	5.00	94.32 %
16-A023797	Nitrate + Nitrite	mg/l	0.77	1.3	0.50	106.00 %
16-A024004	Nitrate + Nitrite	mg/l	1.8	6.6	5.0	96.00 %
16-A024014	Nitrate + Nitrite	mg/l	0.25	0.71	0.50	92.00 %
16-A024083	Nitrate + Nitrite	mg/l	0.015	0.48	0.50	93.00 %
16-A024322	Nitrate + Nitrite	mg/l	0.46	0.94	0.50	96.00 %
16-A024330	Nitrate + Nitrite	mg/l	0.30	0.76	0.50	92.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.454	90.8 %
Total Nitrogen (TKN)	mg/l	2.50	2.58	103. %
Total Nitrogen (TKN)	mg/l	2.50	2.52	101. %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %
Nitrate + Nitrite	mg/l	0.50	0.46	92.0 %
Nitrate + Nitrite	mg/l	0.50	0.49	98.0 %

QC Summary for sample numbers: 16-A024001 to 16-A024015...

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Laboratory Reference #: 09-041

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: 14-05806-000

Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20160906 24001	9/6/16	0345	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20160906 02	9/6/16	0100	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20160906 03	9/6/16	0040	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20160906 04	9/6/16	0125	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20160906 05	9/6/16	0140	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20160906 06	9/6/16	0250	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20160906 07	9/6/16	0325	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20160906 08	9/6/16	0335	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20160906 09	9/6/16	0300	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20160906 10	9/6/16	0215	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by:		OnSite Env		9/16/16	1430	EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:						
Relinquished by:						
Received by: RM		Amtest J=4.3		9/16/16	1430	
Relinquished by:						
Received by:						



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:
 _____ 1 Day
 _____ 2 Day
 _____ 3 Day
 Standard

09-041

Laboratory No. 09-041														
Requested Analyses														
Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *						

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *						
1	COLM-2016 0904	9/6/16	03:45	Water	7	X	X	X	X	X	X	X	X	X						
2	COUMI-2016 0906	9/6/16	01:00	Water	7	X	X	X	X	X	X	X	X	X						
3	COUMO-2016 0906	9/6/16	00:40	Water	7	X	X	X	X	X	X	X	X	X						
4	EVAMS-2016 0906	9/6/16	01:25	Water	7	X	X	X	X	X	X	X	X	X						
5	EVALSS-2016 0906	9/6/16	01:40	Water	7	X	X	X	X	X	X	X	X	X						
6	MONMN-2016 0906	9/6/16	02:50	Water	7	X	X	X	X	X	X	X	X	X						
7	MONMS-2016 0906	9/6/16	03:25	Water	7	X	X	X	X	X	X	X	X	X						
8	MONM-2016 0906	9/6/16	03:35	Water	7	X	X	X	X	X	X	X	X	X						
9	SEIMN-2016 0906	9/6/16	03:00	Water	7	X	X	X	X	X	X	X	X	X						
10	SEIMS-2016 0906	9/6/16	02:15	Water	7	X	X	X	X	X	X	X	X	X						
11	TOSMI-2016 0906	9/6/16	00:40	Water	7	X	X	X	X	X	X	X	X	X						
12	TOSMO-2016 0906	9/6/16	01:30	Water	7	X	X	X	X	X	X	X	X	X						
13	TYLMI-2016 0906	9/6/16	02:25	Water	7	X	X	X	X	X	X	X	X	X						
14	TYLMO-2016 0906	9/6/16	02:00	Water	7	X	X	X	X	X	X	X	X	X						
15	QA 11-20160906	9/6/16	00:45	Water	7	X	X	X	X	X	X	X	X	X						

Relinquished by Manny Jimenez Date 9/6/16 Received by [Signature] Date 9/6/16
 Firm Herrera Env. Cons. Time 10:02 Firm SPROEDY Time 10:02
 Relinquished by [Signature] Date 9/6/16 Received by [Signature] Date 9/6/16
 Firm SPROEDY Time 11:00 Firm [Signature] Time 9/11/16

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: George Itner

CHAIN OF CUSTODY

Turnaround Requested:
 _____ 1 Day
 _____ 2 Day
 _____ 3 Day
 X Standard

Laboratory No. _____									
Requested Analyses									

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *									
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *				
1	COLM-2016 0906	9/6/16	03:45	Water	7	X	X	X	X	X	X	X	X	X				
2	COUMI-2016 0906	9/6/16	01:00	Water	7	X	X	X	X	X	X	X	X	X				
3	COUMO-2016 0906	9/6/16	00:40	Water	7	X	X	X	X	X	X	X	X	X				
4	EVAMS-2016 0906	9/6/16	01:25	Water	7	X	X	X	X	X	X	X	X	X				
5	EVALSS-2016 0906	9/6/16	01:40	Water	7	X	X	X	X	X	X	X	X	X				
6	MONMN-2016 0906	9/6/16	02:50	Water	7	X	X	X	X	X	X	X	X	X				
7	MONMS-2016 0906	9/6/16	03:25	Water	7	X	X	X	X	X	X	X	X	X				
8	MONM-2016 0906	9/6/16	03:35	Water	7	X	X	X	X	X	X	X	X	X				
9	SEIMN-2016 0906	9/6/16	03:00	Water	7	X	X	X	X	X	X	X	X	X				
10	SEIMS-2016 0906	9/6/16	02:15	Water	7	X	X	X	X	X	X	X	X	X				
11	TOSMI-2016 0906	9/6/16	00:40	Water	7	X	X	X	X	X	X	X	X	X				
12	TOSMO-2016 0906	9/6/16	01:30	Water	7	X	X	X	X	X	X	X	X	X				
13	TYLMI-2016 0906	9/6/16	02:25	Water	7	X	X	X	X	X	X	X	X	X				
14	TYLMO-2016 0906	9/6/16	02:00	Water	7	X	X	X	X	X	X	X	X	X				
15	QA 11 - 20160906	9/6/16	00:45	Water	7	X	X	X	X	X	X	X	X	X				

Relinquished by Manny Itner Date 9/6/16 Received by [Signature] Date 9/6/16
 Firm Herrera Env. Cons. Time 10:02 Firm SPURDY Time 10:02
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	Bhanna Bland		
Meter:	YSI Pro Plus		
Date/Time:	9/5/2016 @ 22:30		
Barometric Pressure Start of Day:	mm Hg: 738.2	Time:	22:30
Barometric Pressure End of Day:	mm Hg: 754.9	Time:	05:17

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	6.9	0	24.0	
Conductivity (µS/cm)	1005	1,000	24.0	
Conductivity (µS/cm)	100.1	100	24.1	
DO % Saturation	106.0	100	23.5	
POST Field Run CHECK				
	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.9	0	23.2	
Conductivity (µS/cm)	100.7	100	23.9	
DO % Saturation	108.3	100	23.5	

101.1

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.
- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: Brianna Bland
Meter: YSI Pro DDS
Date/Time: 9/5/2016 @ 22:30
Barometric Pressure Start of Day: mm Hg: 757.0 Time: 22:30
Barometric Pressure End of Day: mm Hg: 750.3 Time: 05:17

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	8.32	0	23.9	
Conductivity (µS/cm)	985	1,000	24.1	
Conductivity (µS/cm)	101.9	100	24.1	
DO % Saturation	99.7	100	24.1	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	4.8	0	23.2	
Conductivity (µS/cm)	95.8	100	23.9	
DO % Saturation	98.3	100	23.1	

- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB/VW
 Sample Date: 9/6/16 Sample Time: 3:45
 Base Flow or Storm Event? Storm Field Filtered Time: 3:45
(Must filter within 15 minutes of collection)

SITE ID: COLM
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 57°F, rain

Water Quality Sampling

Sample ID: COLM 10160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: no
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: JC Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020) X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): N/A
 Reference Point (description): N/A

Water Quality Measurements

Temperature (°C) 13.3
 Conductivity (µs/cm) 39.9
 Dissolved Oxygen (mg/L) 4.15

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB

Sample Date: 9.16.16

Sample Time: 01:00

PDT

SITE ID: COUM1

Base Flow or Storm Event? STORM

Field Filtered Time: 01:00

PST

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Water Quality Sampling

Sample ID: COUM1-20160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date:

Time:

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: SHOWERS & 57°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05MT466) - DSS X

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.91

Reference Point (description): top of pipe down

Water Quality Measurements

Temperature (°C) 13.3

Conductivity (µs/cm) 344.8

Dissolved Oxygen (mg/L) 10.16

Quality Assurance

Checked By: SL

Signature: [Signature]

Date Checked: 9.18.16

Time: 7:50

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 9/6/16 Sample Time: 00:33 PDT:
 Base Flow or Storm Event? storm Field Filtered Time: 00:40 PST: X
(Must filter within 15 minutes of collection)

SITE ID: COUMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: showers @ 57°F

Water Quality Sampling

Sample ID: COUMO-20160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N ↓
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: SL Signature: [Signature]
 Date Checked: 9-13-16 Time: 09:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M11466) X
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 1.05
 Reference Point (description): from top of pin down

Water Quality Measurements

Temperature (°C) 14.5
 Conductivity (µs/cm) 301.2
 Dissolved Oxygen (mg/L) 9.84

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB/VW
 Sample Date: 9/6/16 Sample Time: 1:25 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 1:25 PST
(Must filter within 15 minutes of collection)

SITE ID: EVAMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 57°F, showers

Water Quality Sampling

Sample ID: EVAMS20160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	no
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	↓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: N/A
 Transfer blank sample ID: N/A

Visual and Olfactory Conditions:

Clarity: clear
 Color: no
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: JL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.79
 Reference Point (description): read from stage gage

(old stage measurement changed after meter installation)

Water Quality Measurements

Temperature (°C) 12.6
 Conductivity (µs/cm) 239.9
 Dissolved Oxygen (mg/L) 10.25

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB/VW
 Sample Date: 9/6/16 Sample Time: 1:40 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 1:40 PST
(Must filter within 15 minutes of collection)

SITE ID: EVALSS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 57°F Showers

Water Quality Sampling

Sample ID: EVALSS20160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: N/A
 Transfer blank sample ID: N/A

Visual and Olfactory Conditions:

Clarity: clear
 Color: no
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: JL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 7.29

Reference Point (description): @ staff gage

(old PVC pipe altered after meter installation)

Water Quality Measurements

Temperature (°C) 12.8

Conductivity (µs/cm) 217.0

Dissolved Oxygen (mg/L) 10.57

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

 Field Personnel: JB/B

SITE ID:

MONMN

Sample Date:

9-10-16

Sample Time:

02:50

PDT:

Base Flow or Storm Event?

storm

Field Filtered Time:

02:50

 PST:

 Project Number: 14-05806-000

(Must filter within 15 minutes of collection)


HERRERA

 Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID:

MONMN - 20160910

Current Weather and Temp:

Rainy 35°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:

NA

Filter blank sample ID:

NA

Transfer blank sample ID:

NA

Visual and Olfactory Conditions:

Clarity:

clear

Color:

cloudiness light brown

Odor:

odorless

Sheen:

none

Floatables:

none some debris

LABORATORY DELIVERY

Date:

Time:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M146) DDS X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

 Stream Stage (ft): 0.01

Reference Point (description):

from top of bolt down

Water Quality Measurements

Temperature (°C)

14.2

Conductivity (µs/cm)

176.3

Dissolved Oxygen (mg/L)

9.21

Quality Assurance

Checked By:

SL

Signature:

Date Checked:

9-13-16

Time:

9:50

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: MB

SITE ID:

MONMS

Sample Date: 9.6.16

Sample Time: 03:25

PDT:

Base Flow or Storm Event? storm

Field Filtered Time: 03:25

PST:

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Partly B SS°F

Water Quality Sampling

Sample ID: MONMS-20160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>↓</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: SL

Signature: [Signature]

Date Checked: 9.13.16

Time: 9:50

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) DDS X

YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 6.77

Reference Point (description): through vault

Water Quality Measurements

Temperature (°C) 13.7

Conductivity (µs/cm) 318.3

Dissolved Oxygen (mg/L) 7.02

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: B/B
 Sample Date: 9.10.16 Sample Time: 03:35 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 03:35 PST
(Must filter within 15 minutes of collection)

SITE ID: MONM

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rainy 35.5°F

Water Quality Sampling

Sample ID: MONM-20160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: 3L Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466) DDS X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 3.05 ft
 Reference Point (description): from top of culvert down

Water Quality Measurements

Temperature (°C) 13.8
 Conductivity (µs/cm) 229.6
 Dissolved Oxygen (mg/L) 10.00

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB/NW
 Sample Date: 9/6/16 Sample Time: 3:00 PDT:
 Base Flow or Storm Event? Storm Field Filtered Time: 3:00 PST:
(Must filter within 15 minutes of collection)

SITE ID: SEIMN
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 57°F, rain

Water Quality Sampling

Sample ID: SEIMN 20160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: N/A
 Transfer blank sample ID: N/A

Visual and Olfactory Conditions:

Clarity: clear
 Color: no
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: SL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:56
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466)
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.77
 Reference Point (description): down from bottom of bolt

Water Quality Measurements

Temperature (°C) 11.9
 Conductivity (µs/cm) 176.3
 Dissolved Oxygen (mg/L) 10.30

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB/VW
 Sample Date: 9/6/2016 Sample Time: 2:15 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 2:15 PST
(Must filter within 15 minutes of collection)

SITE ID: SEIMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: 57°F, Showers

Water Quality Sampling

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: N/A
 Transfer blank sample ID: N/A

Visual and Olfactory Conditions:
 Clarity: Clear
 Color: no
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance
 Checked By: JL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:50
 Data Entered into Database? YES NO initials: _____
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
 YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.77
 Reference Point (description): down from pin
0.77ft on staff gage

Water Quality Measurements

Temperature (°C) 12.2
 Conductivity (µs/cm) 132.5
 Dissolved Oxygen (mg/L) 9.86

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: JB / VW
 Sample Date: 9/6/16 Sample Time: 00:40 / 00:45 PDT
 Base Flow or Storm Event? Storm Field Filtered Time: 00:40 / 00:45 PST
(Must filter within 15 minutes of collection)

SITE ID: TOSM1
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study
 Current Weather and Temp: 57°F, showers

Water Quality Sampling

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	yes
DOC *	HDPE	250 ml	1	HCL	yes
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	yes
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	yes
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	yes
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	yes
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	yes

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA-TOSM1-2016-0906 QA11-20160906
 Filter blank sample ID: N/A
 Transfer blank sample ID: N/A

Visual and Olfactory Conditions:
 Clarity: clear
 Color: no
 Odor: no
 Sheen: no
 Floatables: no

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance
 Checked By: SL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): no stage, dry
 Reference Point (description): bottom of nail down to water surface.

Water Quality Measurements

Temperature (°C) 13.8
 Conductivity (µs/cm) 321.2
 Dissolved Oxygen (mg/L) 9.51

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: MB

Sample Date: 9-16-16

Sample Time: 01:30

PDT:

SITE ID:

TOSMO

Base Flow or Storm Event? storm

Field Filtered Time: 01:30

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TOSMO - 201609100

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>✓</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: N/A
 Filter blank sample ID: N/A
 Transfer blank sample ID: N/A

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: SL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Current Weather and Temp: rainy & 55° F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 650 (TOSMT466) DDS X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.52

Reference Point (description): from top of pindown

Water Quality Measurements

Temperature (°C) 12.8

Conductivity (µs/cm) 2104.5

Dissolved Oxygen (mg/L) 10.43

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: MB

Sample Date: 9.16.16

Sample Time: 02:25

PDT:

SITE

ID: TYLMI

Base Flow or Storm Event? Storm

Field Filtered Time: 02:25

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



HERRERA

Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rainy 85°F

Water Quality Sampling

Sample ID: TYLMI-20160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>↓</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: Clear
 Color: colorless
 Odor: odorless
 Sheen: None
 Floatables: None

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: SL Signature: [Signature]
 Date Checked: 9.13.16 Time: 9:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05MI466) DDS X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.58

Reference Point (description): from top of culvert down

Water Quality Measurements

Temperature (°C) 14.8

Conductivity (µs/cm) 182.3

Dissolved Oxygen (mg/L) 9.10

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: MB

Sample Date: 9.16.16

Sample Time: 02:00

PDT:

SITE ID: TYLMO

Base Flow or Storm Event? Storm

Field Filtered Time: 02:00

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TYLMO-20160906

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: None
 Floatables: None

LABORATORY DELIVERY

Date: _____ Time: _____

Current Weather and Temp: Rainy 35°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M11466) DDS X
YSI Pro Plus (15D100020)

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 2.89

Reference Point (description): from top of culvert down

Water Quality Measurements

Temperature (°C) 13.5

Conductivity (µs/cm) 193.6

Dissolved Oxygen (mg/L) 10.07

Quality Assurance

Checked By: SL Signature: [Signature]
 Date Checked: 9-13-16 Time: 9:50
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____



Data Quality Assurance Worksheet

G

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria
 Sample Date/Sample ID: 9/6/2016 / All sites, 1 FD (QA11) at TOSMI

By G. Catarra
 Date 9/29/2016 Page 1 of 2
 Checked: initials JL
 date 10/14/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	2	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	92	±20	11	≤25	DIFF=2.2	≤25	OK	"J" TOSMI AND QA11 DUE TO FD EXCEEDANCE
Turbidity	OK / EPA 180.1	NA	NA	1	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	1	≤25	49	≤25	OK	"J" TOSMI AND QA11 DUE TO FD EXCEEDANCE
Hardness	OK / SM 2340B	NA	NA	6	≤180	≤1.0 mg/L 1.0 mg/L	112,105	±25	99	±15	4	≤20	7.4	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	8	≤28	≤1.0 mg/L 1.0 mg/L	103	±25	113	±15	3	≤20	0	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	6	≤28	≤0.01 mg/L 0.01 mg/L	108	±25	99	±20	3	≤20	0	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	2,9	≤28	≤0.1 mg/L 0.1 mg/L	92-117	±25	92-103	±20	NC-5.7	≤20	6.3	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 9/29/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 9/6/2016 / All sites, 1 FD (QA11) at TOSMI

date 10/14/16

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	3	≤180	≤1.0 µg/L 1.0 µg/L	104,106	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	3	≤180	≤5.0 µg/L 5.0 µg/L	101,101	±25	NR	±15	NC	≤20	D=5.4	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	3	≤180	≤1.0 µg/L 1.0 µg/L	93,94	±25	NR	±15	NC	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	3	≤180	≤5.0 µg/L 5.0 µg/L	94,96	±25	NR	±15	NC	≤20	D=1.2	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	12	≤35	157	≤50	OK	"J" TOSMI AND QA11 DUE TO FD EXCEEDANCE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 6, 2016

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1609-222

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on September 17, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Blair Goodrow", enclosed within a large, loopy, handwritten oval.

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 6, 2016
Samples Submitted: September 17, 2016
Laboratory Reference: 1609-222
Project: 14-05806-000

Case Narrative

Samples were collected on September 17, 2016 and received by the laboratory on September 17, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: October 6, 2016
 Samples Submitted: September 17, 2016
 Laboratory Reference: 1609-222
 Project: 14-05806-000

**TOTAL SUSPENDED SOLIDS
 SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160917					
Laboratory ID:	09-222-01					
Total Suspended Solids	5.6	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	COUMI-20160917					
Laboratory ID:	09-222-02					
Total Suspended Solids	79	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	COUMO-20160917					
Laboratory ID:	09-222-03					
Total Suspended Solids	27	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	EVAMS-20160917					
Laboratory ID:	09-222-04					
Total Suspended Solids	21	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	EVALSS-20160917					
Laboratory ID:	09-222-05					
Total Suspended Solids	25	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	MONMN-20160917					
Laboratory ID:	09-222-06					
Total Suspended Solids	25	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	MONMS-20160917					
Laboratory ID:	09-222-07					
Total Suspended Solids	4.6	1.0	SM 2540D	9-19-16	9-20-16	



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**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160917					
Laboratory ID:	09-222-08					
Total Suspended Solids	16	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	SEIMN-20160917					
Laboratory ID:	09-222-09					
Total Suspended Solids	12	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	SEIMS-20160917					
Laboratory ID:	09-222-10					
Total Suspended Solids	67	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	TOSMI-20160917					
Laboratory ID:	09-222-11					
Total Suspended Solids	86	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	TOSMO-20160917					
Laboratory ID:	09-222-12					
Total Suspended Solids	280	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	TYLMI-20160917					
Laboratory ID:	09-222-13					
Total Suspended Solids	37	1.0	SM 2540D	9-19-16	9-20-16	

Client ID:	TYLMO-20160917					
Laboratory ID:	09-222-14					
Total Suspended Solids	28	1.0	SM 2540D	9-19-16	9-20-16	



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**TOTAL SUSPENDED SOLIDS
SM 2540D**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA12-20160917					
Laboratory ID:	09-222-15					
Total Suspended Solids	76	1.0	SM 2540D	9-19-16	9-20-16	



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**TOTAL SUSPENDED SOLIDS
 SM 2540D
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0919W1					
Total Suspended Solids	ND	1.0	SM 2540D	9-19-16	9-20-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-222-08							
	ORIG	DUP						
Total Suspended Solids	16.4	16.8	NA	NA	NA	2	17	

SPIKE BLANK								
Laboratory ID:	SB0919W1							
	SB	SB		SB				
Total Suspended Solids	82.0	100	NA	82	75-114	NA	NA	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160917					
Laboratory ID:	09-222-01					
Turbidity	0.55	0.10	EPA 180.1	9-19-16	9-19-16	
Client ID:	COUMI-20160917					
Laboratory ID:	09-222-02					
Turbidity	3.0	0.10	EPA 180.1	9-19-16	9-19-16	
Client ID:	COUMO-20160917					
Laboratory ID:	09-222-03					
Turbidity	9.1	0.10	EPA 180.1	9-19-16	9-19-16	
Client ID:	EVAMS-20160917					
Laboratory ID:	09-222-04					
Turbidity	4.7	0.10	EPA 180.1	9-19-16	9-19-16	
Client ID:	EVALSS-20160917					
Laboratory ID:	09-222-05					
Turbidity	5.8	0.10	EPA 180.1	9-19-16	9-19-16	
Client ID:	MONMN-20160917					
Laboratory ID:	09-222-06					
Turbidity	5.5	0.10	EPA 180.1	9-19-16	9-19-16	
Client ID:	MONMS-20160917					
Laboratory ID:	09-222-07					
Turbidity	2.0	0.10	EPA 180.1	9-19-16	9-19-16	



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TURBIDITY
EPA 180.1

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160917					
Laboratory ID:	09-222-08					
Turbidity	4.4	0.10	EPA 180.1	9-19-16	9-19-16	

Client ID:	SEIMN-20160917					
Laboratory ID:	09-222-09					
Turbidity	4.8	0.10	EPA 180.1	9-19-16	9-19-16	

Client ID:	SEIMS-20160917					
Laboratory ID:	09-222-10					
Turbidity	10	0.10	EPA 180.1	9-19-16	9-19-16	

Client ID:	TOSMI-20160917					
Laboratory ID:	09-222-11					
Turbidity	13	0.10	EPA 180.1	9-19-16	9-19-16	

Client ID:	TOSMO-20160917					
Laboratory ID:	09-222-12					
Turbidity	12	0.10	EPA 180.1	9-19-16	9-19-16	

Client ID:	TYLMI-20160917					
Laboratory ID:	09-222-13					
Turbidity	6.8	0.10	EPA 180.1	9-19-16	9-19-16	

Client ID:	TYLMO-20160917					
Laboratory ID:	09-222-14					
Turbidity	8.6	0.10	EPA 180.1	9-19-16	9-19-16	



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TURBIDITY
EPA 180.1

Matrix: Water
Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA12-20160917					
Laboratory ID:	09-222-15					
Turbidity	2.3	0.10	EPA 180.1	9-19-16	9-19-16	



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**TURBIDITY
 EPA 180.1
 QUALITY CONTROL**

Matrix: Water
 Units: NTU

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0919W1					
Turbidity	ND	0.10	EPA 180.1	9-19-16	9-19-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-214-01							
	ORIG	DUP						
Turbidity	4.14	4.15	NA	NA	NA	NA	0	15



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160917					
Laboratory ID:	09-222-01					
Hardness	17	1.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	COUMI-20160917					
Laboratory ID:	09-222-02					
Hardness	100	5.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	COUMO-20160917					
Laboratory ID:	09-222-03					
Hardness	81	5.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	EVAMS-20160917					
Laboratory ID:	09-222-04					
Hardness	110	5.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	EVALSS-20160917					
Laboratory ID:	09-222-05					
Hardness	110	5.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	MONMN-20160917					
Laboratory ID:	09-222-06					
Hardness	100	5.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	MONMS-20160917					
Laboratory ID:	09-222-07					
Hardness	160	5.0	200.7/SM 2340B	9-22-16	9-23-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160917					
Laboratory ID:	09-222-08					
Hardness	97	5.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	SEIMN-20160917					
Laboratory ID:	09-222-09					
Hardness	49	1.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	SEIMS-20160917					
Laboratory ID:	09-222-10					
Hardness	58	1.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	TOSMI-20160917					
Laboratory ID:	09-222-11					
Hardness	41	1.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	TOSMO-20160917					
Laboratory ID:	09-222-12					
Hardness	65	5.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	TYLMI-20160917					
Laboratory ID:	09-222-13					
Hardness	110	5.0	200.7/SM 2340B	9-22-16	9-23-16	

Client ID:	TYLMO-20160917					
Laboratory ID:	09-222-14					
Hardness	39	1.0	200.7/SM 2340B	9-22-16	9-23-16	



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HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA12-20160917					
Laboratory ID:	09-222-15					
Hardness	62	5.0	200.7/SM 2340B	9-22-16	9-23-16	



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HARDNESS
EPA 200.7/SM 2340B
QUALITY CONTROL

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0922WH1					
Hardness	ND	1.0	200.7/SM 2340B	9-22-16	9-23-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-222-01							
	ORIG	DUP						
Hardness	17.3	17.3	NA	NA	NA	0	20	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags		
MATRIX SPIKES										
Laboratory ID:	09-222-01									
	MS	MSD	MS	MSD	MS	MSD				
Hardness	159	162	132	132	17.3	107	110	75-125	2	20

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags	
SPIKE BLANK									
Laboratory ID:	SB0922WH1								
	SB		SB		SB				
Hardness	145		132		NA	110	80-120	NA	NA



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160917					
Laboratory ID:	09-222-01					
Dissolved Organic Carbon	9.0	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	COUMI-20160917					
Laboratory ID:	09-222-02					
Dissolved Organic Carbon	9.3	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	COUMO-20160917					
Laboratory ID:	09-222-03					
Dissolved Organic Carbon	8.0	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	EVAMS-20160917					
Laboratory ID:	09-222-04					
Dissolved Organic Carbon	3.5	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	EVALSS-20160917					
Laboratory ID:	09-222-05					
Dissolved Organic Carbon	2.8	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	MONMN-20160917					
Laboratory ID:	09-222-06					
Dissolved Organic Carbon	6.0	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	MONMS-20160917					
Laboratory ID:	09-222-07					
Dissolved Organic Carbon	5.6	1.0	SM 5310B	9-26-16	9-26-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160917					
Laboratory ID:	09-222-08					
Dissolved Organic Carbon	5.5	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	SEIMN-20160917					
Laboratory ID:	09-222-09					
Dissolved Organic Carbon	2.5	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	SEIMS-20160917					
Laboratory ID:	09-222-10					
Dissolved Organic Carbon	5.8	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	TOSMI-20160917					
Laboratory ID:	09-222-11					
Dissolved Organic Carbon	11	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	TOSMO-20160917					
Laboratory ID:	09-222-12					
Dissolved Organic Carbon	11	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	TYLMI-20160917					
Laboratory ID:	09-222-13					
Dissolved Organic Carbon	4.2	1.0	SM 5310B	9-26-16	9-26-16	
Client ID:	TYLMO-20160917					
Laboratory ID:	09-222-14					
Dissolved Organic Carbon	8.2	1.0	SM 5310B	9-26-16	9-26-16	



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**DISSOLVED ORGANIC CARBON
SM 5310B**

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA12-20160917					
Laboratory ID:	09-222-15					
Dissolved Organic Carbon	5.7	1.0	SM 5310B	9-26-16	9-26-16	



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**DISSOLVED ORGANIC CARBON
 SM 5310B
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0926D1					
Dissolved Organic Carbon	ND	1.0	SM 5310B	9-26-16	9-26-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-222-01							
	ORIG	DUP						
Dissolved Organic Carbon	9.02	8.70	NA	NA	NA	4	20	

MATRIX SPIKE

Laboratory ID:	09-222-01							
	MS	MS		MS				
Dissolved Organic Carbon	19.0	10.0	9.02	100	75-125	NA	NA	

SPIKE BLANK

Laboratory ID:	SB0926D1							
	SB	SB		SB				
Dissolved Organic Carbon	10.7	10.0	NA	107	75-125	NA	NA	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLM-20160917					
Laboratory ID:	09-222-01					
Total Phosphorus	0.022	0.010	EPA 365.1	9-20-16	9-20-16	
Client ID:	COUMI-20160917					
Laboratory ID:	09-222-02					
Total Phosphorus	0.29	0.010	EPA 365.1	9-20-16	9-20-16	
Client ID:	COUMO-20160917					
Laboratory ID:	09-222-03					
Total Phosphorus	0.17	0.010	EPA 365.1	9-20-16	9-20-16	
Client ID:	EVAMS-20160917					
Laboratory ID:	09-222-04					
Total Phosphorus	0.047	0.010	EPA 365.1	9-20-16	9-20-16	
Client ID:	EVALSS-20160917					
Laboratory ID:	09-222-05					
Total Phosphorus	0.050	0.010	EPA 365.1	9-20-16	9-20-16	
Client ID:	MONMN-20160917					
Laboratory ID:	09-222-06					
Total Phosphorus	0.088	0.010	EPA 365.1	9-20-16	9-20-16	
Client ID:	MONMS-20160917					
Laboratory ID:	09-222-07					
Total Phosphorus	0.033	0.010	EPA 365.1	9-20-16	9-20-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONM-20160917					
Laboratory ID:	09-222-08					
Total Phosphorus	0.089	0.010	EPA 365.1	9-20-16	9-20-16	

Client ID:	SEIMN-20160917					
Laboratory ID:	09-222-09					
Total Phosphorus	0.061	0.010	EPA 365.1	9-20-16	9-20-16	

Client ID:	SEIMS-20160917					
Laboratory ID:	09-222-10					
Total Phosphorus	0.19	0.010	EPA 365.1	9-20-16	9-20-16	

Client ID:	TOSMI-20160917					
Laboratory ID:	09-222-11					
Total Phosphorus	0.21	0.010	EPA 365.1	9-20-16	9-20-16	

Client ID:	TOSMO-20160917					
Laboratory ID:	09-222-12					
Total Phosphorus	0.36	0.010	EPA 365.1	9-20-16	9-20-16	

Client ID:	TYLMI-20160917					
Laboratory ID:	09-222-13					
Total Phosphorus	0.10	0.010	EPA 365.1	9-20-16	9-20-16	

Client ID:	TYLMO-20160917					
Laboratory ID:	09-222-14					
Total Phosphorus	0.091	0.010	EPA 365.1	9-20-16	9-20-16	



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TOTAL PHOSPHORUS
EPA 365.1

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	QA12-20160917					
Laboratory ID:	09-222-15					
Total Phosphorus	0.16	0.010	EPA 365.1	9-20-16	9-20-16	



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**TOTAL PHOSPHORUS
 EPA 365.1
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0920W2					
Total Phosphorus	ND	0.010	EPA 365.1	9-20-16	9-20-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-222-01							
	ORIG	DUP						
Total Phosphorus	0.0221	0.0215	NA	NA	NA	3	10	

MATRIX SPIKE								
Laboratory ID:	09-222-01							
	MS	MS		MS				
Total Phosphorus	0.281	0.250	0.0221	104	86-115	NA	NA	

SPIKE BLANK								
Laboratory ID:	SB0920W2							
	SB	SB		SB				
Total Phosphorus	0.242	0.250	NA	97	86-112	NA	NA	



Date of Report: October 6, 2016
 Samples Submitted: September 17, 2016
 Laboratory Reference: 1609-222
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-222-01						
Client ID: COLM-20160917						
Copper	1.4	1.0	200.8	10-3-16	10-3-16	
Zinc	ND	5.0	200.8	10-3-16	10-3-16	
Lab ID: 09-222-02						
Client ID: COUMI-20160917						
Copper	11	1.0	200.8	10-3-16	10-3-16	
Zinc	43	5.0	200.8	10-3-16	10-3-16	
Lab ID: 09-222-03						
Client ID: COUMO-20160917						
Copper	7.4	1.0	200.8	10-3-16	10-3-16	
Zinc	30	5.0	200.8	10-3-16	10-3-16	
Lab ID: 09-222-04						
Client ID: EVAMS-20160917						
Copper	1.0	1.0	200.8	10-3-16	10-3-16	
Zinc	ND	5.0	200.8	10-3-16	10-3-16	
Lab ID: 09-222-05						
Client ID: EVALSS-20160917						
Copper	2.1	1.0	200.8	10-3-16	10-3-16	
Zinc	ND	5.0	200.8	10-3-16	10-3-16	
Lab ID: 09-222-06						
Client ID: MONMN-20160917						
Copper	1.4	1.0	200.8	10-3-16	10-3-16	
Zinc	9.8	5.0	200.8	10-3-16	10-3-16	



Date of Report: October 6, 2016
 Samples Submitted: September 17, 2016
 Laboratory Reference: 1609-222
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-222-07					
Client ID:	MONMS-20160917					
Copper	ND	1.0	200.8	10-3-16	10-3-16	
Zinc	ND	5.0	200.8	10-3-16	10-3-16	
Lab ID:	09-222-08					
Client ID:	MONM-20160917					
Copper	1.8	1.0	200.8	10-3-16	10-3-16	
Zinc	17	5.0	200.8	10-3-16	10-3-16	
Lab ID:	09-222-09					
Client ID:	SEIMN-20160917					
Copper	2.0	1.0	200.8	10-3-16	10-3-16	
Zinc	ND	5.0	200.8	10-3-16	10-3-16	
Lab ID:	09-222-10					
Client ID:	SEIMS-20160917					
Copper	1.7	1.0	200.8	10-3-16	10-4-16	
Zinc	6.8	5.0	200.8	10-3-16	10-4-16	
Lab ID:	09-222-11					
Client ID:	TOSMI-20160917					
Copper	19	1.0	200.8	10-3-16	10-4-16	
Zinc	120	5.0	200.8	10-3-16	10-4-16	
Lab ID:	09-222-12					
Client ID:	TOSMO-20160917					
Copper	20	1.0	200.8	10-3-16	10-4-16	
Zinc	120	5.0	200.8	10-3-16	10-4-16	



Date of Report: October 6, 2016
 Samples Submitted: September 17, 2016
 Laboratory Reference: 1609-222
 Project: 14-05806-000

TOTAL METALS
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-222-13					
Client ID:	TYLMI-20160917					
Copper	6.8	1.0	200.8	10-3-16	10-4-16	
Zinc	26	5.0	200.8	10-3-16	10-4-16	

Lab ID:	09-222-14					
Client ID:	TYLMO-20160917					
Copper	13	1.0	200.8	10-3-16	10-4-16	
Zinc	22	5.0	200.8	10-3-16	10-4-16	

Lab ID:	09-222-15					
Client ID:	QA12-20160917					
Copper	1.7	1.0	200.8	10-3-16	10-4-16	
Zinc	6.4	5.0	200.8	10-3-16	10-4-16	



Date of Report: October 6, 2016
Samples Submitted: September 17, 2016
Laboratory Reference: 1609-222
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Extracted: 10-3-16
Date Analyzed: 10-3-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB1003WH1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: October 6, 2016
Samples Submitted: September 17, 2016
Laboratory Reference: 1609-222
Project: 14-05806-000

**TOTAL METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Extracted: 10-3-16
Date Analyzed: 10-3-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-222-07

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5	



Date of Report: October 6, 2016
 Samples Submitted: September 17, 2016
 Laboratory Reference: 1609-222
 Project: 14-05806-000

**TOTAL METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Extracted: 10-3-16

Date Analyzed: 10-3-16

Matrix: Water

Units: ug/L (ppb)

Lab ID: 09-222-07

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	100	100	100	99.8	100	0	
Zinc	100	107	107	108	108	1	



Date of Report: October 6, 2016
 Samples Submitted: September 17, 2016
 Laboratory Reference: 1609-222
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-222-01						
Client ID: COLM-20160917						
Copper	ND	1.0	200.8		10-5-16	
Zinc	ND	5.0	200.8		10-5-16	
Lab ID: 09-222-02						
Client ID: COUMI-20160917						
Copper	5.1	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	
Lab ID: 09-222-03						
Client ID: COUMO-20160917						
Copper	4.2	1.0	200.8		9-29-16	
Zinc	11	5	200.8		9-29-16	
Lab ID: 09-222-04						
Client ID: EVAMS-20160917						
Copper	ND	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	
Lab ID: 09-222-05						
Client ID: EVALSS-20160917						
Copper	ND	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	
Lab ID: 09-222-06						
Client ID: MONMN-20160917						
Copper	ND	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 6, 2016
 Samples Submitted: September 17, 2016
 Laboratory Reference: 1609-222
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-222-07					
Client ID:	MONMS-20160917					
Copper	ND	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	
Lab ID:	09-222-08					
Client ID:	MONM-20160917					
Copper	ND	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	
Lab ID:	09-222-09					
Client ID:	SEIMN-20160917					
Copper	ND	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	
Lab ID:	09-222-10					
Client ID:	SEIMS-20160917					
Copper	ND	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	
Lab ID:	09-222-11					
Client ID:	TOSMI-20160917					
Copper	8.4	1.0	200.8		9-29-16	
Zinc	25	5.0	200.8		9-29-16	
Lab ID:	09-222-12					
Client ID:	TOSMO-20160917					
Copper	5.9	1.0	200.8		9-29-16	
Zinc	7.2	5.0	200.8		9-29-16	



Date of Report: October 6, 2016
 Samples Submitted: September 17, 2016
 Laboratory Reference: 1609-222
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-222-13					
Client ID:	TYLMI-20160917					
Copper	1.7	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	
Lab ID:	09-222-14					
Client ID:	TYLMO-20160917					
Copper	9.7	1.0	200.8		9-29-16	
Zinc	6.0	5.0	200.8		9-29-16	
Lab ID:	09-222-15					
Client ID:	QA12-20160917					
Copper	ND	1.0	200.8		9-29-16	
Zinc	ND	5.0	200.8		9-29-16	



Date of Report: October 6, 2016
Samples Submitted: September 17, 2016
Laboratory Reference: 1609-222
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
METHOD BLANK QUALITY CONTROL**

Date Analyzed: 10-5-16
Matrix: Water
Units: ug/L (ppb)
Lab ID: MB0929D1

Analyte	Method	Result	PQL
Copper	200.8	ND	1.0
Zinc	200.8	ND	5.0



Date of Report: October 6, 2016
Samples Submitted: September 17, 2016
Laboratory Reference: 1609-222
Project: 14-05806-000

**DISSOLVED METALS
EPA 200.8
DUPLICATE QUALITY CONTROL**

Date Analyzed: 10-5-16

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-222-07

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	ND	ND	NA	1.0	
Zinc	ND	ND	NA	5	



Date of Report: October 6, 2016
 Samples Submitted: September 17, 2016
 Laboratory Reference: 1609-222
 Project: 14-05806-000

**DISSOLVED METALS
 EPA 200.8
 MS/MSD QUALITY CONTROL**

Date Analyzed: 10-5-16

Matrix: Water
 Units: ug/L (ppb)

Lab ID: 09-222-07

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	80.0	77.3	97	74.3	93	4	
Zinc	80.0	83.8	105	82.0	103	2	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

*Professional
Analytical
Services*

Sep 30 2016
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your REDMOND PAIRED WATERSHED STUDY project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
COLM-20160917	Water	16-A024898	Micro, NUT
COUMI-20160917	Water	16-A024899	Micro, NUT
COUMO-20160917	Water	16-A024900	Micro, NUT
EVAMS-20160917	Water	16-A024901	Micro, NUT
EVALSS-20160917	Water	16-A024902	Micro, NUT
MONMN-20160917	Water	16-A024903	Micro, NUT
MONMS-20160917	Water	16-A024904	Micro, NUT
MONM-20160917	Water	16-A024905	Micro, NUT
SEIMN-20160917	Water	16-A024906	Micro, NUT
SEIMS-20160917	Water	16-A024907	Micro, NUT
TOSMI-20160917	Water	16-A024908	Micro, NUT
TOSMO-20160917	Water	16-A024909	Micro, NUT
TYLMI-20160917	Water	16-A024910	Micro, NUT
TYLMO-20160917	Water	16-A024911	Micro, NUT
QA-20160917	Water	16-A024912	Micro, NUT

Your samples were received on Saturday, September 17, 2016. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

**Professional
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Services**

Sep 30 2016
On-Site Environmental
continued . . .

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,


Aaron W. Young
Laboratory Manager

Project #: 14-05806-000
PO Number: 09-222

BACT = Bacteriological
CONV = Conventionals

MET = Metals
ORG = Organics

NUT=Nutrients
DEM=Demand

MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com



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Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: REDMOND PAIRED WATERSHED STUDY
Project #: 14-05806-000
PO Number: 09-222
All results reported on an as received basis.

Date Received: 09/17/16
Date Reported: 9/30/16

AMTEST Identification Number 16-A024898
Client Identification COLM-20160917
Sampling Date 09/17/16, 11:25

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	200	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	1.14	mg/l		0.1			
Total Nitrogen (TKN)	1.10	mg/l		0.1	SM4500N	MJ	09/22/16
Nitrate + Nitrite	0.037	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024899**
Client Identification **COUMI-20160917**
Sampling Date **09/17/16, 07:50**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	3800	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	2.15	mg/l		0.1			
Total Nitrogen (TKN)	1.48	mg/l		0.1	SM4500N	MJ	09/22/16
Nitrate + Nitrite	0.67	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024900**
Client Identification **COUMO-20160917**
Sampling Date **09/17/16, 08:20**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	22000	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	1.19	mg/l		0.1			
Total Nitrogen (TKN)	0.657	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.53	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024901**
Client Identification **EVAMS-20160917**
Sampling Date **09/17/16, 08:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1800	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	1.62	mg/l		0.1			
Total Nitrogen (TKN)	0.321	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	1.3	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024902**
Client Identification **EVALSS-20160917**
Sampling Date **09/17/16, 09:05**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1400	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	1.92	mg/l		0.1			
Total Nitrogen (TKN)	0.620	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	1.3	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024903**
Client Identification **MONMN-20160917**
Sampling Date **09/17/16, 10:30**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	11000	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	0.49	mg/l		0.1			
Total Nitrogen (TKN)	0.393	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.098	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024904**
Client Identification **MONMS-20160917**
Sampling Date **09/17/16, 10:10**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	150	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	0.31	mg/l		0.1			
Total Nitrogen (TKN)	0.272	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.039	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024905**
Client Identification **MONM-20160917**
Sampling Date **09/17/16, 10:55**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	5000	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	0.74	mg/l		0.1			
Total Nitrogen (TKN)	0.528	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.21	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024906**
Client Identification **SEIMN-20160917**
Sampling Date **09/17/16, 10:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	220	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	0.45	mg/l		0.1			
Total Nitrogen (TKN)	0.197	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.25	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024907**
Client Identification **SEIMS-20160917**
Sampling Date **09/17/16, 09:45**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	6700	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	1.75	mg/l		0.1			
Total Nitrogen (TKN)	1.51	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.24	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024908**
Client Identification **TOSMI-20160917**
Sampling Date **09/17/16, 08:00**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	47000	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	1.93	mg/l		0.1			
Total Nitrogen (TKN)	1.40	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.53	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024909**
Client Identification **TOSMO-20160917**
Sampling Date **09/17/16, 08:35**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	44000	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	2.16	mg/l		0.1			
Total Nitrogen (TKN)	1.55	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.61	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number **16-A024910**
Client Identification **TYLMI-20160917**
Sampling Date **09/17/16, 09:40**

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	1900	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	1.50	mg/l		0.1			
Total Nitrogen (TKN)	0.818	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.68	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number 16-A024911
Client Identification TYLMO-20160917
Sampling Date 09/17/16, 09:15

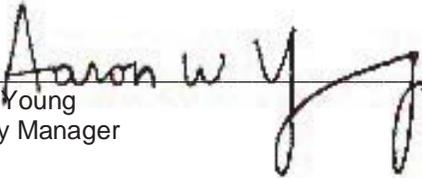
Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	4000	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	1.14	mg/l		0.1			
Total Nitrogen (TKN)	0.791	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.35	mg/l		0.01	SM4500NO3	MJ	09/21/16

AMTEST Identification Number 16-A024912
Client Identification QA-20160917
Sampling Date 09/17/16, 09:55

Results

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Fecal Coliform	7700	CFU/100 ml		1	SM 9222D	SW	09/17/16
Total Nitrogen (NOX&TKN)	1.64	mg/l		0.1			
Total Nitrogen (TKN)	1.39	mg/l		0.1	SM4500N	CO	09/30/16
Nitrate + Nitrite	0.25	mg/l		0.01	SM4500NO3	MJ	09/21/16


Aaron W. Young
Laboratory Manager

QC Summary for sample numbers: 16-A024898 to 16-A024912

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
16-A024906	Fecal Coliform	CFU/100 ml	220	180	20.
16-A024913	Fecal Coliform	CFU/100 ml	13000	12000	8.0
16-A024219	Total Nitrogen (TKN)	mg/l	2.64	2.67	1.1
16-A024325	Total Nitrogen (TKN)	mg/l	< 0.1	0.117	
16-A024369	Total Nitrogen (TKN)	mg/l	1.33	1.30	2.3
16-A024784	Total Nitrogen (TKN)	mg/l	0.126	0.103	20.
16-A024793	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A024836	Total Nitrogen (TKN)	mg/l	< 0.1	< 0.1	
16-A024850	Total Nitrogen (TKN)	mg/l	0.528	0.503	4.8
16-A024905	Total Nitrogen (TKN)	mg/l	0.528	0.547	3.5
16-A024912	Total Nitrogen (TKN)	mg/l	1.39	1.43	2.8
16-A025318	Total Nitrogen (TKN)	mg/l	0.247	0.218	12.
16-A025427	Total Nitrogen (TKN)	mg/l	0.323	0.333	3.0
16-A025433	Total Nitrogen (TKN)	mg/l	0.764	0.683	11.
16-A024785	Nitrate + Nitrite	mg/l	0.25	0.24	4.1
16-A024793	Nitrate + Nitrite	mg/l	< 0.01	< 0.01	
16-A024851	Nitrate + Nitrite	mg/l	0.81	0.84	3.6
16-A024905	Nitrate + Nitrite	mg/l	0.21	0.21	0.00
16-A025189	Nitrate + Nitrite	mg/l	0.49	0.47	4.2

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
16-A024219	Total Nitrogen (TKN)	mg/l	2.64	4.31	2.00	83.50 %
16-A024325	Total Nitrogen (TKN)	mg/l	< 0.1	1.28	1.00	128.00 %
16-A024369	Total Nitrogen (TKN)	mg/l	1.33	2.56	1.00	123.00 %
16-A024784	Total Nitrogen (TKN)	mg/l	0.126	1.15	1.00	102.40 %
16-A024793	Total Nitrogen (TKN)	mg/l	< 0.1	1.02	1.00	102.00 %
16-A024836	Total Nitrogen (TKN)	mg/l	< 0.1	1.11	1.00	111.00 %
16-A024850	Total Nitrogen (TKN)	mg/l	0.528	1.53	1.00	100.20 %
16-A024905	Total Nitrogen (TKN)	mg/l	0.528	1.58	1.00	105.20 %
16-A024912	Total Nitrogen (TKN)	mg/l	1.39	2.42	1.00	103.00 %
16-A025318	Total Nitrogen (TKN)	mg/l	0.247	1.28	1.00	103.30 %
16-A025427	Total Nitrogen (TKN)	mg/l	0.323	1.32	1.00	99.70 %
16-A025433	Total Nitrogen (TKN)	mg/l	0.764	1.83	1.00	106.60 %
16-A024785	Nitrate + Nitrite	mg/l	0.25	0.70	0.50	90.00 %
16-A024793	Nitrate + Nitrite	mg/l	< 0.01	0.48	0.50	96.00 %
16-A024851	Nitrate + Nitrite	mg/l	0.81	1.3	0.50	98.00 %
16-A024905	Nitrate + Nitrite	mg/l	0.21	0.70	0.50	98.00 %
16-A025189	Nitrate + Nitrite	mg/l	0.49	0.96	0.50	94.00 %

QC Summary for sample numbers: 16-A024898 to 16-A024912...

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Total Nitrogen (TKN)	mg/l	0.500	0.530	106. %
Total Nitrogen (TKN)	mg/l	0.500	0.566	113. %
Total Nitrogen (TKN)	mg/l	0.500	0.535	107. %
Total Nitrogen (TKN)	mg/l	0.500	0.502	100. %
Total Nitrogen (TKN)	mg/l	0.500	0.487	97.4 %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %
Nitrate + Nitrite	mg/l	0.50	0.51	102. %
Nitrate + Nitrite	mg/l	0.50	0.52	104. %

BLANKS

ANALYTE	UNITS	RESULT
Fecal Coliform	CFU/100 ml	< 1
Fecal Coliform	CFU/100 ml	< 1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Total Nitrogen (TKN)	mg/l	< 0.1
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01
Nitrate + Nitrite	mg/l	< 0.01



14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th PI Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request
 1 Day 2 Day 3 Day
 Standard
 Other: _____

Laboratory Reference #: 09-222
 Project Manager: David Baumeister
 email: dbaumeister@onsite-env.com
 Project Number: 14-05806-000
 Project Name: Redmond Paired Watershed Study

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	COLM-20160917 24898	9/17/16	11:25	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
2	COUMI-20160917 99	9/17/16	7:50	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
3	COUMO-20160917 24900	9/17/16	8:20	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
4	EVAMS-20160917 01	9/17/16	8:40	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
5	EVALSS-20160917 02	9/17/16	9:05	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
6	MONMN-20160917 03	9/17/16	10:30	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
7	MONMS-20160917 04	9/17/16	10:10	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
8	MONM-20160917 05	9/17/16	10:55	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
9	SEIMN-20160917 06	9/17/16	10:35	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
10	SEIMS-20160917 07	9/17/16	9:45	Water	2	Fecal Coliform SM 9222D, Total Nitrogen SM 4500-N
Signature		Company		Date	Time	Comments/Special Instructions
Relinquished by:		AmTest		9/17/16	1230	
Received by:				9/17/16	1250	
Relinquished by:						
Received by:						
Relinquished by:						EDDs - CSV Reporting Limits: Fecal Coliform - 1.0 cfu/100ml Total Nitrogen - .10 mg/L
Received by:						

10.1



14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants

Project No.: 14-05806-000

Project Name: Redmond Paired Watershed Study

Project Manager: George Iftner

CHAIN OF CUSTODY

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

09-222

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 0917	9.17.16	11:25	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0917	9.17.16	7:50	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0917	9.17.16	8:20	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0917	9.17.16	08:40	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0917	9.17.16	09:05	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 0917	9.17.16	10:30	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0917	9.17.16	10:10	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0917	9.17.16	10:55	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0917	9.17.16	10:35	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0917	9.17.16	09:45	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0917	9.17.16	08:00	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0917	9.17.16	8:35	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0917	9.17.16	9:40	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0917	9.17.16	9:15	Water	7	X	X	X	X	X	X	X	X	X
15	QA12-2016 0917	9.17.16	9:55	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miriam Herrera Date 9.17.16 Received by [Signature] Date 9/17/16
 Firm Herrera Time 11:40 Firm [Signature] Time 1140

Relinquished by [Signature] Date 9/17/16 Received by [Signature] Date 9/17/16
 Firm Herrera Time 1215 Firm [Signature] Time 1215

Comments:
 * - field filtered with 0.45 µm filter within 15 minutes of collecting sample



CHAIN OF CUSTODY

14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants

Project No.: 14-05806-000

Project Name: Redmond Paired Watershed Study

Project Manager: George Iftner

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

09-222

Requested Analyses

Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Suspended Solids (SM 2540D)	Turbidity (EPA 181.1)	Hardness (EPA 200.7 / SM 2340B)	Dissolved Organ Carbon (SM 5310B) *	Fecal Coliform (SM 9222D)	Total Phosphorus (EPA 365.1)	Total Nitrogen (SM 4500 N-B)	Total Cu and Zn (EPA 200.8)	Dissolved Cu and Zn (EPA 200.8) *
1	COLM-2016 0917	9.17.16	11:25	Water	7	X	X	X	X	X	X	X	X	X
2	COUMI-2016 0917	9.17.16	7:50	Water	7	X	X	X	X	X	X	X	X	X
3	COUMO-2016 0917	9.17.16	8:20	Water	7	X	X	X	X	X	X	X	X	X
4	EVAMS-2016 0917	9.17.16	08:40	Water	7	X	X	X	X	X	X	X	X	X
5	EVALSS-2016 0917	9.17.16	09:05	Water	7	X	X	X	X	X	X	X	X	X
6	MONMN-2016 0917	9.17.16	10:30	Water	7	X	X	X	X	X	X	X	X	X
7	MONMS-2016 0917	9.17.16	10:10	Water	7	X	X	X	X	X	X	X	X	X
8	MONM-2016 0917	9.17.16	10:55	Water	7	X	X	X	X	X	X	X	X	X
9	SEIMN-2016 0917	9.17.16	10:35	Water	7	X	X	X	X	X	X	X	X	X
10	SEIMS-2016 0917	9.17.16	09:45	Water	7	X	X	X	X	X	X	X	X	X
11	TOSMI-2016 0917	9.17.16	08:00	Water	7	X	X	X	X	X	X	X	X	X
12	TOSMO-2016 0917	9.17.16	8:35	Water	7	X	X	X	X	X	X	X	X	X
13	TYLMI-2016 0917	9.17.16	9:40	Water	7	X	X	X	X	X	X	X	X	X
14	TYLMO-2016 0917	9.17.16	9:15	Water	7	X	X	X	X	X	X	X	X	X
15	QA12-2016 0917	9.17.16	9:55	Water	7	X	X	X	X	X	X	X	X	X

Relinquished by Miriam Herrera Date 9.17.16 Received by [Signature] Date 9/17/16
 Firm Herrera Time 11:40 Firm [Signature] Time 1140
 Relinquished by William Herrera Date 9/17/16 Received by [Signature] Date 9/17/16
 Firm Herrera Time 12:15 Firm [Signature] Time 1215

Comments:
* - field filtered with 0.45 µm filter within 15 minutes of collecting sample

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number: 14-05806-000
Personnel Performing Calibration: Alex Svendsen
Meter: YSI Ph Plus
Date/Time: 9.17.16 @ 7:00
Barometric Pressure Start of Day: Inches Hg: 750.3 Time: 7:00
Barometric Pressure End of Day: Inches Hg: Time:

Calibration Procedures:
Rinse Multimeter Sonde Between Each Operation
 Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.
Conductivity Calibration Notes:



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	—	0	—	
Conductivity (µS/cm)	1034	1,000	24.4	
Conductivity (µS/cm)	—	100	—	
DO % Saturation	96.4	100	23.4	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	8.2	0	T	
Conductivity (µS/cm)	998	1000	T	
DO % Saturation	95.3	100	22.1	

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
 2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
 3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
 4. Make sure there are no bubbles in the cell; wait 2 minutes.
 5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
 6. Check conductivity using 100 µS/cm standard.
- Dissolved Oxygen Calibration Notes:**
1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
 2. Use KimWipes® to dry any droplets from the sensor cap.
 3. Invert calibration cup's cap and gently rest it on the cup.
 4. Wait 5 minutes, making sure that temperature stabilizes.
 5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
 6. Click "Calibrate". "Calibrate Successful" will be displayed.
 7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
 8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
 9. Keep probe out of direct sun or wind.

METER CALIBRATION LOG - Redmond Paired Watershed Study

Project Number:	14-05806-000		
Personnel Performing Calibration:	Alex Sverdson		
Meter:	YSI DDS		
Date/Time:	9.17.16 @ 7AM		
Barometric Pressure Start of Day:	Inches Hg: 30.8	Time:	7:00
Barometric Pressure End of Day:	Inches Hg:	Time:	

Calibration Procedures:

Rinse Multimeter Sonde Between Each Operation

Rinse 3 times with tap water, 3 times with deionized water, then 3 times with the solution to be used for calibrating or testing.

Conductivity Calibration Notes:

1. Dry the conductivity probe with a lab tissue (e.g., KimWipes®) and DI water.
2. Fill calibration cup to within a centimeter of the top of the calibration cup with DI water (0 µS).
3. Fill the calibration cup with 1,000 µS standard so that the temperature/conductivity probe is submerged.
4. Make sure there are no bubbles in the cell; wait 2 minutes.
5. Enter the appropriate standard value (1,000 µS/cm or 1.0 mS/cm) for Sp Cond.
6. Check conductivity using 100 µS/cm standard.

Dissolved Oxygen Calibration Notes:

1. Fill the calibration cup with about 1/2 inch of DI; it should be below the sensor cap.
2. Use KimWipes® to dry any droplets from the sensor cap.
3. Invert calibration cup's cap and gently rest it on the cup.
4. Wait 5 minutes, making sure that temperature stabilizes.
5. Determine local barometric pressure (mm Hg) and enter this value into the meter.
6. Click "Calibrate". "Calibrate Successful" will be displayed.
7. To retain calibration accuracy between measurements, store with the sensor immersed in water or within a water-saturated air environment such as a sealed storage cup with at least 10 ml of water.
8. It is important to have the water-saturated air and the sensor at the same temperature. Therefore, store a jar of DI in the same environment as the sonde and calibrate in a similar air temperature as the water and sonde.
9. Keep probe out of direct sun or wind.



PRE Field Run CALIBRATION	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	—	0	24.2	
Conductivity (µS/cm)	1013	1,000	24.4	
Conductivity (µS/cm)	—	100	—	
DO % Saturation	99.0	100	24.0	
POST Field Run CHECK	Meter Reading	Buffer / Cal Std	Temp °C	Comments
Conductivity (µS/cm)	7.8	0	T	
Conductivity (µS/cm)	1001	1000	T	
DO % Saturation	101.1	100	20.4	

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/NW

SITE ID: COLM

Sample Date: 9/17/16

Sample Time: 1125

PDT:

Base Flow or Storm Event? (circled)

Field Filtered Time: 1130

PST:

(Must filter within 15 minutes of collection)

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: OVERCAST, MILD, BREEZY, 60°F

Water Quality Sampling

Sample ID: COLM20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions: VERY LOW FLOW CONDITIONS

Clarity: CLAR
 Color: TANNIN
 Odor: NON
 Sheen: NON
 Floatables: NON

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Smith Signature: [Signature]
 Date Checked: 9-23-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI ProDSS X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): NA
 Reference Point (description): NA

Water Quality Measurements

Temperature (°C) 13.3
 Conductivity (µs/cm) 44.9
 Dissolved Oxygen (mg/L) 2.7

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: Brianna Blaud

Sample Date: 9-17-16

Sample Time: 7:45

PDT:

SITE ID:

COUMI

Base Flow or Storm Event? storm

Field Filtered Time: 8:50

PST: X

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: COUMI-20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: cloudy
 Color: light brown
 Odor: none
 Sheen: none
 Floatables: turbidity

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenton Signature: [Signature]
 Date Checked: 9-23-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) X
 DDS 8

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.84

Reference Point (description): top of metal bank holding sign

Water Quality Measurements

Temperature (°C) 14.1

Conductivity (µs/cm) 207.6

Dissolved Oxygen (mg/L) 9.72

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB

Sample Date: 9-17-16

Sample Time: 8:15

PDT:

SITE

ID: COUMO

Base Flow or Storm Event? Storm

Field Filtered Time: 8:20

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)

Project Name: Redmond Paired Watershed Study



Water Quality Sampling

Sample ID: COUMO-20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: some sed./turbidity

LABORATORY DELIVERY

Date:

Time:

Quality Assurance

Checked By: John Leath Signatures:

Date Checked: 9-23-16 Time: 13:40

Data Entered into Database? YES NO initials:

Date Entered: Time:

Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

DDS

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.94

Reference Point (description): top of metal rebar ↓

Water Quality Measurements

Temperature (°C) 15.3

Conductivity (µs/cm) 172.3

Dissolved Oxygen (mg/L) 9.10

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/VW
 Sample Date: 9-17-16 Sample Time: 0840 PDT:
 Base Flow or Storm Event? Field Filtered Time: 0845 PST
 (Must filter within 15 minutes of collection)

SITE ID: EVAMS

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: LIGHT RAIN, 60°F

Water Quality Sampling

Sample ID: EVAMS 20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: SLIGHTLY TURBID
 Color: LIGHT BROWN / CLEAR
 Odor: NONE
 Sheen: NONE
 Floatables: MINOR AMTS OF SEDIMENT
 LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 9-23-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 3.02
 Reference Point (description): STAFF GAGE ON PVC

Water Quality Measurements

Temperature (°C) 12.8
 Conductivity (µs/cm) 226.5
 Dissolved Oxygen (mg/L) 10.3

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/VW
 Sample Date: 9/17/16 Sample Time: 0905 PDT:
 Base Flow or Storm Event? Field Filtered Time: 0910 PST:
 (Must filter within 15 minutes of collection)

SITE ID: EVALSS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: LIGHT RAIN, MILD: 57°F

Water Quality Sampling

Sample ID: EVALSS20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: SLIGHTLY TURBID
 Color: LIGHT BROWN / CLEAR
 Odor: NONE
 Sheen: NONE
 Floatables: NONE

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Solan Lenth Signature: [Signature]
 Date Checked: 9-26-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 2.30
 Reference Point (description): STAFF GAGE ON PVC

Water Quality Measurements

Temperature (°C) 13.0
 Conductivity (µs/cm) 205.5
 Dissolved Oxygen (mg/L) 10.4

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BJD

Sample Date: 9-17-16

Sample Time: 10:25

PDT:

SITE

ID: MONMN

Base Flow or Storm Event? Storm

Field Filtered Time: 10:30

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: MONMN - 20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear

Color: colorless

Odor: odorless

Sheen: none

Floatables: some susp. sed

LABORATORY DELIVERY

Date:

Time:

Current Weather and Temp: drizzling @ 57°F

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020) X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.01

Reference Point (description): from top of bolt up

Water Quality Measurements

Temperature (°C) 16.2

Conductivity (µs/cm) 225.1

Dissolved Oxygen (mg/L) 7.80

Quality Assurance

Checked By: John Lenth

Signature: [Signature]

Date Checked: 9-23-16

Time: 13:46

Data Entered into Database?

YES

NO

initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AB
 Sample Date: 9-17-16 Sample Time: 10:05 PDT:
 Base Flow or Storm Event? storm Field Filtered Time: 10:10 PST: X
 (Must filter within 15 minutes of collection)

SITE ID: MONMS

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: drizzling @ 57°F

Water Quality Sampling

Sample ID: MONMS-20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<u>Y</u>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: some sed/turbidity

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Heath Signature: [Signature]
 Date Checked: 9-23-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) X
DDS B

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 10.75
 Reference Point (description): through vault

Water Quality Measurements

Temperature (°C) 14.2
 Conductivity (µs/cm) 348.9 - in metal grate
 Dissolved Oxygen (mg/L) 10.53

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BK

Sample Date: 9.17.16

Sample Time: 10:50

PDT:

SITE

ID: MONM

Base Flow or Storm Event? storm

Field Filtered Time: 10:55

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: MONM.20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA

Filter blank sample ID: NA

Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date:

Time:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)

YSI Pro Plus (15D100020)

DDS

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 3.59

Reference Point (description): top of culvert ↓

Water Quality Measurements

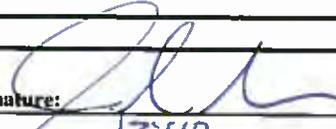
Temperature (°C) 14.0

Conductivity (µs/cm) 223.1

Dissolved Oxygen (mg/L) 9.24

Quality Assurance

Checked By: John Heath

Signature: 

Date Checked: 9-23-16

Time: 13:40

Data Entered into Database?

YES NO initials:

Date Entered:

Time:

Notes:

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/VW
 Sample Date: 9/17/16 Sample Time: 1035 PDT:
 Base Flow or Storm Event? Field Filtered Time: 1040 PST:
 (Must filter within 15 minutes of collection)

SITE ID: SEIMN

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: OVERCAST, BREEZY, 60°F

Water Quality Sampling

Sample ID: SEIMN 20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	N
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	✓

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: _____
 Filter blank sample ID: _____
 Transfer blank sample ID: _____

Visual and Olfactory Conditions:

Clarity: CLEAR
 Color: CLEAR
 Odor: NONE
 Sheen: NONE
 Floatables: NONE

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Sara Lenth Signature: [Signature]
 Date Checked: 9-23-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.76 FT

Reference Point (description): BOTTOM OF NAIL TO H₂O SURFACE

Water Quality Measurements

Temperature (°C) 12.3
 Conductivity (µs/cm) 119.4
 Dissolved Oxygen (mg/L) 10.4

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/VW
 Sample Date: 9/17/16 Sample Time: 0945 PDT
 Base Flow or Storm Event? Field Filtered Time: 0950 PST
 (Must filter within 15 minutes of collection)

SITE ID: SEIMS
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: MCD. PAWN, MI-D; 60°F

Water Quality Sampling

Sample ID: SEIMS20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	Y
DOC *	HDPE	250 ml	1	HCL	Y
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	Y
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	Y
T Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	Y
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	Y
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	Y

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: QA1220160917
 Filter blank sample ID:
 Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: MODERATELY TURBID
 Color: BROWN
 Odor: NONE
 Sheen: NONE
 Floatables: LEAVES

LABORATORY DELIVERY

Date: Time:

Quality Assurance

Checked By: John Lentz Signature: [Signature]
 Date Checked: 9-23-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: Time:
 Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
YSI Pro Plus (15D100020)
✓ YSI Pro DSS

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.76
 Reference Point (description): STAFF LAKE

Water Quality Measurements

Temperature (°C) 12.5
 Conductivity (µs/cm) 126.1
 Dissolved Oxygen (mg/L) 10.1

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: AS/VW
 Sample Date: 9/17/16 Sample Time: 0800 PDT
 Base Flow or Storm Event? Field Filtered Time: 0810 PST
(Must filter within 15 minutes of collection)

SITE ID: POSMI

Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: MOD. RAIN, MILD 57°F

Water Quality Sampling

Sample ID: TOSM120160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	
DOC *	HDPE	250 ml	1	HCL	
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:
 Filter blank sample ID:
 Transfer blank sample ID:

Visual and Olfactory Conditions:

Clarity: TURBID
 Color: BROWN
 Odor: NONE
 Sheen: NONE
 Floatables: SEDIMENT

LABORATORY DELIVERY

Date: Time:

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 9-23-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: Time:
 Notes:

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
YSI Pro DSS X

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 0.93
 Reference Point (description): STAFF GAGE ON PVC

Water Quality Measurements

Temperature (°C) 15.9
 Conductivity (µs/cm) 89.4
 Dissolved Oxygen (mg/L) 9.8

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB

SITE ID: TOSMO

Sample Date: 9-17-16

Sample Time: 8:30

PDT:

Base Flow or Storm Event? Storm

Field Filtered Time: 8:35

PST:

Project Number: 14-05806-000

(Must filter within 15 minutes of collection)



Project Name: Redmond Paired Watershed Study

Water Quality Sampling

Sample ID: TOSMO-20160917

Current Weather and Temp: Rainy @ 57°F

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<input checked="" type="checkbox"/>
DOC *	HDPE	250 ml	1	HCL	<input type="checkbox"/>
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	<input type="checkbox"/>
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	<input type="checkbox"/>
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	<input type="checkbox"/>
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	<input checked="" type="checkbox"/>

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID:	<u>NA</u>
Filter blank sample ID:	<u>NA</u>
Transfer blank sample ID:	<u>NA</u>

Visual and Olfactory Conditions:

Clarity: Very cloudy
 Color: med brown w/ sediment
 Odor: None
 Sheen: NO sheen, but lots of bubbles - like soap
 Floatables: Sediment + high turbidity

LABORATORY DELIVERY

Date:	Time:

Quality Assurance

Checked By: <u>John Lynch</u>	Signature:
Date Checked: <u>9-23-16</u>	Time: <u>13:40</u>
Data Entered into Database?	YES <input type="checkbox"/> NO <input type="checkbox"/> initials:
Date Entered:	Time:
Notes:	

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466)
 YSI Pro Plus (15D100020)
 DDS

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 0.32
 Reference Point (description): top of pin ↓

Water Quality Measurements

Temperature (°C) 13.6
 Conductivity (µs/cm) 120.3
 Dissolved Oxygen (mg/L) 9.71

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 9-17-16 Sample Time: 9:35 PDT:
 Base Flow or Storm Event? storm Field Filtered Time: 9:40 PST: X
(Must filter within 15 minutes of collection)

SITE ID: TYLMI
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: Rainy 89°F

Water Quality Sampling

Sample ID: TYLMI-20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: John Lenth Signature: [Signature]
 Date Checked: 9-23-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form

YSI 556 (05M1466) _____
 YSI Pro Plus (15D100020) X
 DDS *

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)

Stream Stage (ft): 4.50
 Reference Point (description): top of culvert ↓

Water Quality Measurements

Temperature (°C) 14.9
 Conductivity (µs/cm) 230.1
 Dissolved Oxygen (mg/L) 8.02

FIELD SAMPLING SHEET - Redmond Paired Watershed Study

Field Personnel: BB
 Sample Date: 9.17.16 Sample Time: 9:10 PDT
 Base Flow or Storm Event? storm Field Filtered Time: 9:15 PST:
(Must filter within 15 minutes of collection)

SITE ID: TYLMO
 Project Number: 14-05806-000



Project Name: Redmond Paired Watershed Study

Current Weather and Temp: drizzling @ 57°F

Water Quality Sampling

Sample ID: TYLMO - 20160917

Parameter	Bottle Type	Bottle Volume	# Bottles	Preservative	Duplicated?
TSS and Turbidity	HDPE	1L	1	NA	<u>N</u>
DOC *	HDPE	250 ml	1	HCL	↓
Fecal Col. Bact.	HDPE	250 ml	1	EDTA	
T. Phosphorous	HDPE	250 ml	1	H ₂ SO ₄	
T. Nitrogen	HDPE	250 ml	1	H ₂ SO ₄	
Diss. Cu and Zn *	HDPE	250 ml	1	HNO ₃	
Hardness, Total Cu and Zn	HDPE	500 ml	1	HNO ₃	

* - field filtered with Nalgene 250 ml SFCA 0.45 µm filter and vacuum hand pump

Duplicate sample ID: NA
 Filter blank sample ID: NA
 Transfer blank sample ID: NA

Visual and Olfactory Conditions:

Clarity: clear
 Color: colorless
 Odor: odorless
 Sheen: none
 Floatables: none

LABORATORY DELIVERY

Date: _____ Time: _____

Quality Assurance

Checked By: Susan Leuth Signature: [Signature]
 Date Checked: 9-23-16 Time: 13:40
 Data Entered into Database? YES NO initials:
 Date Entered: _____ Time: _____
 Notes: _____

Field Meter Calibration

Check which field meter was used and complete the meter calibration form
YSI 556 (05M1466)
YSI Pro Plus (15D100020)
DDS

Stream Stage Measurement

Indicate reference point for measurement (to nearest 100th of a foot)
 Stream Stage (ft): 2.79
 Reference Point (description): from top of ~~water~~ culvert ↓

Water Quality Measurements

Temperature (°C) 15.2
 Conductivity (µs/cm) 100.8
 Dissolved Oxygen (mg/L) 9.23



Data Quality Assurance Worksheet

G

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 10/19/2016 Page 1 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: Total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 9/17/2016 / All sites, 1 FD (QA12) at SEIMS

date 11/16/2016

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TSS	OK / SM 2540D	NA	NA	3	≤7	≤1.0 mg/L 1.0 mg/L	NA	NA	82	±20	2	≤25	15	≤25	OK	NONE
Turbidity	OK / EPA 180.1	NA	NA	2	≤2	≤0.1 NTU 0.1 NTU	NA	NA	NA	±10	0	≤25	125	≤25	OK	"J" SEIMS AND QA12 DUE TO FD EXCEEDANCE
Hardness	OK / SM 2340B	NA	NA	6	≤180	≤1.0 mg/L 1.0 mg/L	107,110	±25	110	±15	0	≤20	6.7	≤20	OK	NONE
DOC	OK / SM 5310B	<15	≤15	9	≤28	≤1.0 mg/L 1.0 mg/L	100	±25	107	±15	4	≤20	1.7	≤20	OK	NONE
Total Phosphorus	OK / EPA 365.1	NA	NA	3	≤28	≤0.01 mg/L 0.01 mg/L	104	±25	97	±20	3	≤20	17	≤20	OK	NONE
Total Nitrogen	OK/ SM 4500 N-B	NA	NA	4-13	≤28	≤0.1 mg/L 0.1 mg/L	98-105	±25	97-113	±20	0-3.5	≤20	6.5	≤20	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



Data Quality Assurance Worksheet

By G. Catarra

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond

Date 10/19/2016 Page 2 of 2

Laboratory/Parameters: OnSite Environmental : TSS, turbidity, hardness, DOC, TP, Dissolved & Total Cu, Zn / AmTest: total nitrogen, fecal coliform bacteria

Checked: initials JL

Sample Date/Sample ID: 9/17/2016 / All sites, 1 FD (QA12) at SEIMS

date 11/16/2016

Parameter	Completeness/ Methodology	Pre-preservation Holding Times (days)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal ¹	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
Total Copper	OK/ EPA 200.8	NA	NA	16	≤180	≤1.0 µg/L 1.0 µg/L	100,100	±25	NR	±15	0	≤20	D=0	≤20	OK	NONE
Total Zinc	OK/ EPA 200.8	NA	NA	16	≤180	≤5.0 µg/L 5.0 µg/L	107,108	±25	NR	±15	1	≤20	D=0.4	≤20	OK	NONE
Dissolved Copper	OK/ EPA 200.8	<15	≤15	12,18	≤180	≤1.0 µg/L 1.0 µg/L	97,93	±25	NR	±15	4	≤20	NC	≤20	OK	NONE
Dissolved Zinc	OK/ EPA 200.8	<15	≤15	12,18	≤180	≤5.0 µg/L 5.0 µg/L	105,103	±25	NR	±15	2	≤20	NC	≤20	OK	NONE
Fecal Coliform	OK/ SM 9222D	NA	NA	<1	≤1	≤1.0 cfu/ 100mL 1.0 cfu/ 100mL	NA	NA	NA	NA	20	≤35	14	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.

APPENDIX G

Data Validation Memorandum for Water Quality Monitoring

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 14-05806-000
From Gina Catarra, Herrera Environmental Consultants
Date December 6, 2016
Subject Data Quality Assurance Review of the Redmond Paired Watershed Stormwater Retrofit Effectiveness Water Quality Monitoring Data

This memorandum presents a review of data quality for 152 water samples (including 10 field duplicates, 1 filter blank, and 1 transfer blank) collected for the Redmond Paired Watershed Stormwater Retrofit Effectiveness Study between March 18 and September 17, 2016. OnSite Environmental, Inc., of Redmond, Washington analyzed the samples for:

- Total suspended solids (TSS) by Standard Method 2540D
- Turbidity by EPA method 180.1
- Hardness by Standard Method 2340B
- Dissolved organic carbon (DOC) by Standard Method 5310B
- Total phosphorus by EPA method 365.1
- Total and dissolved metals (copper and zinc) by EPA method 200.8.

In addition, Am Test Inc., of Kirkland, Washington analyzed the samples for:

- Total nitrogen by Standard Methods 4500-N and 4500-NO3
- Fecal coliform by Standard Method 9222D.

Results for the following samples were validated.

Date Collected	Lab SDG	Samples Collected	QC Samples Collected
3/18/2016	1603-185	All 14 stations	None
3/31/2016	1603-275	All 14 stations	2 field duplicates, 1 filter blank, 1 transfer blank
4/24/2016	1604-188	All 14 stations	1 field duplicate
5/21/2016	1605-187	All 14 stations	1 field duplicate
6/1/2016	1606-006	All 14 stations	1 field duplicate
6/18/2016	1606-193	All 14 stations	1 field duplicate

Date Collected	Lab SDG	Samples Collected	QC Samples Collected
7/21/2016	1607-181	All 14 stations	1 field duplicate
9/2/2016	1609-030	All 14 stations	1 field duplicate
9/6/2016	1609-041	All 14 stations	1 field duplicate
9/17/2016	1609-222	All 14 stations	1 field duplicate

The laboratory's performance was reviewed in accordance with quality control (QC) criteria established in the *Redmond Paired Watershed Study Quality Assurance Project Plan (QAPP)* (Herrera 2015), by the laboratory, and in the specified methods.

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data Quality Assurance Worksheets were completed for each laboratory report and are included as an Attachment to this memorandum. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable with Qualification

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. With the exceptions noted below, samples were analyzed within the required method holding times. The laboratory report was complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

The holding time (28 days) was exceeded by 7 days for samples Toshmid, Countrymou, and Countrymid collected on 3/18/2016 for total nitrogen analysis. Samples were qualified as estimated (flagged J) due to the holding time exceedance, as shown in the table below.

Date Collected	Lab SDG	Sample Location	Reason for Qualification	Data Flag
3/18/2016	1603-185	Toshmid	Holding time exceedance	J
3/18/2016	1603-185	Countrymou	Holding time exceedance	J
3/18/2016	1603-185	Countrymid	Holding time exceedance	J

Laboratory Reporting Limits—Acceptable

The laboratory reporting limits met those established in the QAPP. No data were qualified based on laboratory reporting limits.

Method Blank Analysis—Acceptable

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Filter Blank Analysis—Acceptable

A filter blank was collected on 3/31/2016 and analyzed for DOC and dissolved copper and zinc, as required by the QAPP. The filter blank did not contain levels of target analytes above the laboratory reporting limits.

Transfer Blank Analysis—Acceptable with Discussion

A transfer blank were collected on 3/31/2016 and analyzed for all parameters as required by the QAPP. With the exception noted below, the transfer blanks did not contain levels of target analytes above the laboratory reporting limits.

Dissolved copper (3.9 µg/L) was detected in the transfer blank above the reporting limit (1.0 µg/L). However, no data were qualified because dissolved copper was not detected above the reporting limit for any associated samples.

Laboratory Control Sample Analysis—Acceptable

Blank spike samples were analyzed with project samples for TSS, hardness, DOC, total phosphorus, and total nitrogen at the required frequency. The percent recovery values for all compounds met the criteria established in the QAPP.

Matrix Spike Analysis—Acceptable

Matrix spike samples were analyzed for hardness, DOC, total phosphorus, total nitrogen, total copper and zinc, and dissolved copper and zinc. The percent recovery values for all parameters met the control limits established in the QAPP.

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicates were analyzed for all parameters. The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. The relative percent difference (RPD) values or difference values met the control limits established by the laboratory.

Field Duplicate Analysis—Acceptable with Qualification

Field duplicates were analyzed for all parameters at the required frequency (10 field duplicates analyzed in total). The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. With the exceptions noted below,

the relative percent difference (RPD) values or difference values met the control limits established in the QAPP.

As shown in the table below, several field duplicate values did not meet the criteria established in the QAPP. The sample and associated duplicate were qualified as estimated (flagged J) due to the field duplicate exceedance.

Date Collected	Lab SDG	Sample Location	Duplicate ID	Parameter	Reason for Qualification	Data Flag
3/31/2016	1603-185	MOMN	QA1	Turbidity	Field duplicate exceedance	J
3/31/2016	1603-185	MOMN	QA1	Total nitrogen	Field duplicate exceedance	J
5/21/2016	1605-187	SEIMN	QA6	Fecal coliform	Field duplicate exceedance	J
6/1/2016	1606-006	COLM	QA7	Turbidity	Field duplicate exceedance	J
6/18/2016	1606-193	MONMN	QA8	Total nitrogen	Field duplicate exceedance	J
7/21/2016	1607-181	EVALSS	QA9	Fecal coliform	Field duplicate exceedance	J
9/6/2016	1609-041	TOSMI	QA11	TSS	Field duplicate exceedance	J
9/6/2016	1609-041	TOSMI	QA11	Turbidity	Field duplicate exceedance	J
9/6/2016	1609-041	TOSMI	QA11	Fecal coliform	Field duplicate exceedance	J
9/17/2016	1609-222	SEIMS	QA12	Turbidity	Field duplicate exceedance	J

Definition of Data Qualifiers

The following data qualifier definitions are taken from the QAPP (Herrera 2015).

- U** Value is below the reporting limit.
- J** Value is an estimate based on analytical results.
- UJ** Value is below the reporting limit and is an estimate based on analytical results.
- R** Value is rejected based on analytical results.

References

Herrera. 2015. Redmond Paired Watershed Study Quality Assurance Project Plan. Herrera Environmental Consultants, Seattle, Washington. December 31, 2015.

APPENDIX H

Summary Statistics for Pollutant Concentrations Measured in Storm Event and Base Flow Samples

Table H-1. Summary Statistics for Total Suspended Solids Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
VALSS	4	4.4	6.2	6.9	7.1	7.4	0.9	100%	NA
EVAMS	4	8.2	8.8	10.0	11.0	11.0	2.2	100%	NA
MONM	4	1.2	1.7	2.8	5.1	8.8	3.4	100%	NA
MONMN	4	2.2	2.4	4.6	7.4	9.0	5.0	100%	NA
MONMS	4	1.4	1.4	1.4	3.0	7.8	1.6	100%	NA
TOSMO	4	1.4	2.9	3.7	4.1	4.4	1.2	100%	NA
TOSMI	4	2.0	2.8	4.2	6.8	11.0	4.1	100%	NA
COLM	4	1.0	1.3	1.4	1.5	1.6	0.2	100%	NA
SEIMN	4	3.2	4.6	5.1	5.6	6.6	1.0	100%	NA
SEIMS	4	6.2	9.8	12.0	13.0	13.0	3.2	100%	NA
COUMO	4	3.6	4.5	4.8	5.1	6.0	0.6	100%	NA
COUMI	4	4.6	5.2	6.7	9.5	14.0	4.3	100%	NA
TYLMO	4	1.6	1.8	1.9	2.2	2.6	0.4	100%	NA
TYLMI	4	1.6	2.8	3.4	5.5	11.0	2.7	100%	NA
Storm Event Samples									
VALSS	6	11.0	19.0	22.0	40.0	200.0	21.0	100%	NA
EVAMS	6	12.0	15.8	21.0	29.3	180.0	13.5	100%	NA
MONM	6	3.8	7.1	15.5	31.8	71.0	24.7	100%	NA
MONMN	6	5.4	11.4	23.5	25.0	130.0	13.7	100%	NA
MONMS	6	1.0	2.9	4.2	6.9	21.0	4.0	100%	NA
TOSMO	6	5.8	30.3	55.0	226.8	400.0	196.5	100%	NA
TOSMI	6	3.6	44.5	84.0	90.5	110.0	46.0	100%	NA
COLM	6	1.6	3.0	3.3	5.1	11.0	2.1	100%	NA
SEIMN	6	6.4	12.0	12.5	14.5	28.0	2.5	100%	NA
SEIMS	6	25.0	26.3	34.5	60.0	74.0	33.8	100%	NA
COUMO	6	4.4	10.0	13.5	24.3	140.0	14.3	100%	NA
COUMI	6	21.0	24.0	25.5	66.0	170.0	42.0	100%	NA
TYLMO	6	3.6	6.4	14.6	26.0	45.0	19.7	100%	NA
TYLMI	6	7.6	13.8	23.0	35.3	54.0	21.5	100%	NA

mg/L: milligram/liter

NA: not applicable

Table H-2. Summary Statistics for Turbidity Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (NTU)	25th Percentile (NTU)	Median (NTU)	75th Percentile (NTU)	Maximum (NTU)	Interquartile Range (NTU)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	1.0	1.1	1.5	1.9	2.0	0.9	100%	NA
EVAMS	4	1.0	1.6	1.8	1.8	1.9	0.2	100%	NA
MONM	4	0.6	1.1	1.4	1.8	2.5	0.8	100%	NA
MONMN	4	0.7	1.1	1.7	2.2	2.3	1.1	100%	NA
MONMS	4	0.9	0.9	1.3	2.3	4.2	1.4	100%	NA
TOSMO	4	0.6	0.8	1.1	1.5	2.0	0.7	100%	NA
TOSMI	4	0.7	1.0	1.2	1.5	2.2	0.5	100%	NA
COLM	4	0.5	1.0	1.4	1.7	1.8	0.6	100%	NA
SEIMN	4	1.1	1.1	1.1	1.4	2.3	0.3	100%	NA
SEIMS	4	1.1	1.3	1.7	2.3	3.0	0.9	100%	NA
COUMO	4	1.7	2.2	2.7	3.1	3.3	0.9	100%	NA
COUMI	4	1.2	2.3	3.3	4.3	5.5	2.0	100%	NA
TYLMO	4	1.3	1.5	1.7	1.9	2.0	0.4	100%	NA
TYLMI	4	0.7	1.2	1.9	2.4	2.8	1.2	100%	NA
Storm Event Samples									
EVASS	6	2.2	3.1	5.1	6.3	49.0	3.2	100%	NA
EVAMS	6	2.0	3.1	5.1	7.9	51.0	4.9	100%	NA
MONM	6	1.4	3.0	4.6	8.2	15.0	5.2	100%	NA
MONMN	6	2.9	4.2	5.9	6.6	9.7	2.4	100%	NA
MONMS	6	0.7	1.9	2.1	2.5	5.6	0.6	100%	NA
TOSMO	6	1.9	7.5	11.0	12.0	96.0	4.6	100%	NA
TOSMI	6	1.4	6.4	10.6	17.5	21.0	11.1	100%	NA
COLM	6	0.6	1.1	1.5	1.7	2.9	0.7	100%	NA
SEIMN	6	2.2	2.7	4.3	5.2	8.5	2.5	100%	NA
SEIMS	6	3.3	4.6	6.5	9.3	18.0	4.8	100%	NA
COUMO	6	1.9	4.0	5.4	8.3	46.0	4.2	100%	NA
COUMI	6	2.5	3.6	7.0	9.4	56.0	5.8	100%	NA
TYLMO	6	1.8	2.6	5.1	8.1	11.0	5.5	100%	NA
TYLMI	6	1.3	2.8	5.8	6.8	9.6	4.0	100%	NA

NTU: Nephelometric Turbidity Unit

NA: not applicable

Table H-3. Summary Statistics for Total Hardness Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVALLS	4	80	80	88	96	100	16	100%	NA
EVAMS	4	87	88	94	102	110	14	100%	NA
MONM	4	75	77	89	100	100	23	100%	NA
MONMN	4	53	55	71	87	90	33	100%	NA
MONMS	4	110	110	130	158	180	48	100%	NA
TOSMO	4	110	110	115	120	120	10	100%	NA
TOSMI	4	120	128	135	140	140	13	100%	NA
COLM	4	9	9	11	14	15	5	100%	NA
SEIMN	4	25	26	37	47	48	22	100%	NA
SEIMS	4	42	43	50	57	59	14	100%	NA
COUMO	4	74	109	120	123	130	14	100%	NA
COUMI	4	84	111	125	135	150	24	100%	NA
TYLMO	4	75	75	80	88	99	13	100%	NA
TYLMI	4	74	78	85	96	110	18	100%	NA
Storm Event Samples									
EVALLS	6	86	88	90	93	110	5	100%	NA
EVAMS	6	92	96	100	100	110	5	100%	NA
MONM	6	80	82	84	93	97	11	100%	NA
MONMN	6	60	71	80	89	100	18	100%	NA
MONMS	6	66	100	130	138	160	38	100%	NA
TOSMO	6	41	48	59	99	110	51	100%	NA
TOSMI	6	23	33	39	61	140	28	100%	NA
COLM	6	12	13	13	14	17	1	100%	NA
SEIMN	6	39	43	45	48	50	5	100%	NA
SEIMS	6	48	52	53	54	58	2	100%	NA
COUMO	6	44	85	95	97	130	13	100%	NA
COUMI	6	100	113	120	128	180	15	100%	NA
TYLMO	6	23	43	63	81	85	38	100%	NA
TYLMI	6	34	69	87	99	110	30	100%	NA

mg/L: milligram/liter

NA: not applicable

Table H-4. Summary Statistics for Dissolved Organic Carbon Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
VALSS	4	2.2	2.5	3.0	3.4	3.5	0.9	100%	NA
EVAMS	4	2.3	3.2	3.7	3.8	3.8	0.6	100%	NA
MONM	4	2.9	3.5	3.8	3.8	3.9	0.3	100%	NA
MONMN	4	3.3	3.6	3.7	3.7	3.8	0.1	100%	NA
MONMS	4	3.9	4.9	5.5	6.0	6.6	1.1	100%	NA
TOSMO	4	1.7	2.2	2.7	3.0	3.0	0.9	100%	NA
TOSMI	4	2.3	2.7	3.2	3.6	3.7	1.0	100%	NA
COLM	4	11.0	11.0	11.0	11.3	12.0	0.3	100%	NA
SEIMN	4	2.0	2.2	4.1	5.9	6.0	3.8	100%	NA
SEIMS	4	2.9	3.2	3.5	3.8	3.9	0.6	100%	NA
COUMO	4	2.6	2.8	3.0	3.3	3.4	0.5	100%	NA
COUMI	4	2.8	3.1	3.2	3.3	3.6	0.2	100%	NA
TYLMO	4	3.4	3.9	4.1	4.3	4.5	0.4	100%	NA
TYLMI	4	2.5	2.7	3.8	4.9	5.0	2.1	100%	NA
Storm Event Samples									
VALSS	6	2.1	2.9	3.6	4.3	10.0	1.5	100%	NA
EVAMS	6	2.7	3.6	4.1	5.3	14.0	1.7	100%	NA
MONM	6	4.6	4.8	5.2	6.6	9.6	1.7	100%	NA
MONMN	6	4.9	5.2	6.2	7.2	12.0	2.0	100%	NA
MONMS	6	5.6	5.9	6.4	8.7	10.0	2.8	100%	NA
TOSMO	6	2.3	4.1	7.5	10.4	15.0	6.4	100%	NA
TOSMI	6	2.3	7.6	8.6	10.5	11.0	2.9	100%	NA
COLM	6	7.7	9.8	12.5	13.0	14.0	3.3	100%	NA
SEIMN	6	1.9	2.5	3.4	5.1	5.5	2.6	100%	NA
SEIMS	6	3.9	4.9	5.5	7.1	18.0	2.2	100%	NA
COUMO	6	2.3	4.8	5.6	7.4	13.0	2.6	100%	NA
COUMI	6	3.0	5.2	6.1	8.5	17.0	3.4	100%	NA
TYLMO	6	4.3	4.8	5.6	7.6	9.6	2.9	100%	NA
TYLMI	6	3.5	3.9	4.2	5.9	6.7	2.0	100%	NA

mg/L: milligram/liter

NA: not applicable

Table H-5. Summary Statistics for Fecal Coliform Bacteria Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (CFU/100 mL)	25th Percentile (CFU/100 mL)	Median (CFU/100 mL)	75th Percentile (CFU/100 mL)	Maximum (CFU/100 mL)	Interquartile Range (CFU/100 mL)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVALSS	4	8	11	19	69	200	58	100%	0%
EVAMS	4	8	52	68	160	430	109	100%	25%
MONM	4	5	45	74	443	1500	398	100%	25%
MONMN	4	4	279	480	683	960	404	100%	75%
MONMS	4	3	5	28	68	120	62	100%	0%
TOSMO	4	51	53	147	320	560	267	100%	50%
TOSMI	4	49	71	189	358	530	287	100%	50%
COLM	4	2	16	23	90	280	74	100%	25%
SEIMN	4	1	3	10	36	100	33	75%	0%
SEIMS	4	11	21	25	49	120	28	100%	0%
COUMO	4	28	40	87	198	400	158	100%	25%
COUMI	4	32	76	126	230	440	154	100%	25%
TYLMO	4	38	70	90	168	370	98	100%	25%
TYLMI	4	42	86	170	355	700	270	100%	50%
Storm Event Samples									
EVALSS	6	110	170	845	2,225	18,000	2,055	100%	67%
EVAMS	6	300	368	945	1,725	7,200	1,358	100%	100%
MONM	6	160	675	1,450	4,175	12,000	3,500	100%	83%
MONMN	6	150	853	1,200	4,450	11,000	3,598	100%	83%
MONMS	6	20	133	145	1,238	6,200	1,105	100%	33%
TOSMO	6	14	810	3,600	6,000	44,000	5,190	100%	83%
TOSMI	6	40	2,075	3,500	4,475	47,000	2,400	100%	83%
COLM	6	30	32	93	188	2,100	156	100%	17%
SEIMN	6	72	140	180	588	13,000	448	100%	50%
SEIMS	6	110	208	345	5,125	16,000	4,918	100%	67%
COUMO	6	670	1,275	1,550	10,900	22,000	9,625	100%	100%
COUMI	6	400	1,133	2,950	4,025	13,000	2,893	100%	100%
TYLMO	6	2	298	1,435	3,525	14,000	3,228	100%	67%
TYLMI	6	200	628	955	1,725	19,000	1,098	100%	83%

CFU/100 mL: Coliform forming units per 100 milliliter

NA: not applicable

^a Percentage of samples that exceed that applicable water quality standards for fecal coliform bacteria from WAC 173-201A-200.

Table H-6. Summary Statistics for Total Phosphorus Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
VALSS	4	0.012	0.020	0.026	0.029	0.031	0.009	100%	NA
EVAMS	4	0.011	0.020	0.023	0.024	0.027	0.004	100%	NA
MONM	4	0.017	0.025	0.041	0.055	0.058	0.031	100%	NA
MONMN	4	0.017	0.025	0.044	0.068	0.092	0.044	100%	NA
MONMS	4	0.016	0.020	0.024	0.028	0.033	0.008	100%	NA
TOSMO	4	0.052	0.053	0.060	0.070	0.079	0.017	100%	NA
TOSMI	4	0.048	0.053	0.061	0.071	0.081	0.018	100%	NA
COLM	4	0.010	0.012	0.018	0.023	0.024	0.011	75%	NA
SEIMN	4	0.018	0.020	0.025	0.031	0.041	0.011	100%	NA
SEIMS	4	0.034	0.039	0.046	0.064	0.100	0.026	100%	NA
COUMO	4	0.035	0.046	0.058	0.068	0.076	0.022	100%	NA
COUMI	4	0.063	0.071	0.078	0.095	0.130	0.024	100%	NA
TYLMO	4	0.024	0.028	0.046	0.065	0.072	0.038	100%	NA
TYLMI	4	0.022	0.023	0.024	0.028	0.038	0.005	100%	NA
Storm Event Samples									
VALSS	6	0.036	0.040	0.046	0.064	0.280	0.024	100%	NA
EVAMS	6	0.031	0.040	0.047	0.051	0.290	0.011	100%	NA
MONM	6	0.046	0.057	0.081	0.127	0.180	0.070	100%	NA
MONMN	6	0.049	0.075	0.094	0.108	0.360	0.032	100%	NA
MONMS	6	0.021	0.029	0.034	0.067	0.088	0.039	100%	NA
TOSMO	6	0.071	0.077	0.124	0.310	0.550	0.233	100%	NA
TOSMI	6	0.071	0.083	0.140	0.200	0.220	0.117	100%	NA
COLM	6	0.015	0.024	0.030	0.035	0.055	0.011	100%	NA
SEIMN	6	0.052	0.057	0.064	0.070	0.100	0.013	100%	NA
SEIMS	6	0.067	0.073	0.080	0.164	0.260	0.091	100%	NA
COUMO	6	0.071	0.074	0.089	0.152	0.360	0.078	100%	NA
COUMI	6	0.130	0.143	0.160	0.260	0.460	0.118	100%	NA
TYLMO	6	0.051	0.063	0.076	0.090	0.170	0.027	100%	NA
TYLMI	6	0.031	0.042	0.072	0.099	0.130	0.057	100%	NA

mg/L: milligram/liter

NA: not applicable

Table H-7. Summary Statistics for Total Nitrogen Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	1.35	1.39	1.63	2.14	2.98	0.75	100%	NA
EVAMS	4	1.83	1.88	2.03	2.18	2.22	0.29	100%	NA
MONM	4	0.26	0.49	0.68	0.87	1.08	0.39	100%	NA
MONMN	4	0.17	0.28	0.37	0.64	1.29	0.36	100%	NA
MONMS	4	0.10	0.42	0.71	1.09	1.59	0.67	75%	NA
TOSMO	4	0.52	0.54	0.59	0.68	0.86	0.14	100%	NA
TOSMI	4	0.74	0.85	0.91	0.96	1.03	0.11	100%	NA
COLM	4	0.21	0.26	0.29	0.96	2.98	0.70	100%	NA
SEIMN	4	0.26	0.37	0.47	0.71	1.25	0.34	100%	NA
SEIMS	4	0.26	0.37	0.43	0.50	0.60	0.13	100%	NA
COUMO	4	0.44	0.54	0.74	2.17	5.99	1.64	100%	NA
COUMI	4	0.33	0.37	0.43	0.51	0.62	0.14	100%	NA
TYLMO	4	0.37	0.42	0.47	0.61	0.92	0.20	100%	NA
TYLMI	4	0.54	0.82	0.96	1.00	1.01	0.19	100%	NA
Storm Event Samples									
EVASS	6	1.31	1.42	1.69	3.06	4.56	1.65	100%	NA
EVAMS	6	1.62	1.85	2.52	4.16	5.64	2.30	100%	NA
MONM	6	0.30	0.61	0.91	1.53	1.77	0.92	100%	NA
MONMN	6	0.21	0.41	0.66	0.98	1.12	0.57	100%	NA
MONMS	6	0.27	0.35	0.65	0.84	1.12	0.49	100%	NA
TOSMO	6	0.59	0.82	1.49	2.02	6.03	1.20	100%	NA
TOSMI	6	0.77	1.36	1.60	1.69	1.93	0.33	100%	NA
COLM	6	0.34	0.67	0.79	1.02	1.14	0.36	100%	NA
SEIMN	6	0.25	0.28	0.37	0.56	1.05	0.29	100%	NA
SEIMS	6	0.26	0.55	0.75	1.53	3.57	0.99	100%	NA
COUMO	6	0.86	0.97	1.23	1.29	3.08	0.32	100%	NA
COUMI	6	0.75	0.85	1.04	1.90	3.91	1.05	100%	NA
TYLMO	6	0.56	0.58	0.87	1.25	1.88	0.68	100%	NA
TYLMI	6	0.52	0.93	1.18	1.42	1.50	0.49	100%	NA

mg/L: milligram/liter

NA: not applicable

Table H-8. Summary Statistics for Nitrate + Nitrite Nitrogen Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVALLS	4	1.20	1.35	1.45	1.50	1.50	0.15	100%	NA
EVAMS	4	1.60	1.83	1.90	1.93	2.00	0.10	100%	NA
MONM	4	0.26	0.28	0.33	0.36	0.37	0.08	100%	NA
MONMN	4	0.15	0.15	0.16	0.18	0.20	0.03	100%	NA
MONMS	4	0.01	0.21	0.32	0.43	0.61	0.22	100%	NA
TOSMO	4	0.48	0.51	0.54	0.55	0.56	0.04	100%	NA
TOSMI	4	0.74	0.76	0.82	0.87	0.88	0.11	100%	NA
COLM	4	0.04	0.04	0.04	0.06	0.10	0.02	100%	NA
SEIMN	4	0.20	0.23	0.25	0.26	0.27	0.03	100%	NA
SEIMS	4	0.26	0.26	0.27	0.29	0.30	0.03	100%	NA
COUMO	4	0.44	0.45	0.49	0.53	0.54	0.09	100%	NA
COUMI	4	0.33	0.34	0.36	0.40	0.47	0.07	100%	NA
TYLMO	4	0.34	0.36	0.40	0.48	0.63	0.12	100%	NA
TYLMI	4	0.54	0.62	0.71	0.84	1.00	0.22	100%	NA
Storm Event Samples									
EVALLS	6	1.20	1.30	1.30	1.38	1.90	0.08	100%	NA
EVAMS	6	1.30	1.33	1.60	1.88	2.50	0.55	100%	NA
MONM	6	0.21	0.24	0.30	0.36	0.38	0.12	100%	NA
MONMN	6	0.09	0.11	0.18	0.27	0.33	0.16	100%	NA
MONMS	6	0.04	0.17	0.23	0.27	0.39	0.10	100%	NA
TOSMO	6	0.31	0.44	0.49	0.59	0.61	0.15	100%	NA
TOSMI	6	0.25	0.39	0.57	0.65	0.76	0.26	100%	NA
COLM	6	0.01	0.04	0.05	0.16	0.42	0.12	100%	NA
SEIMN	6	0.25	0.25	0.27	0.29	0.66	0.03	100%	NA
SEIMS	6	0.19	0.23	0.25	0.27	0.77	0.04	100%	NA
COUMO	6	0.39	0.46	0.56	0.71	1.10	0.25	100%	NA
COUMI	6	0.33	0.40	0.50	0.65	1.30	0.25	100%	NA
TYLMO	6	0.25	0.35	0.41	0.48	0.58	0.13	100%	NA
TYLMI	6	0.36	0.62	0.66	0.75	0.96	0.13	100%	NA

mg/L: milligram/liter

NA: not applicable

Table H-9. Summary Statistics for Total Kjeldahl Nitrogen Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (mg/L)	25th Percentile (mg/L)	Median (mg/L)	75th Percentile (mg/L)	Maximum (mg/L)	Interquartile Range (mg/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
VALSS	4	0.100	0.119	0.258	0.642	1.480	0.523	75%	NA
EVAMS	4	0.100	0.215	0.228	0.239	0.264	0.024	75%	NA
MONM	4	0.100	0.168	0.320	0.525	0.794	0.357	75%	NA
MONMN	4	0.100	0.129	0.194	0.452	1.140	0.323	75%	NA
MONMS	4	0.100	0.186	0.274	0.541	1.220	0.355	75%	NA
TOSMO	4	0.100	0.032	0.086	0.177	0.304	0.146	50%	NA
TOSMI	4	0.100	0.153	0.157	0.161	0.164	0.008	50%	NA
COLM	4	0.168	0.227	0.248	0.908	2.880	0.681	100%	NA
SEIMN	4	0.100	0.111	0.216	0.481	1.050	0.370	75%	NA
SEIMS	4	0.100	0.119	0.148	0.197	0.323	0.078	75%	NA
COUMO	4	0.100	0.091	0.239	1.632	5.460	1.541	75%	NA
COUMI	4	0.100	0.283	0.283	0.283	0.283	0.000	25%	NA
TYLMO	4	0.100	0.068	0.125	0.204	0.293	0.136	50%	NA
TYLMI	4	0.100	0.161	0.197	0.238	0.272	0.077	50%	NA
Storm Event Samples									
VALSS	6	0.100	0.122	0.391	1.310	3.260	1.188	83%	NA
EVAMS	6	0.288	0.350	0.670	2.580	3.340	2.230	100%	NA
MONM	6	0.100	0.397	0.655	1.170	1.390	0.774	83%	NA
MONMN	6	0.100	0.317	0.447	0.746	0.888	0.429	83%	NA
MONMS	6	0.100	0.276	0.427	0.627	0.725	0.351	83%	NA
TOSMO	6	0.121	0.347	1.023	1.428	5.600	1.081	100%	NA
TOSMI	6	0.110	0.959	1.007	1.228	1.400	0.269	100%	NA
COLM	6	0.288	0.542	0.630	0.808	1.100	0.266	100%	NA
SEIMN	6	0.100	0.108	0.165	0.308	0.389	0.200	50%	NA
SEIMS	6	0.100	0.296	0.539	1.296	2.800	0.999	83%	NA
COUMO	6	0.203	0.469	0.564	0.673	2.330	0.204	100%	NA
COUMI	6	0.183	0.504	0.631	1.287	2.610	0.784	100%	NA
TYLMO	6	0.112	0.231	0.524	0.771	1.390	0.540	100%	NA
TYLMI	6	0.159	0.291	0.395	0.612	0.818	0.321	100%	NA

mg/L: milligram/liter

NA: not applicable

Table H-10. Summary Statistics for Dissolved Copper Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (ug/L)	25th Percentile (ug/L)	Median (ug/L)	75th Percentile (ug/L)	Maximum (ug/L)	Interquartile Range (ug/L)	Percent Detected	Percent Exceeding Standard ^a
Base Flow Samples									
EVALSS	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
EVAMS	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
MONM	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
MONMN	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
MONMS	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
TOSMO	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
TOSMI	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
COLM	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
SEIMN	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
SEIMS	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
COUMO	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
COUMI	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
TYLMO	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
TYLMI	4	1.1	1.3	1.5	1.8	2.2	0.4	100%	0%
Storm Event Samples									
EVALSS	6	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
EVAMS	6	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
MONM	6	1.0	1.4	1.4	1.4	1.4	0.0	17%	0%
MONMN	6	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
MONMS	6	1.0	0.3	0.7	2.0	3.8	1.7	50%	0%
TOSMO	6	1.0	2.0	3.2	5.2	5.9	3.1	67%	0%
TOSMI	6	1.0	4.2	4.4	6.2	8.4	2.1	83%	33%
COLM	6	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
SEIMN	6	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
SEIMS	6	1.0	1.0	1.0	1.0	1.0	0.0	0%	0%
COUMO	6	1.0	1.8	2.3	3.3	4.2	1.6	83%	0%
COUMI	6	1.0	0.8	1.8	2.7	5.1	1.9	67%	0%
TYLMO	6	1.0	3.6	5.2	6.3	9.7	2.7	83%	33%
TYLMI	6	1.7	2.5	3.8	4.5	6.3	2.0	100%	0%

ug/L: microgram/liter

NA: not applicable

^a Percentage of samples that exceed the applicable water quality standards for dissolved copper from WAC 173-201A-240. Base flow and storm event concentrations were compared to the hardness dependent chronic and acute criteria, respectively, for impacts to aquatic life in freshwater.

Table H-11. Summary Statistics for Total Copper Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (ug/L)	25th Percentile (ug/L)	Median (ug/L)	75th Percentile (ug/L)	Maximum (ug/L)	Interquartile Range (ug/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
EVASS	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	NA
EVAMS	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	NA
MONM	4	1.0	1.2	1.2	1.2	1.2	0.0	25%	NA
MONMN	4	1.0	1.0	1.0	1.0	1.0	0.0	25%	NA
MONMS	4	1.0	1.3	1.3	1.3	1.3	0.0	25%	NA
TOSMO	4	1.0	1.4	1.4	1.4	1.4	0.0	25%	NA
TOSMI	4	1.0	1.5	1.5	1.5	1.5	0.0	50%	NA
COLM	4	1.0	1.1	1.1	1.1	1.1	0.0	25%	NA
SEIMN	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	NA
SEIMS	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	NA
COUMO	4	1.0	1.0	1.0	1.0	1.0	0.0	0%	NA
COUMI	4	1.0	1.2	1.2	1.2	1.2	0.0	25%	NA
TYLMO	4	1.0	0.7	0.9	1.2	1.4	0.5	50%	NA
TYLMI	4	1.6	1.6	2.0	2.5	3.0	0.9	100%	NA
Storm Event Samples									
EVASS	6	1.0	0.6	1.6	2.1	5.6	1.5	67%	NA
EVAMS	6	1.0	0.2	0.7	1.1	3.4	0.9	50%	NA
MONM	6	1.0	0.9	1.6	2.4	4.1	1.5	67%	NA
MONMN	6	1.0	0.5	1.3	1.7	8.7	1.2	67%	NA
MONMS	6	1.0	0.7	1.6	3.0	6.2	2.3	67%	NA
TOSMO	6	1.0	3.3	9.2	17.0	20.0	13.7	83%	NA
TOSMI	6	1.0	8.7	10.5	12.5	19.0	3.8	100%	NA
COLM	6	1.0	0.8	0.9	1.1	1.4	0.4	33%	NA
SEIMN	6	1.0	0.1	0.3	0.8	2.0	0.7	33%	NA
SEIMS	6	1.0	0.9	1.4	1.8	2.8	0.9	50%	NA
COUMO	6	1.0	3.2	4.2	6.7	8.8	3.5	83%	NA
COUMI	6	2.6	3.5	4.1	8.0	11.0	4.6	100%	NA
TYLMO	6	1.5	4.9	7.1	9.1	13.0	4.2	100%	NA
TYLMI	6	4.1	5.6	6.3	8.1	13.0	2.5	100%	NA

ug/L: microgram/liter

NA: not applicable

Table H-12. Summary Statistics for Dissolved Zinc Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (ug/L)	25th Percentile (ug/L)	Median (ug/L)	75th Percentile (ug/L)	Maximum (ug/L)	Interquartile Range (ug/L)	Percent Detected	Percent Exceeding Standard ^a
Base Flow Samples									
EVALSS	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
EVAMS	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
MONM	4	5.0	7.3	7.9	8.4	9.1	1.1	75%	0%
MONMN	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
MONMS	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
TOSMO	4	5.0	2.2	3.8	5.9	8.1	3.6	50%	0%
TOSMI	4	7.9	10.2	11.5	13.5	18.0	3.3	100%	0%
COLM	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
SEIMN	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
SEIMS	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
COUMO	4	5.0	5.6	5.6	5.6	5.6	0.0	25%	0%
COUMI	4	5.0	6.5	7.3	8.1	10.0	1.5	75%	0%
TYLMO	4	5.0	6.2	7.2	8.4	9.4	2.3	50%	0%
TYLMI	4	5.0	12.0	12.0	12.0	12.0	0.0	25%	0%
Storm Event Samples									
EVALSS	6	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
EVAMS	6	5.0	7.5	7.5	7.5	7.5	0.0	17%	0%
MONM	6	5.0	6.8	8.0	10.4	16.0	3.5	83%	0%
MONMN	6	5.0	5.6	5.6	5.6	5.6	0.0	17%	0%
MONMS	6	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
TOSMO	6	5.0	7.8	10.2	14.0	140.0	6.3	83%	17%
TOSMI	6	7.3	23.5	26.5	28.8	230.0	5.3	100%	17%
COLM	6	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
SEIMN	6	5.0	5.0	5.0	5.0	5.0	0.0	0%	0%
SEIMS	6	5.0	6.7	6.7	6.7	6.7	0.0	17%	0%
COUMO	6	6.1	10.3	11.0	23.0	79.0	12.8	100%	0%
COUMI	6	5.0	7.2	9.2	11.3	14.0	4.1	67%	0%
TYLMO	6	5.0	7.3	11.5	12.8	26.0	5.5	83%	0%
TYLMI	6	5.0	3.1	6.6	10.9	24.0	7.9	67%	0%

ug/L: microgram/liter

NA: not applicable

^a Percentage of samples that exceed that applicable water quality standards for dissolved zinc from WAC 173-201A-240. Base flow and storm event concentrations were compared to the hardness dependent chronic and acute criteria, respectively, for impacts to aquatic life in freshwater.

Table H-13. Summary Statistics for Total Zinc Concentrations Measured in Storm Event and Base Flow Samples.

Station	n	Minimum (ug/L)	25th Percentile (ug/L)	Median (ug/L)	75th Percentile (ug/L)	Maximum (ug/L)	Interquartile Range (ug/L)	Percent Detected	Percent Exceeding Standard
Base Flow Samples									
VALSS	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	NA
EVAMS	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	NA
MONM	4	7.8	8.3	8.5	10.5	16.0	2.2	100%	NA
MONMN	4	5.0	5.7	5.7	5.7	5.7	0.0	25%	NA
MONMS	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	NA
TOSMO	4	5.0	5.2	6.4	7.5	8.9	2.3	75%	NA
TOSMI	4	12.0	12.8	13.5	16.3	23.0	3.5	100%	NA
COLM	4	5.0	6.0	6.0	6.0	6.0	0.0	25%	NA
SEIMN	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	NA
SEIMS	4	5.0	5.0	5.0	5.0	5.0	0.0	0%	NA
COUMO	4	5.3	6.1	6.5	8.2	13.0	2.1	100%	NA
COUMI	4	6.0	10.5	12.0	13.5	18.0	3.0	100%	NA
TYLMO	4	5.0	11.0	11.0	11.0	11.0	0.0	50%	NA
TYLMI	4	5.0	17.0	17.0	17.0	17.0	0.0	25%	NA
Storm Event Samples									
VALSS	6	5.0	3.7	6.2	9.9	16.0	6.2	67%	NA
EVAMS	6	5.0	4.5	5.6	8.1	11.0	3.6	33%	NA
MONM	6	6.3	17.3	20.0	27.3	82.0	10.0	100%	NA
MONMN	6	7.8	9.1	11.9	15.5	110.0	6.5	100%	NA
MONMS	6	5.0	2.7	4.2	8.7	16.0	6.1	33%	NA
TOSMO	6	5.0	30.3	83.0	135.0	350.0	104.8	83%	NA
TOSMI	6	12.0	61.3	79.5	110.5	550.0	49.3	100%	NA
COLM	6	5.0	5.0	5.0	5.0	5.0	0.0	0%	NA
SEIMN	6	5.0	3.8	4.2	4.8	5.5	1.0	33%	NA
SEIMS	6	5.0	5.6	6.6	6.8	8.3	1.2	67%	NA
COUMO	6	6.3	21.0	40.0	53.8	70.0	32.8	100%	NA
COUMI	6	11.0	30.5	33.5	41.0	55.0	10.5	100%	NA
TYLMO	6	7.0	16.8	24.0	26.8	36.0	10.0	100%	NA
TYLMI	6	12.0	20.3	23.5	30.5	38.0	10.3	100%	NA

ug/L: microgram/liter

NA: not applicable

APPENDIX I

Box and Whisker Plots Showing Pollutant Concentrations Measured in Storm Event and Base Flow Samples

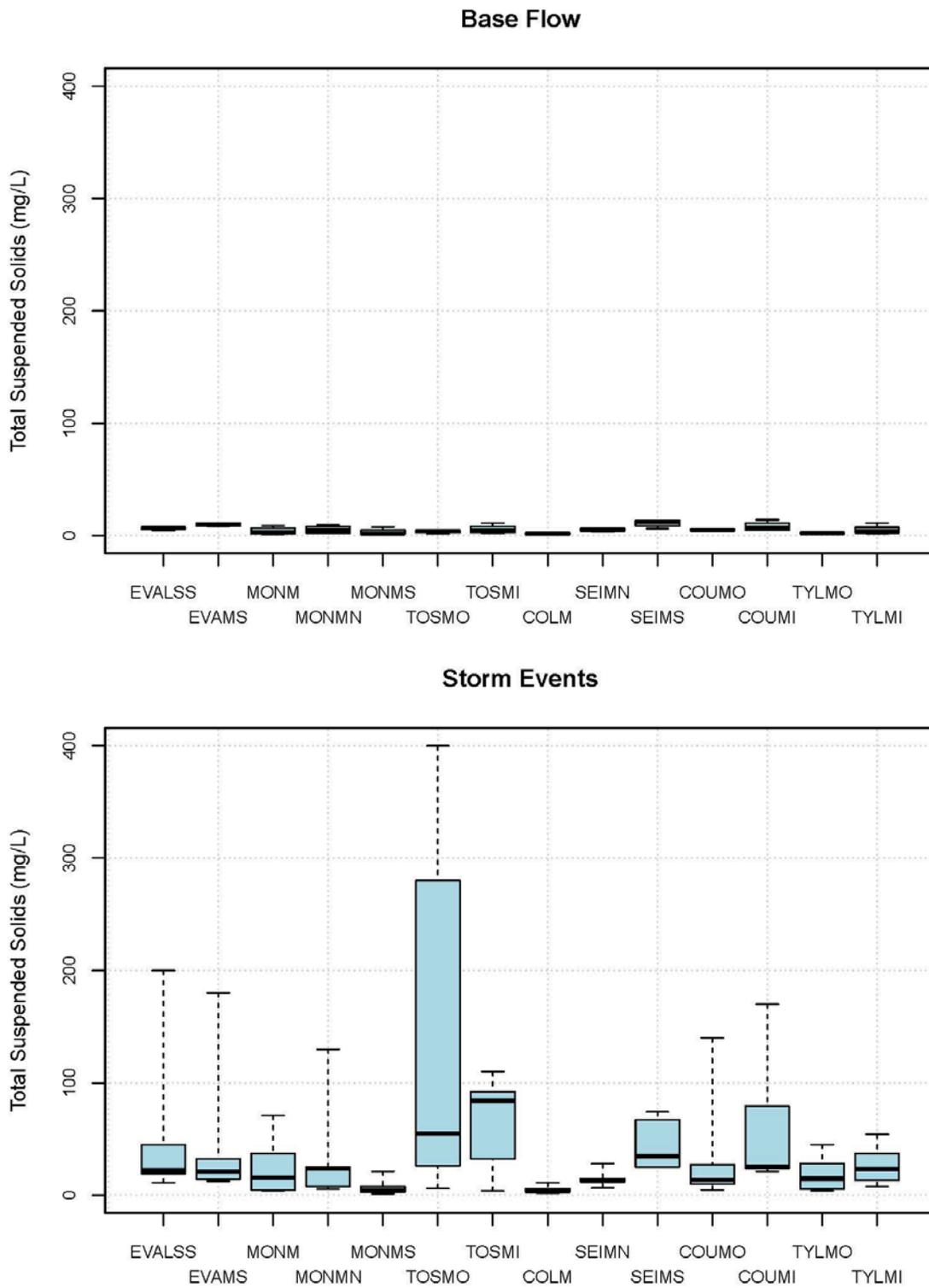


Figure I-1. Total Suspended Solids Concentrations Measured in Base Flow and Storm Event Samples.

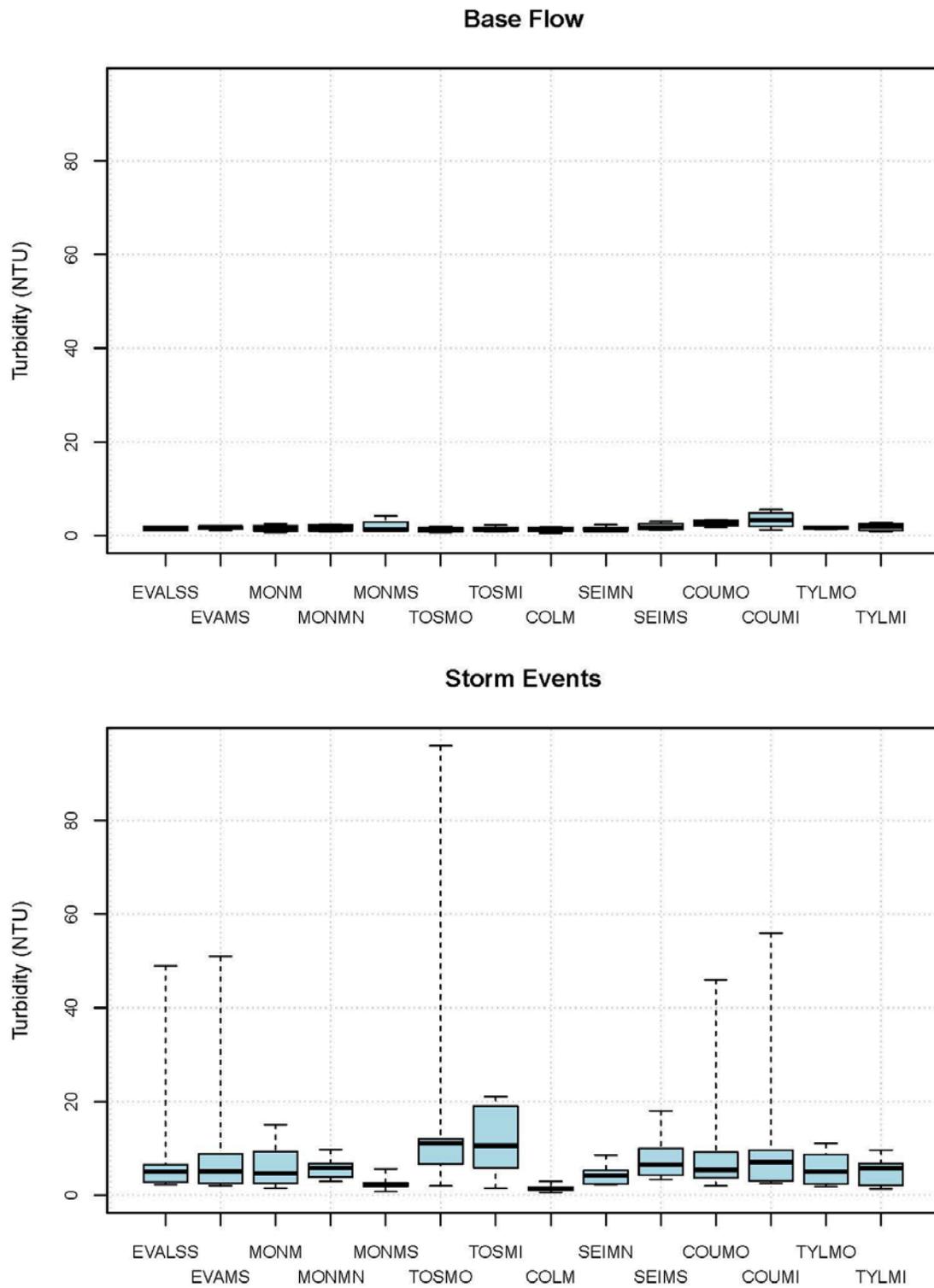


Figure I-2. Turbidity Levels Measured in Base Flow and Storm Event Samples.

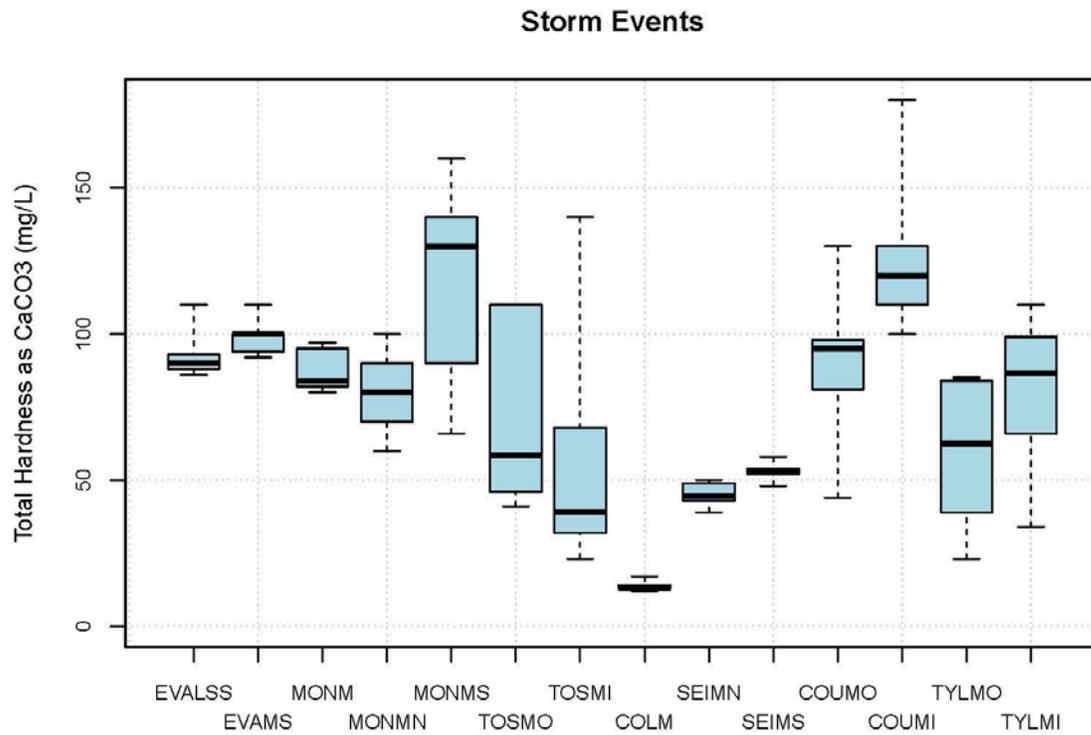
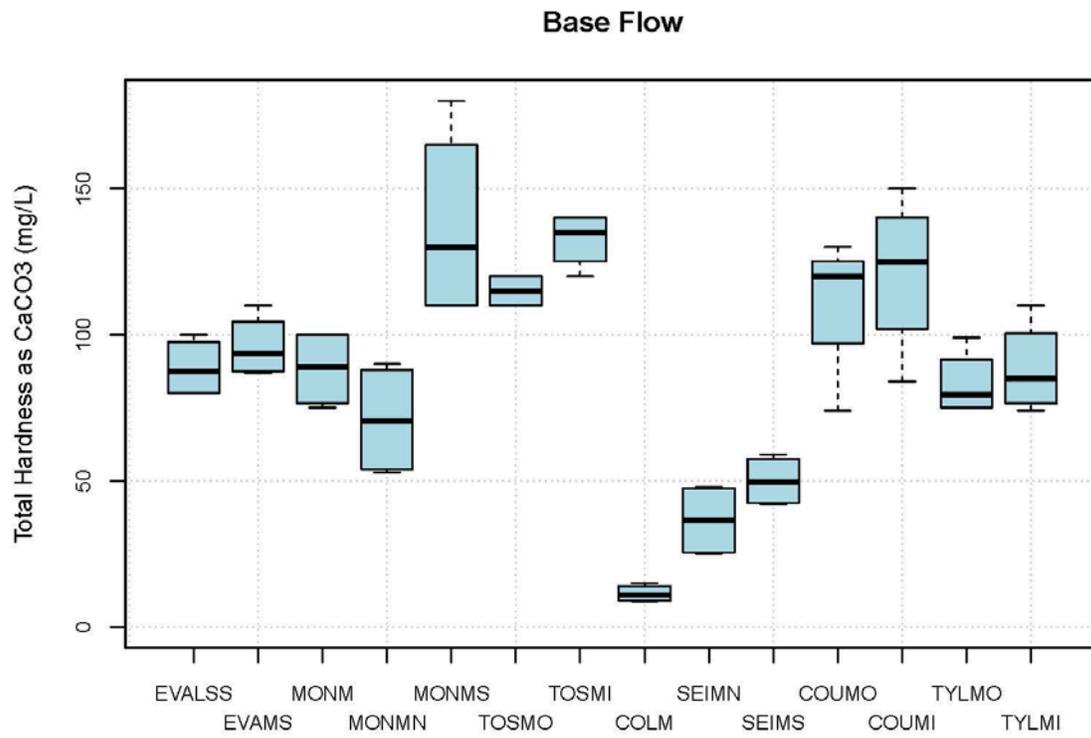


Figure I-3. Total Hardness Concentrations Measured in Base Flow and Storm Event Samples.

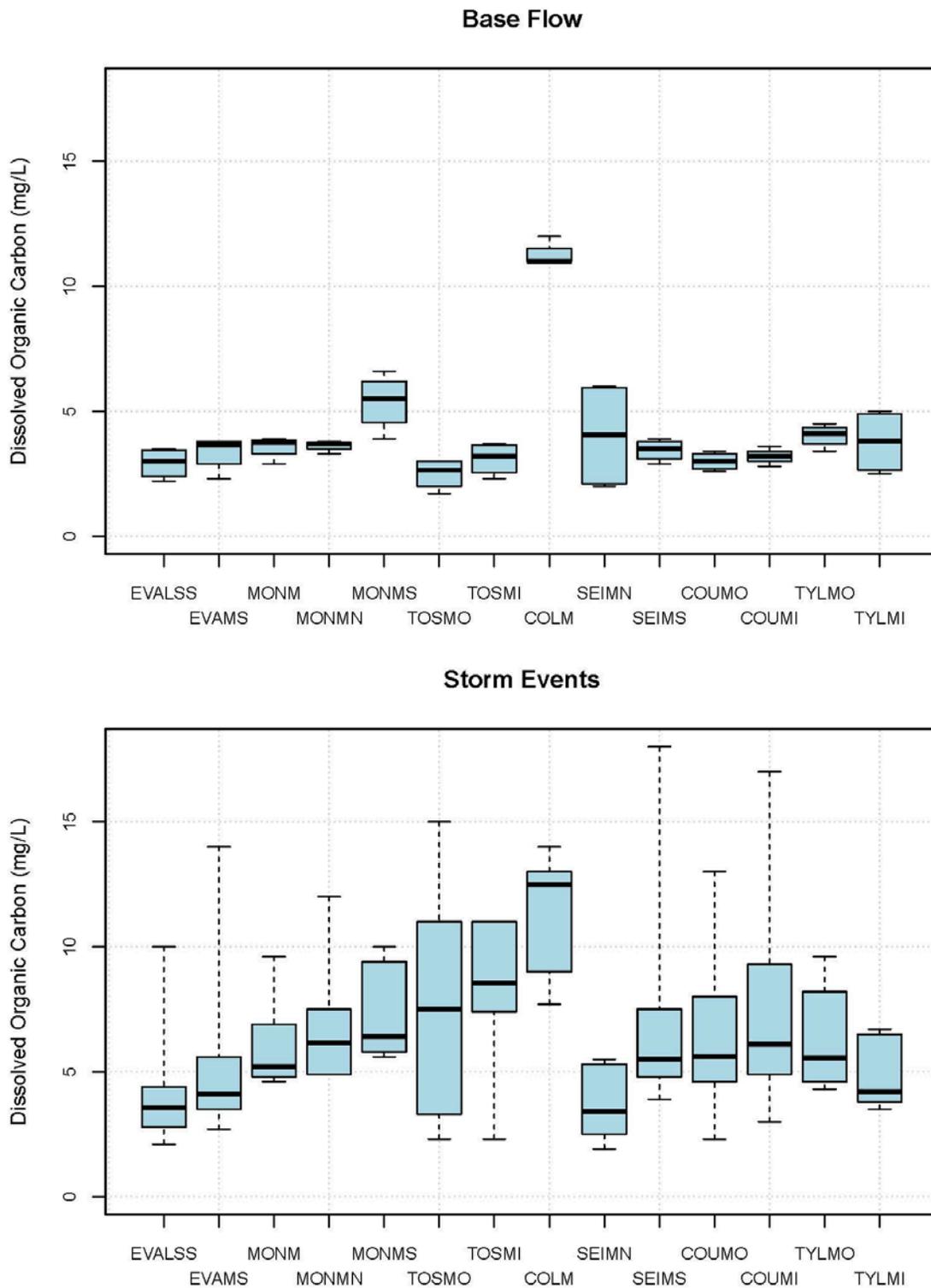


Figure I-4. Dissolved Organic Carbon Concentrations Measured in Base Flow and Storm Event Samples.

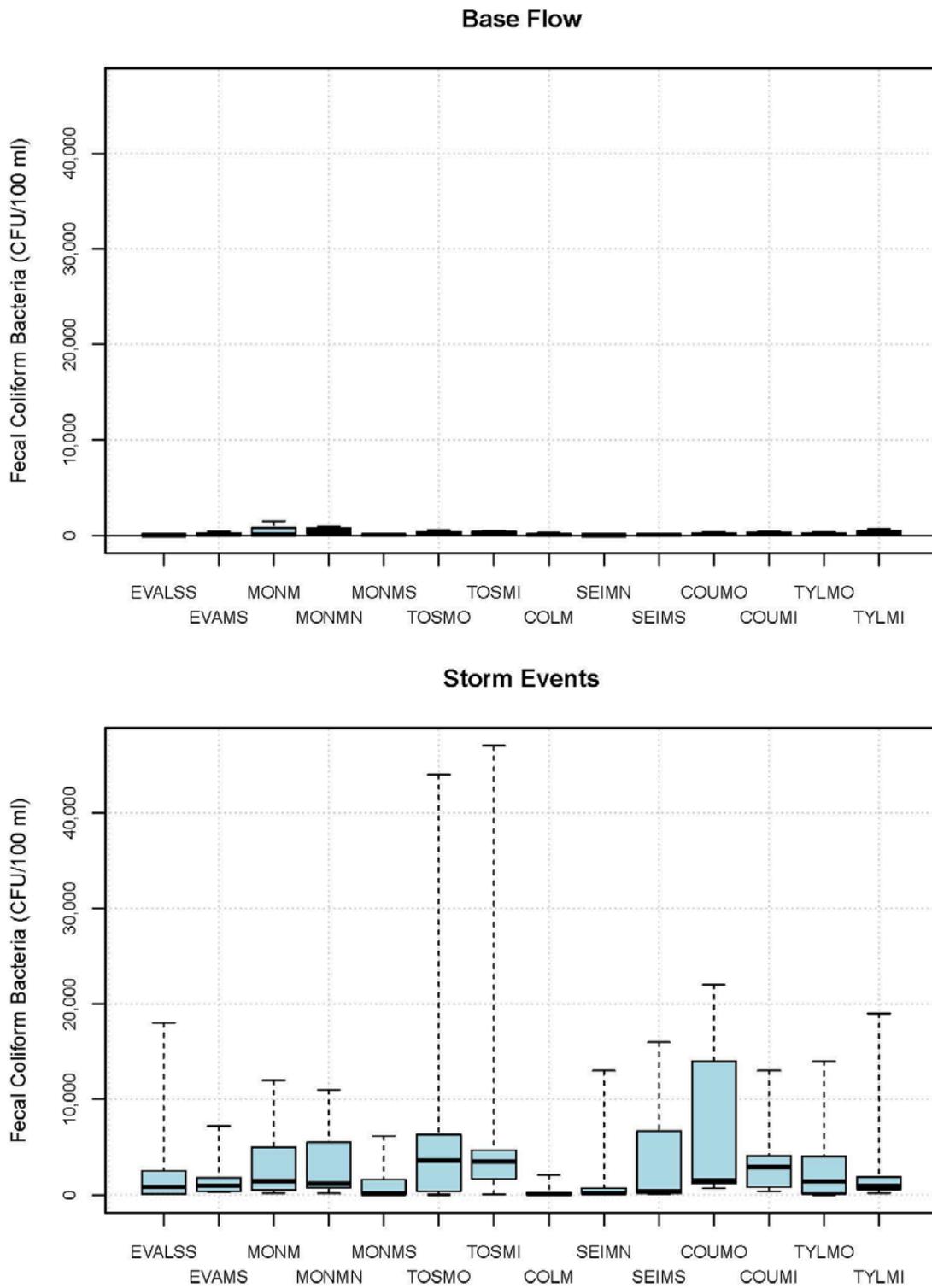


Figure I-5. Fecal Coliform Bacteria Concentrations Measured in Base Flow and Storm Event Samples.

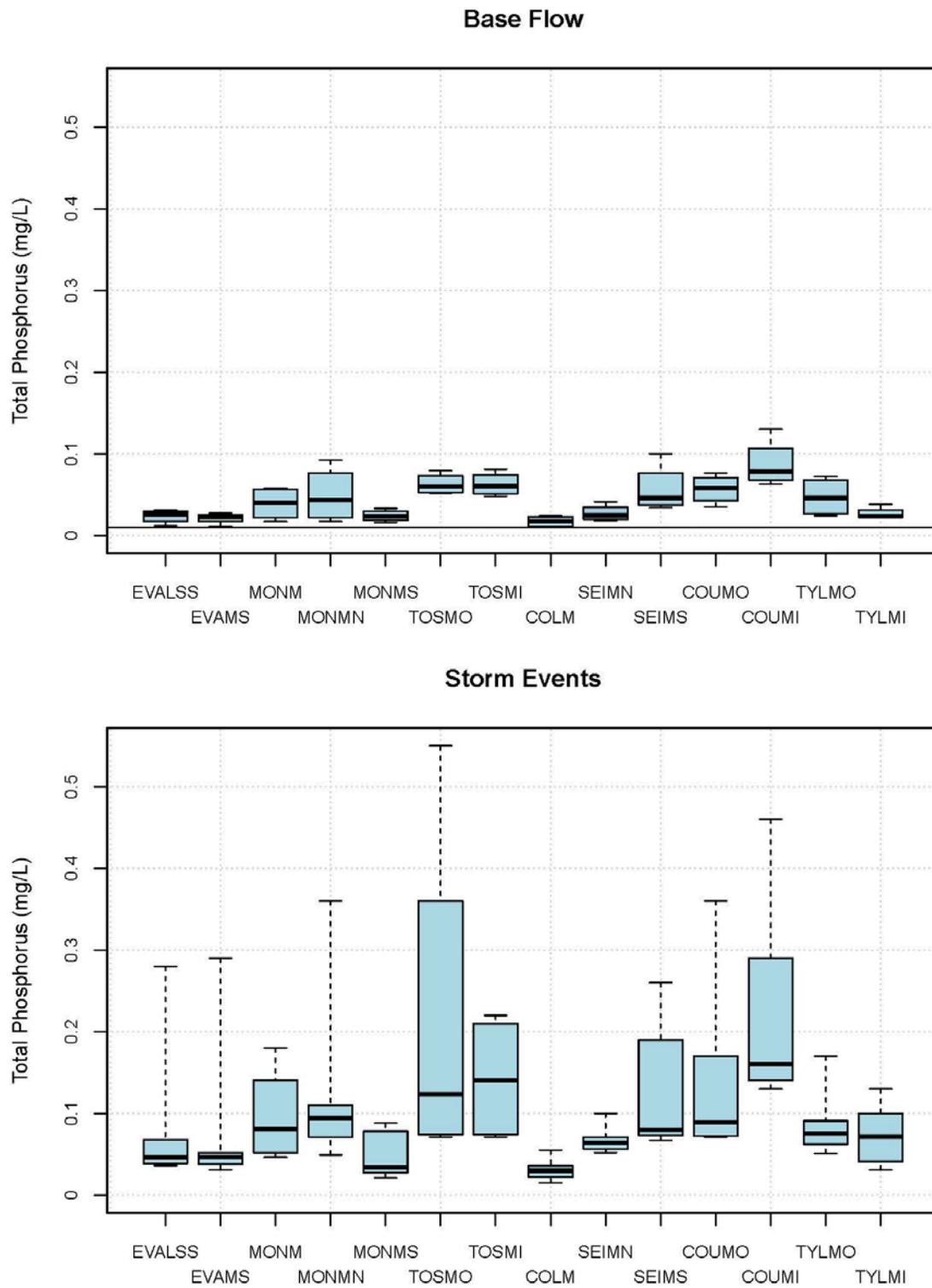


Figure I-6. Total Phosphorus Concentrations Measured in Base Flow and Storm Event Samples.

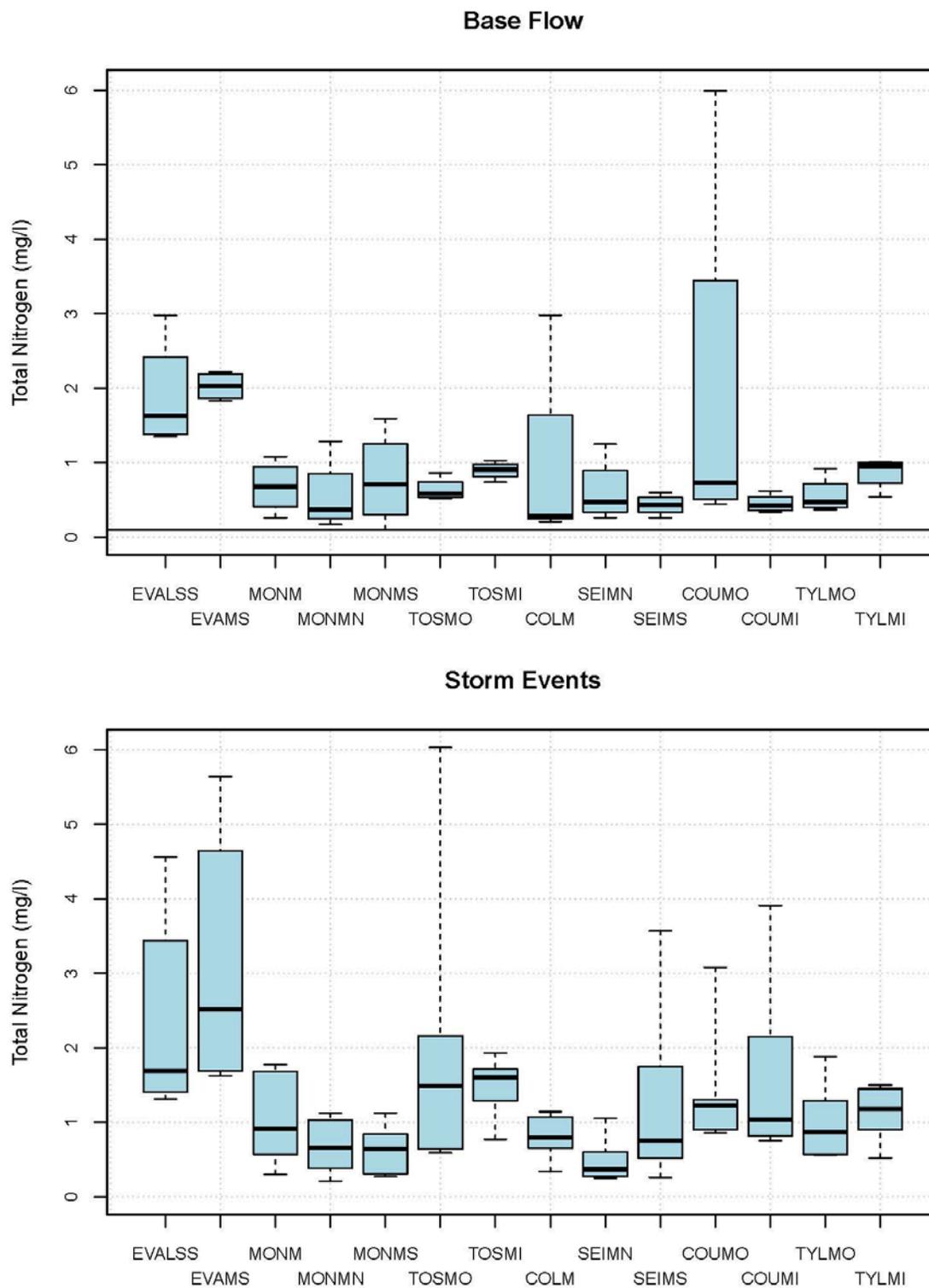


Figure I-7. Total Nitrogen Concentrations Measured in Base Flow and Storm Event Samples.

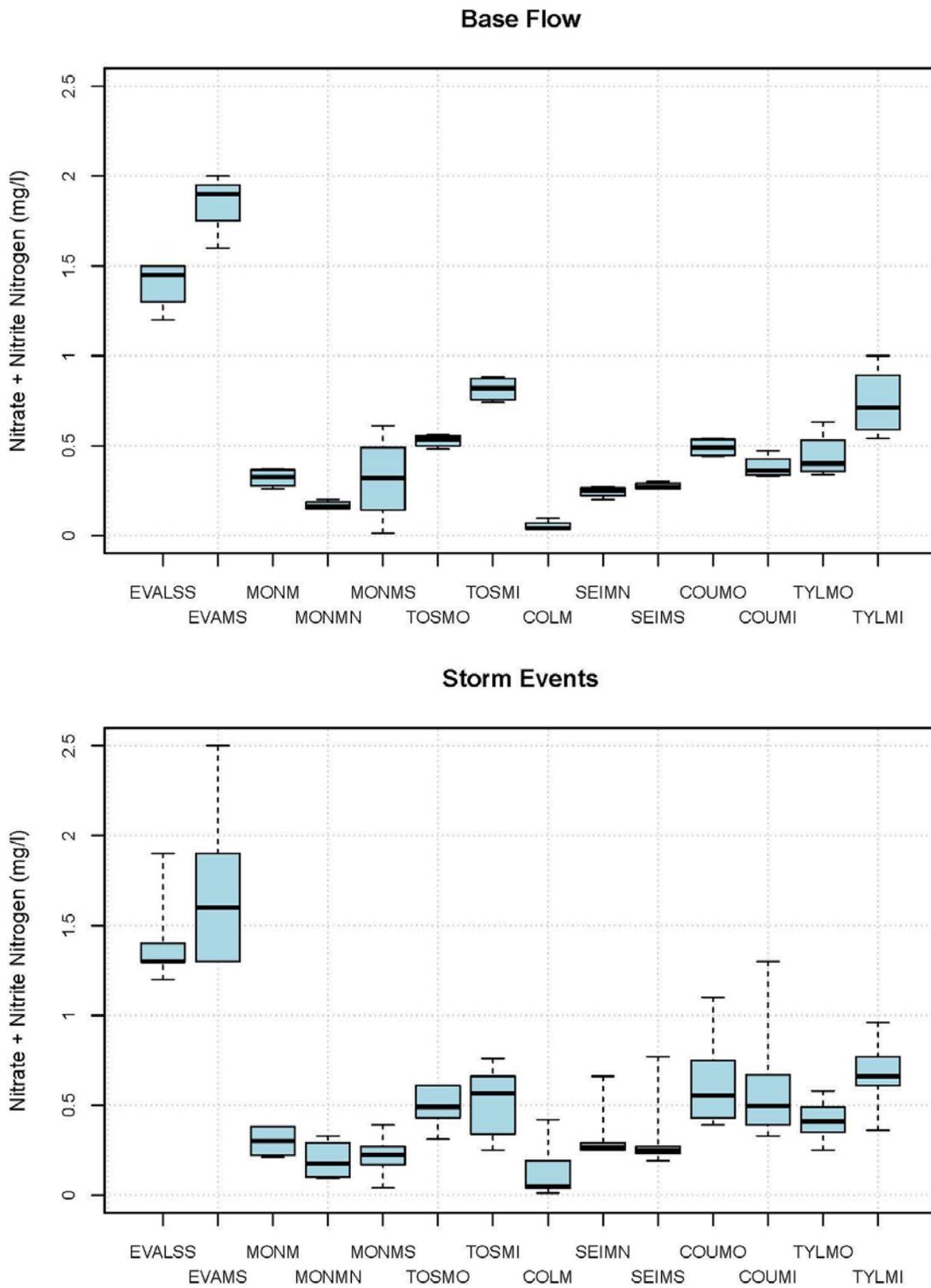


Figure I-8. Nitrate + Nitrite Nitrogen Concentrations Measured in Base Flow and Storm Event Samples.

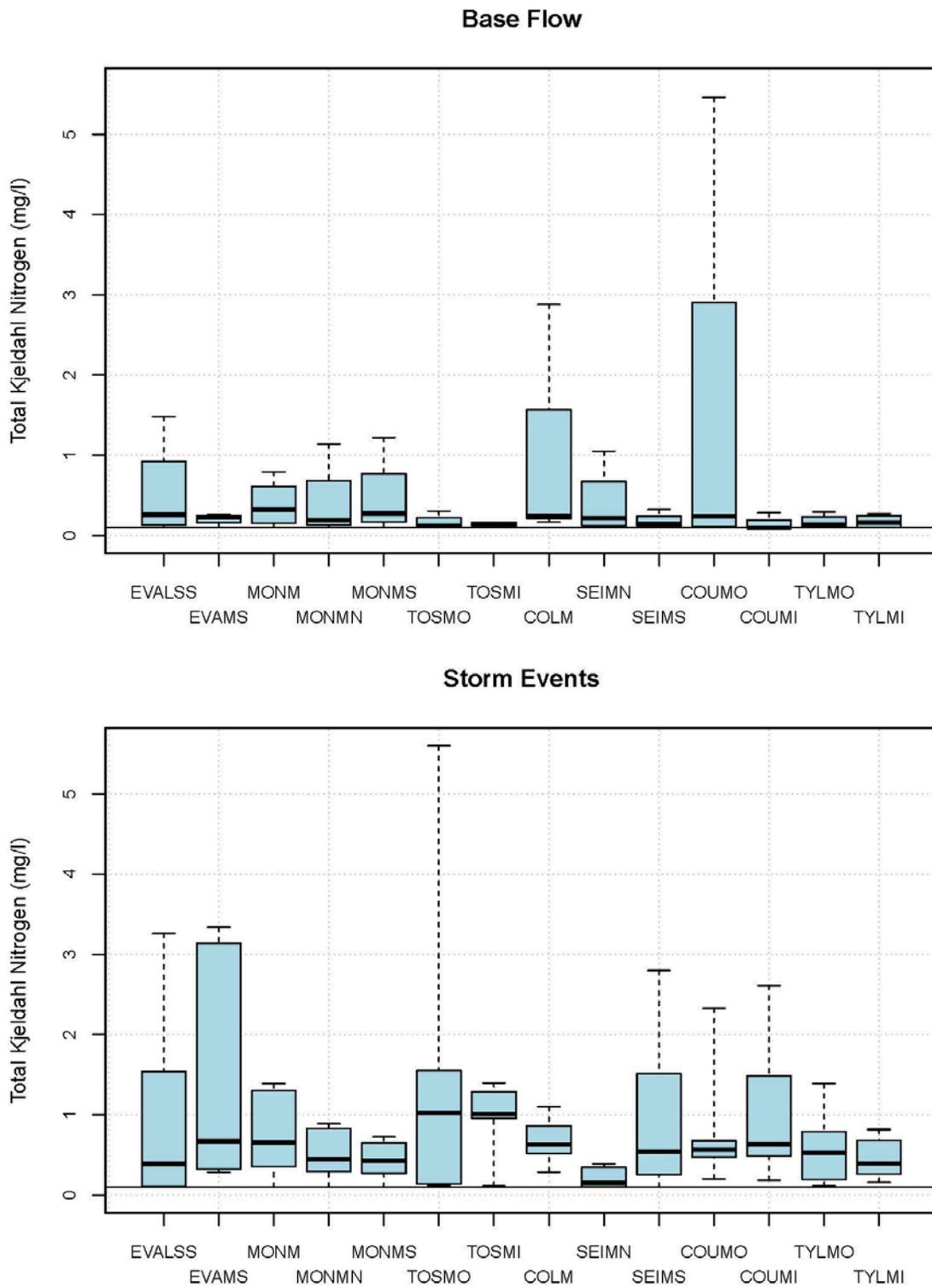


Figure I-9. Total Kjeldahl Nitrogen Concentrations Measured in Base Flow and Storm Event Samples.

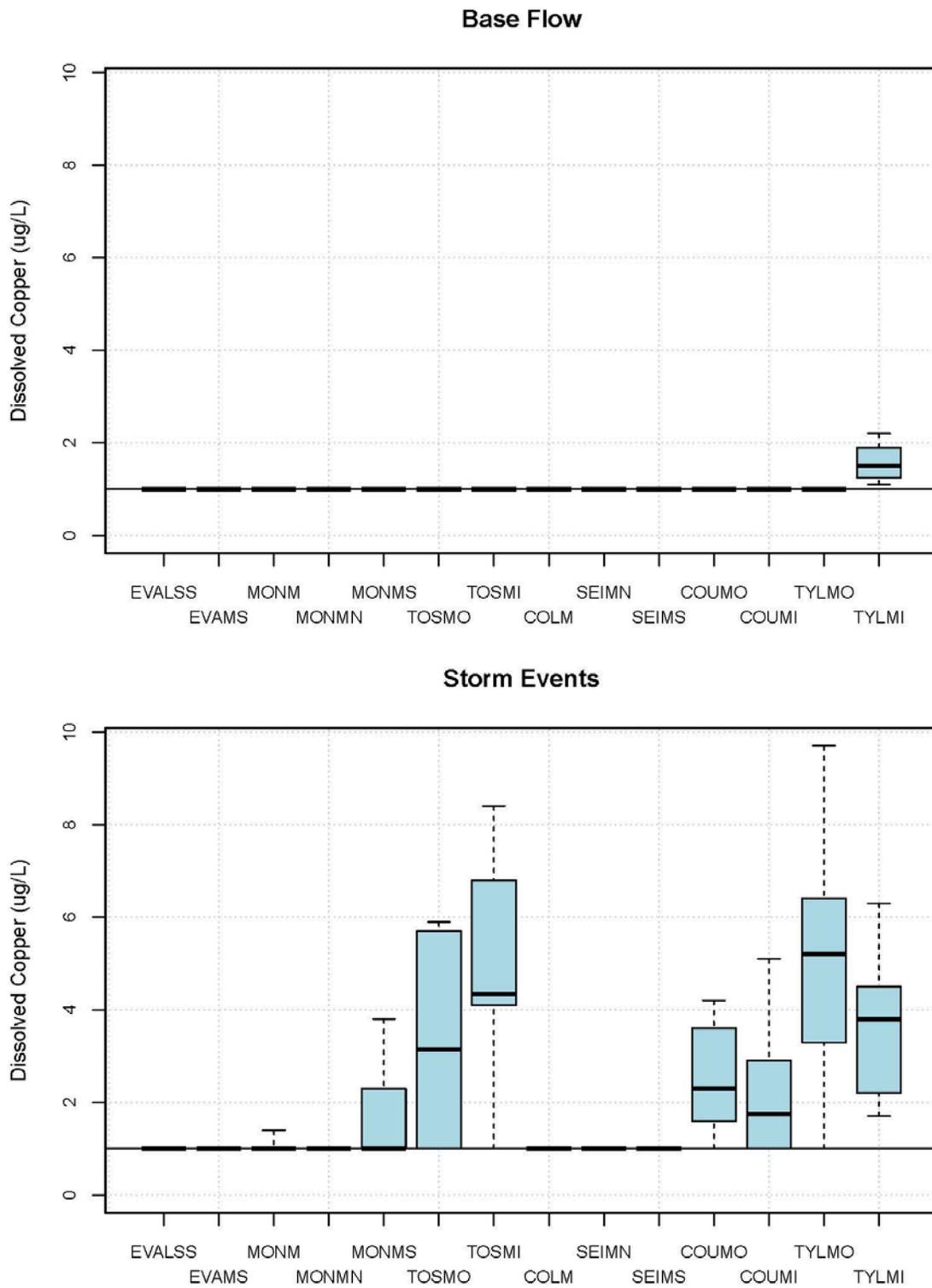


Figure I-10. Dissolved Copper Concentrations Measured in Base Flow and Storm Event Samples.

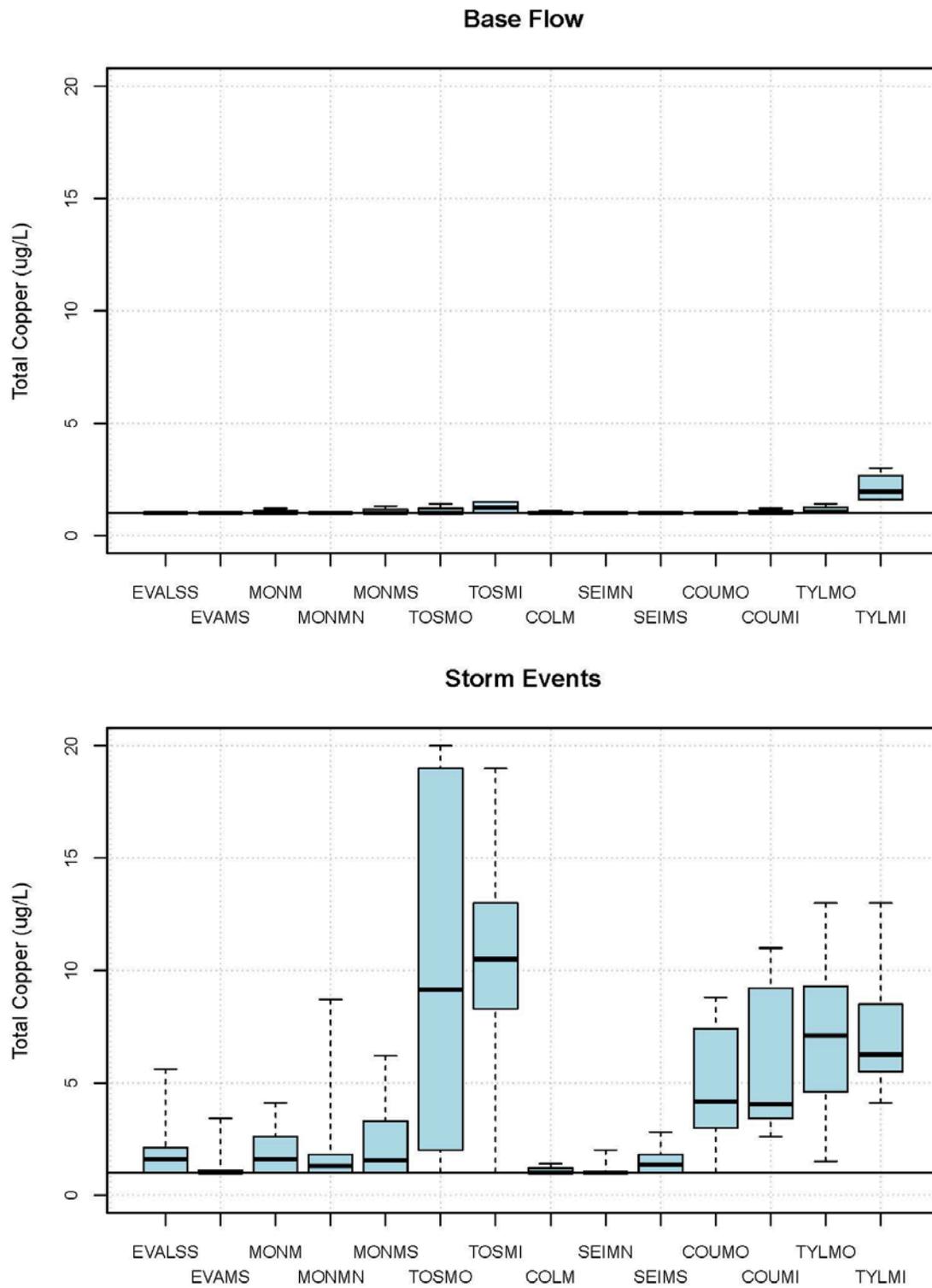


Figure I-11. Total Copper Concentrations Measured in Base Flow and Storm Event Samples.

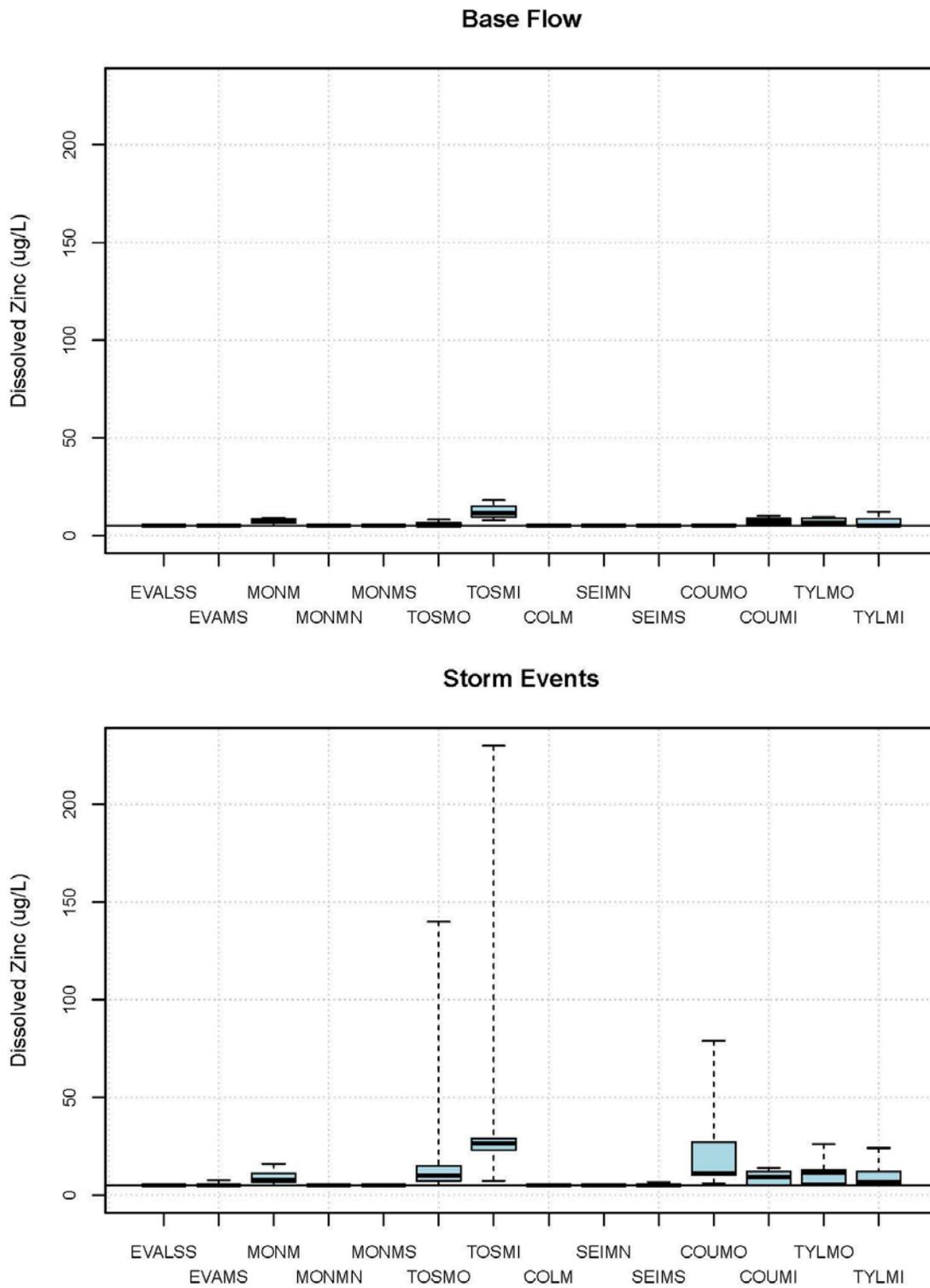


Figure I-12. Dissolved Zinc Concentrations Measured in Base Flow and Storm Event Samples.

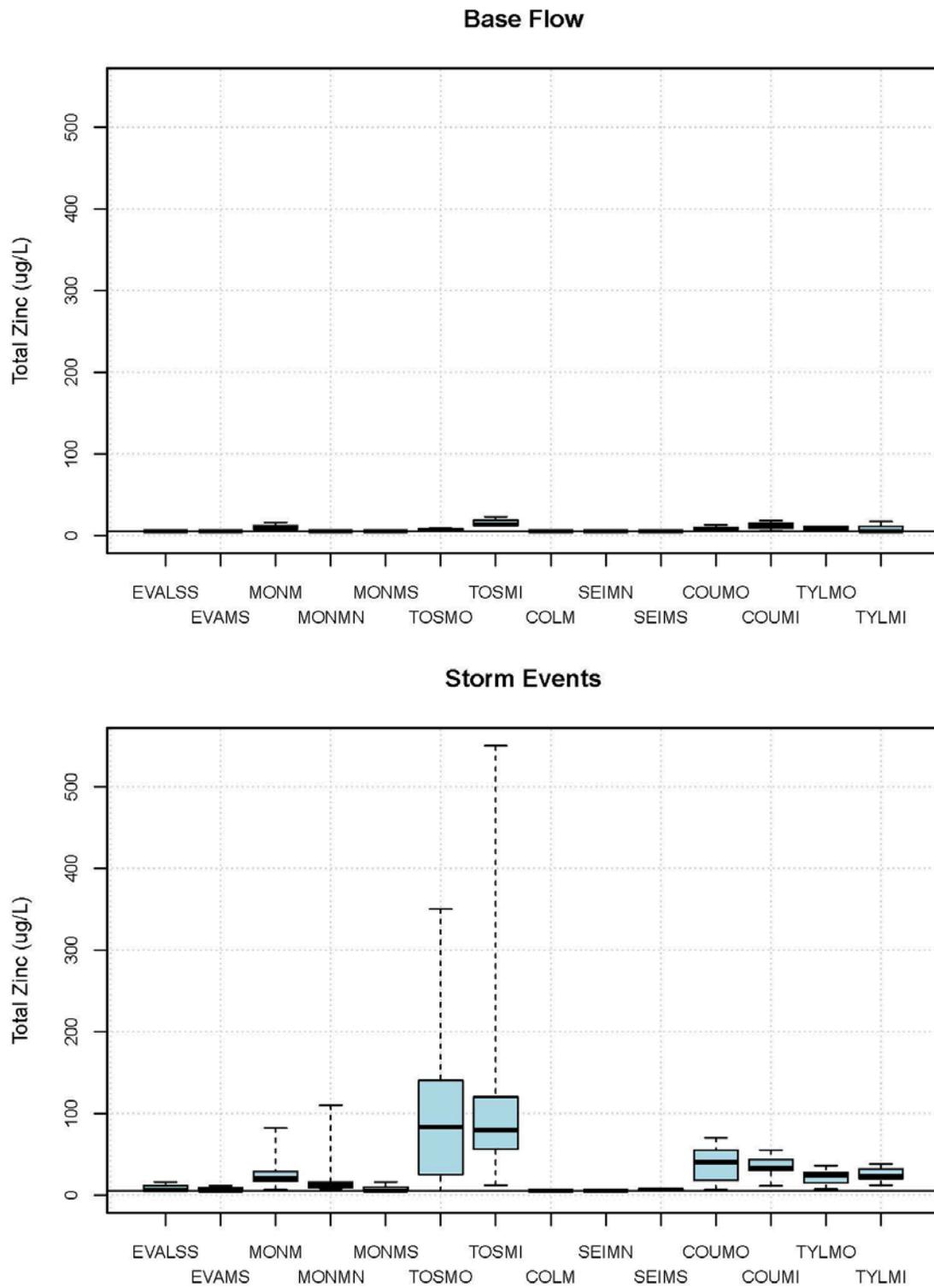


Figure I-13. Total Zinc Concentrations Measured in Base Flow and Storm Event Samples.

APPENDIX J

Line Plots Showing Continuous Temperature Data

EVALSS

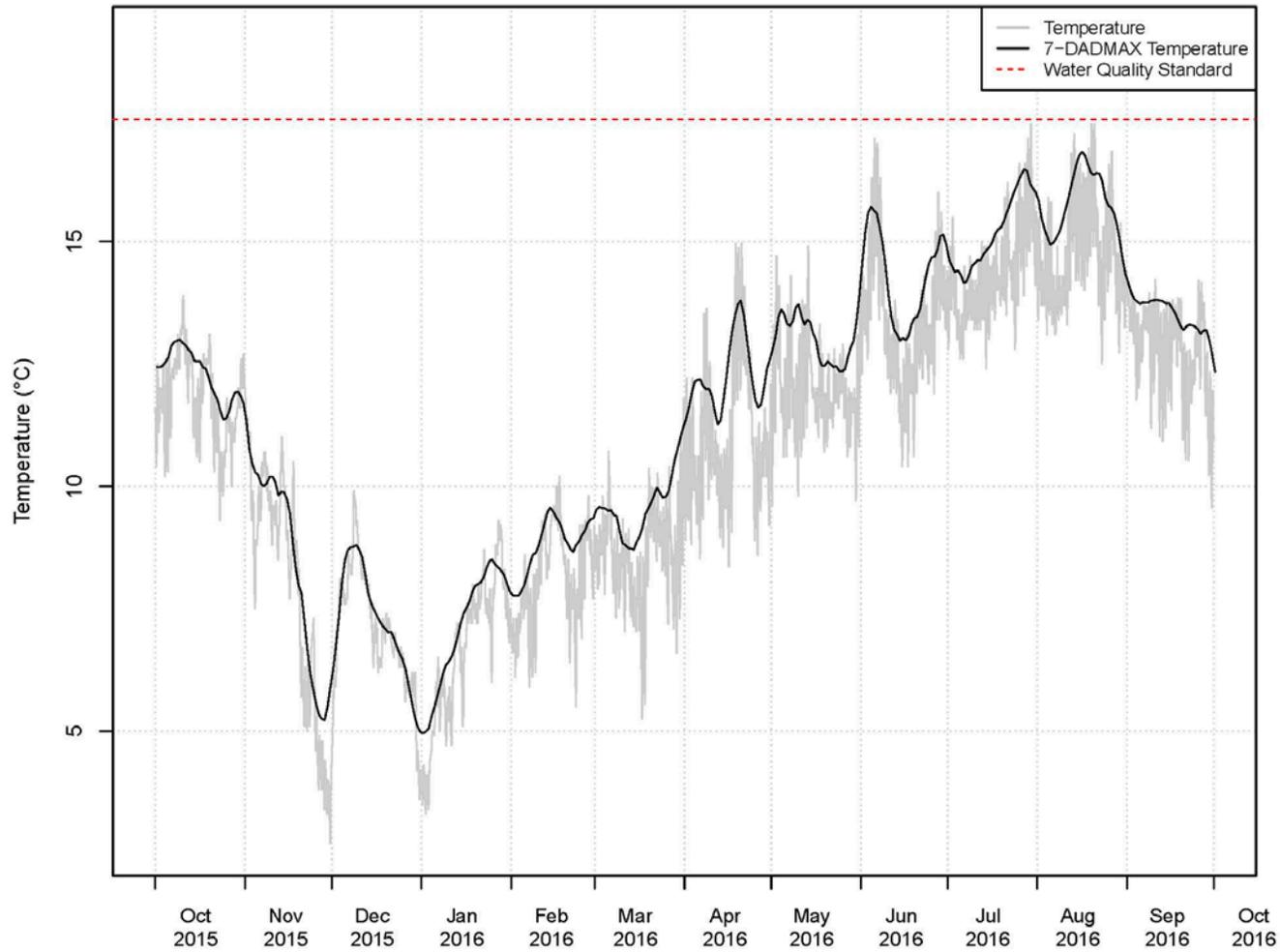


Figure J-1. Continuous Temperature and 7-DADMAX Measured at the EVALSS Station.

EVAMS

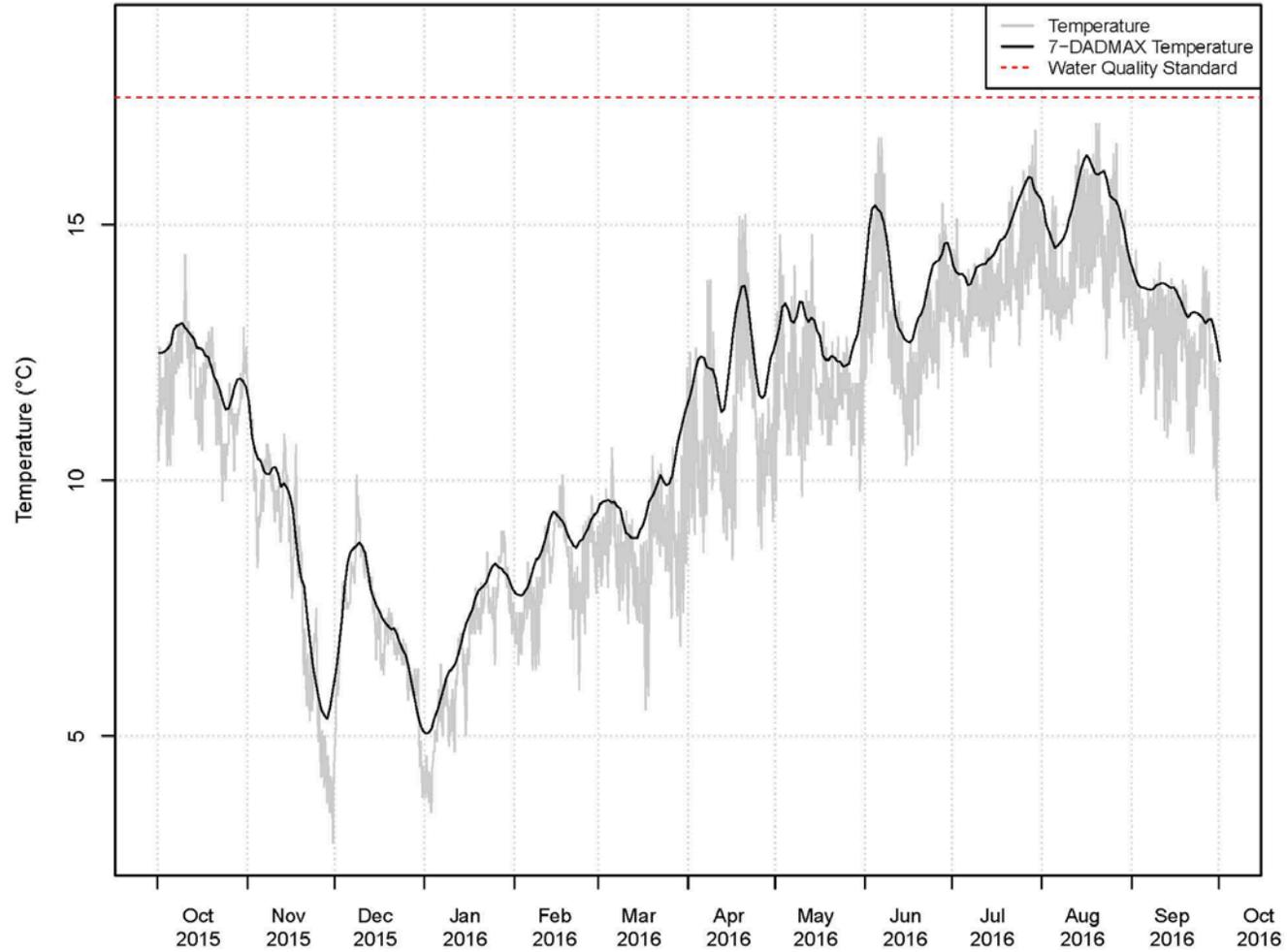


Figure J-2. Continuous Temperature and 7-DADMAX Measured at the EVAMS Station.

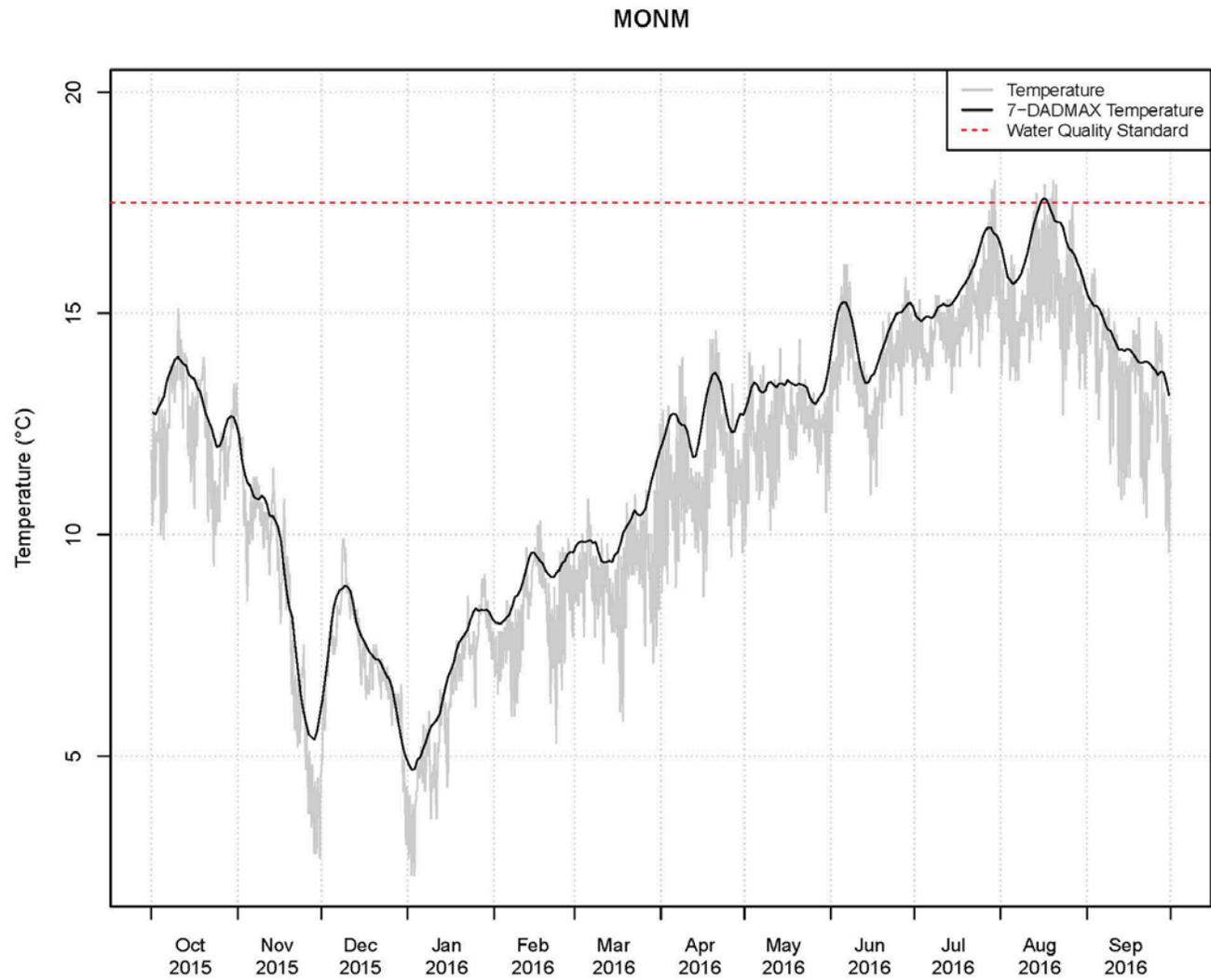


Figure J-3. Continuous Temperature and 7-DADMAX Measured at the MONM Station.

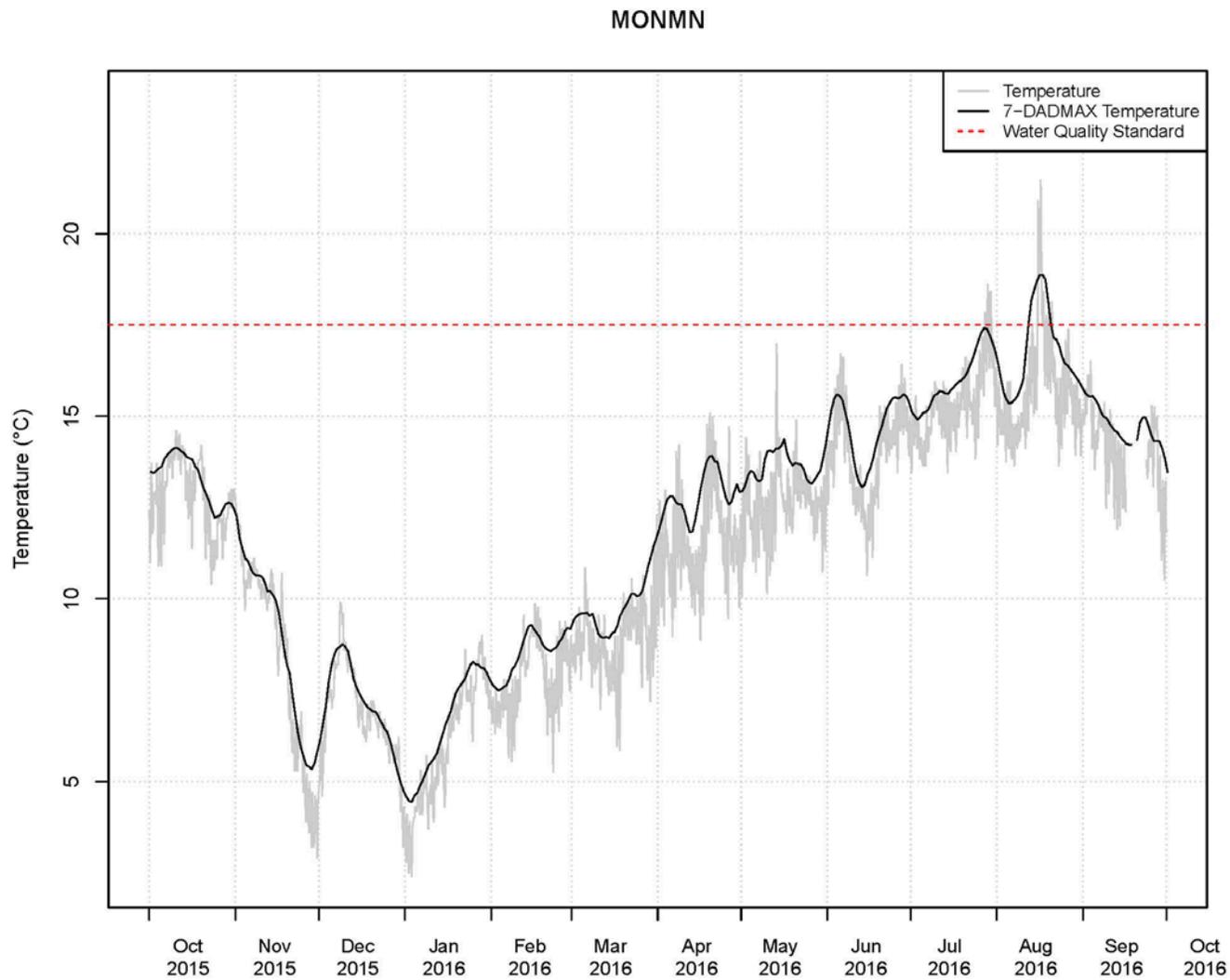


Figure J-4. Continuous Temperature and 7-DADMAX Measured at the MONMN Station.

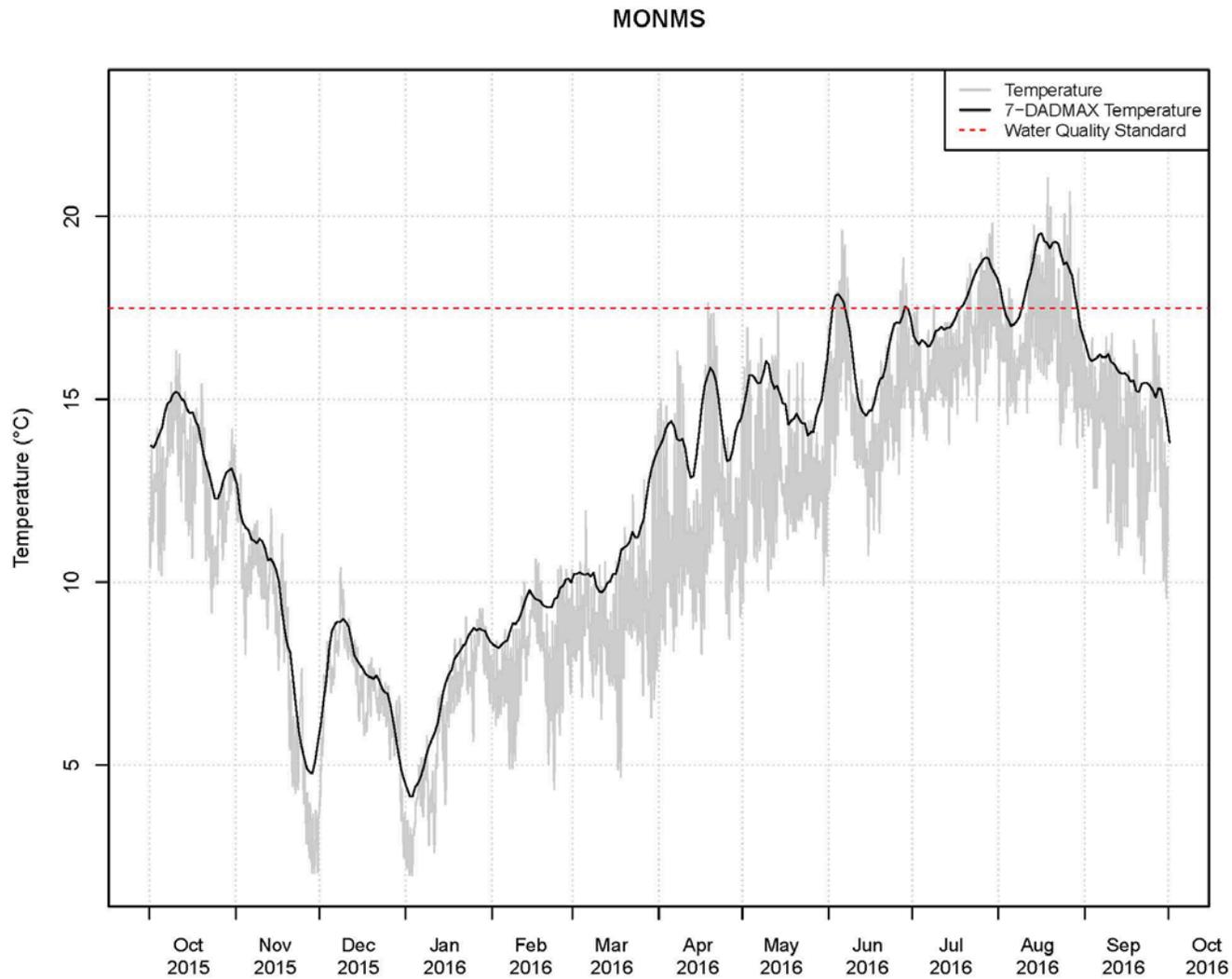


Figure J-5. Continuous Temperature and 7-DADMAX Measured at the MONMS Station.

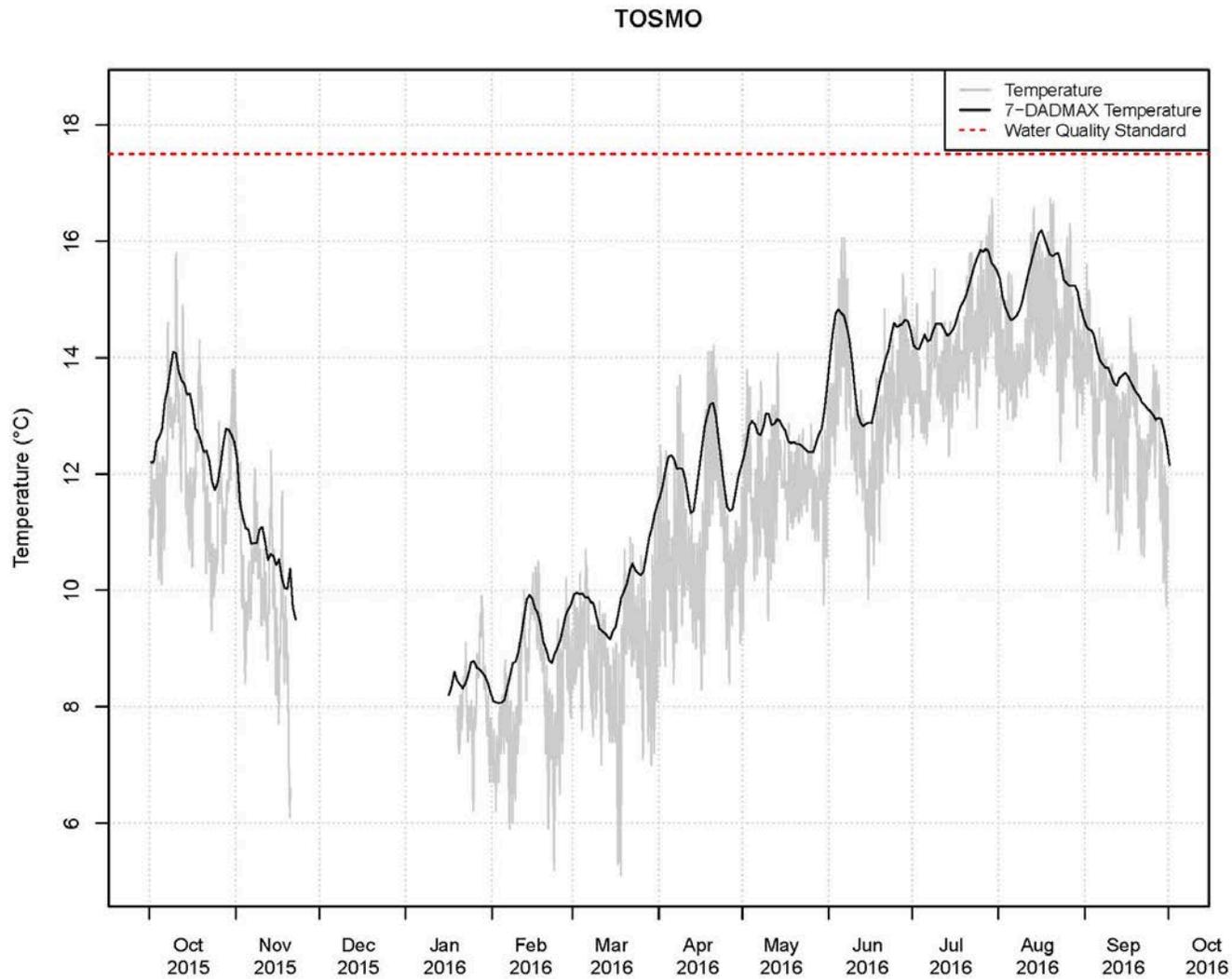


Figure J-6. Continuous Temperature and 7-DADMAX Measured at the TOSMO Station.

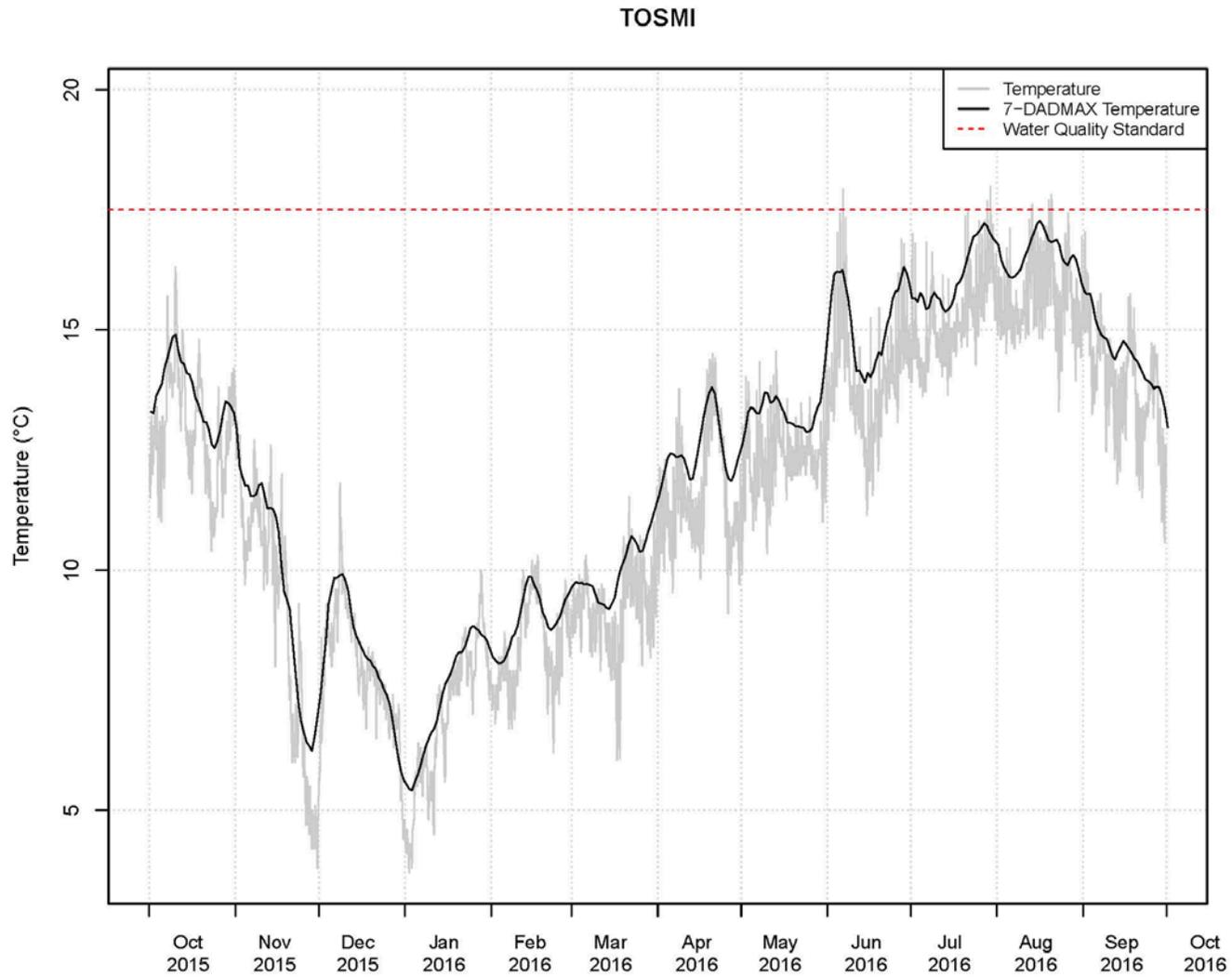


Figure J-7. Continuous Temperature and 7-DADMAX Measured at the TOSMI Station.

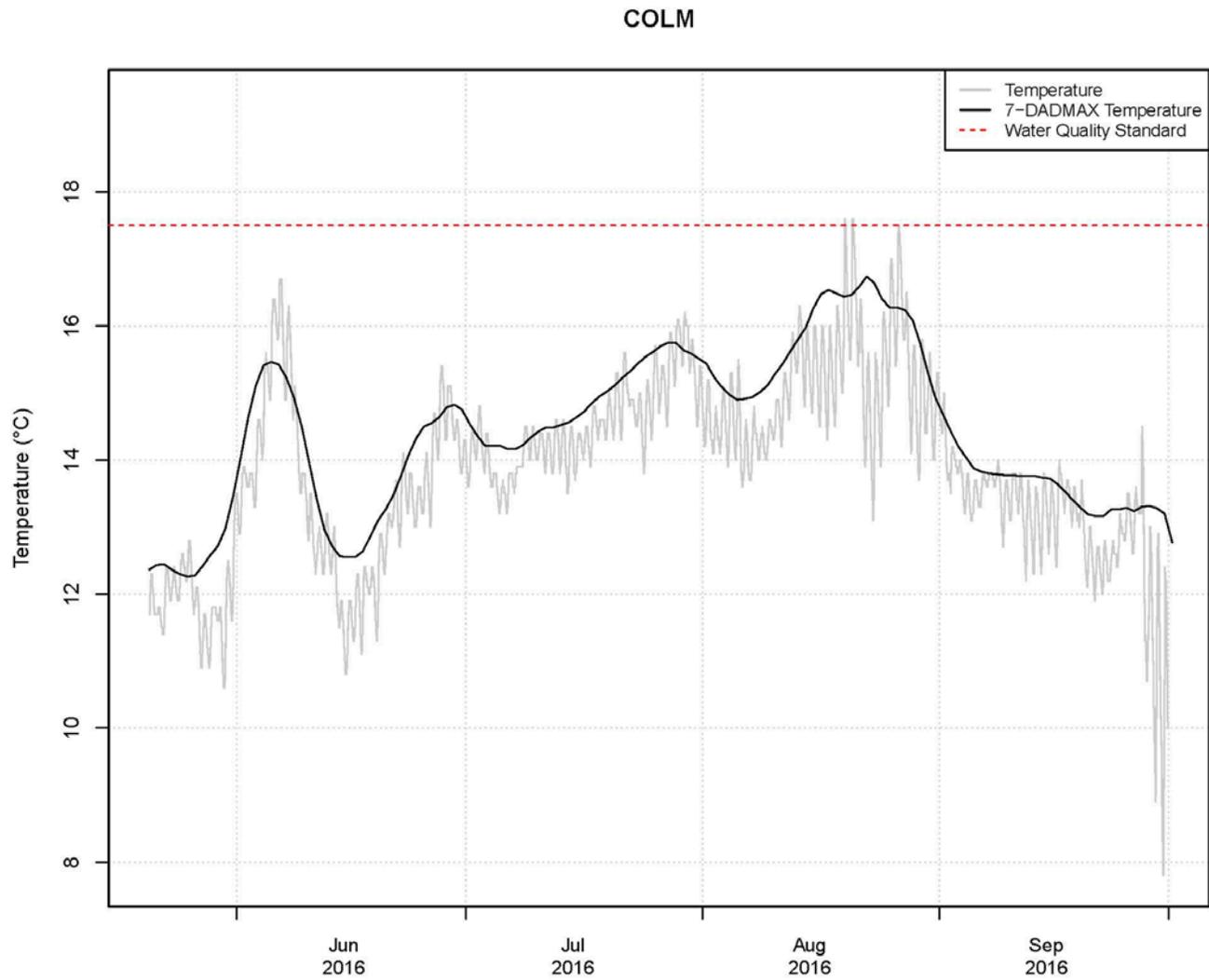


Figure J-8. Continuous Temperature and 7-DADMAX Measured at the COLM Station.

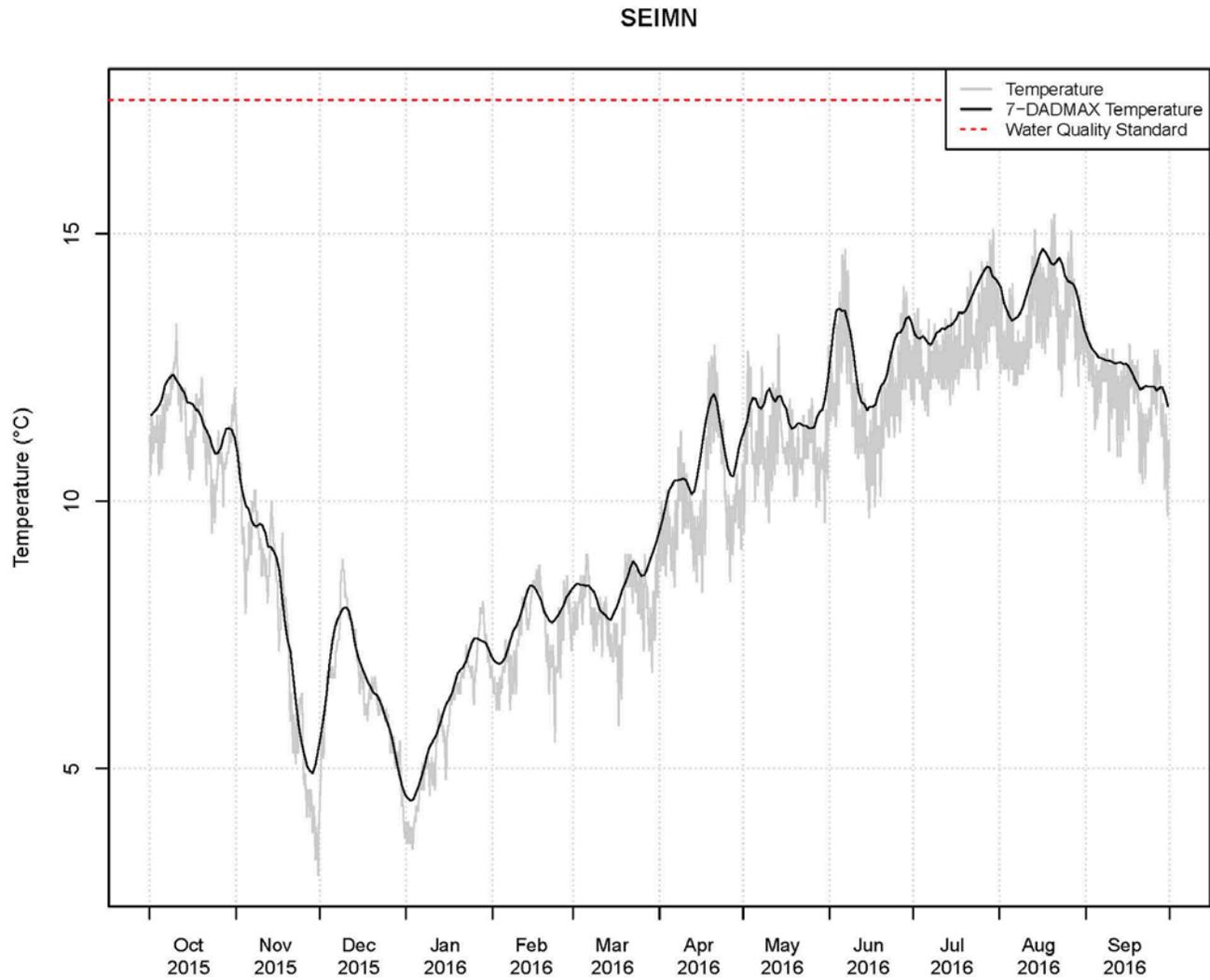


Figure J-9. Continuous Temperature and 7-DADMAX Measured at the SEIMN Station.

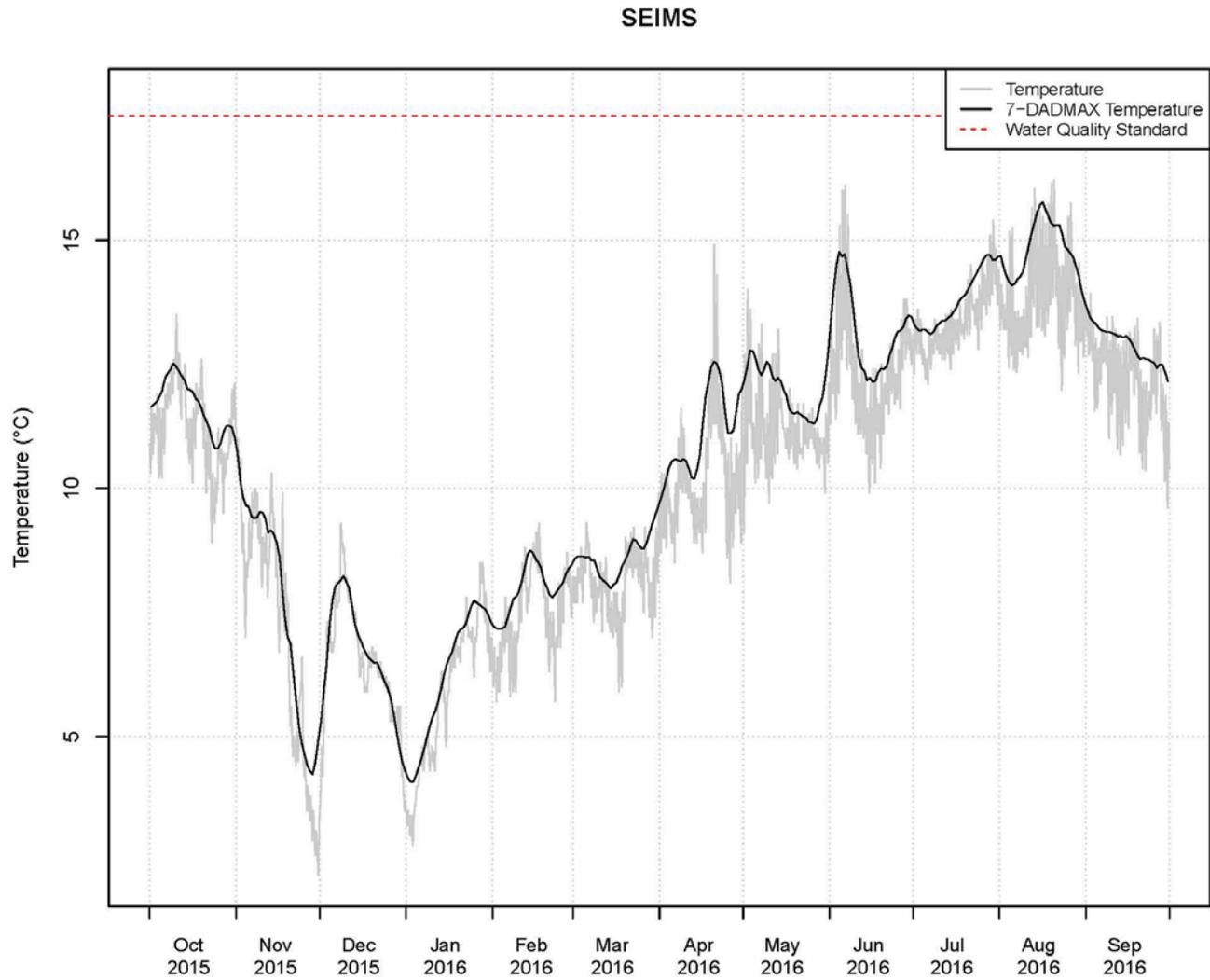


Figure J-10. Continuous Temperature and 7-DADMAX Measured at the SEIMS Station.

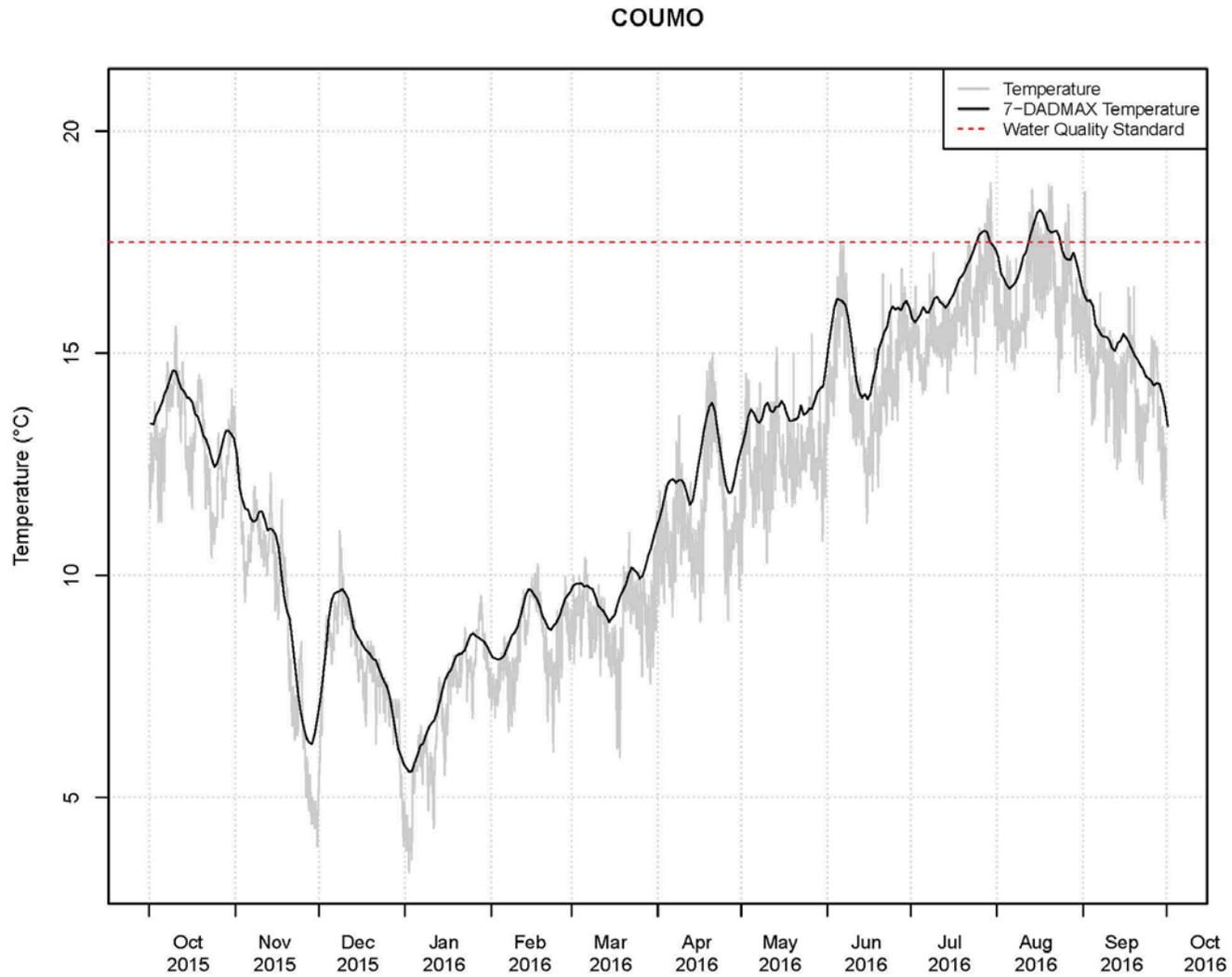


Figure J-11. Continuous Temperature and 7-DADMAX Measured at the COUMO Station.

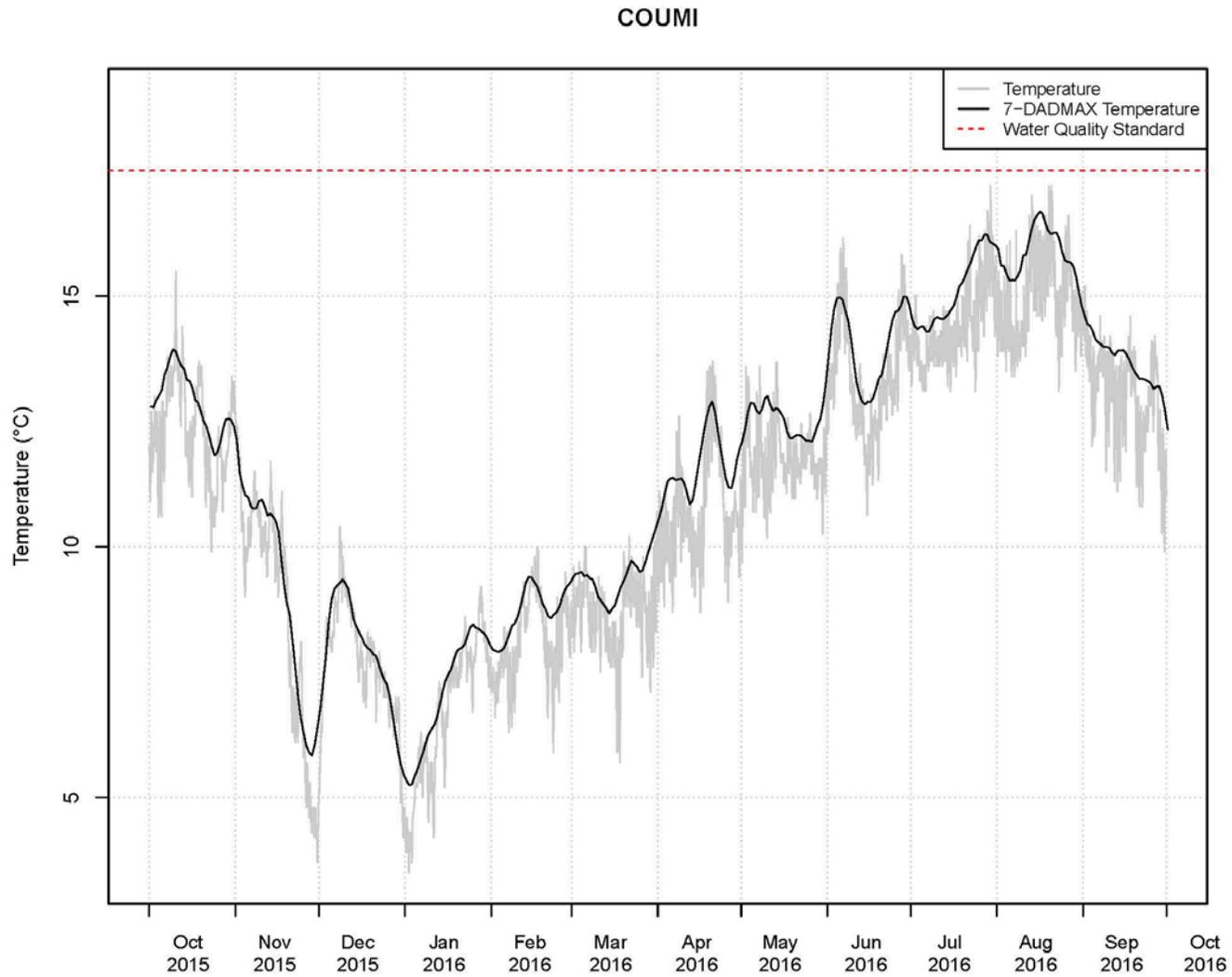


Figure J-12. Continuous Temperature and 7-DADMAX Measured at the COUMI Station.

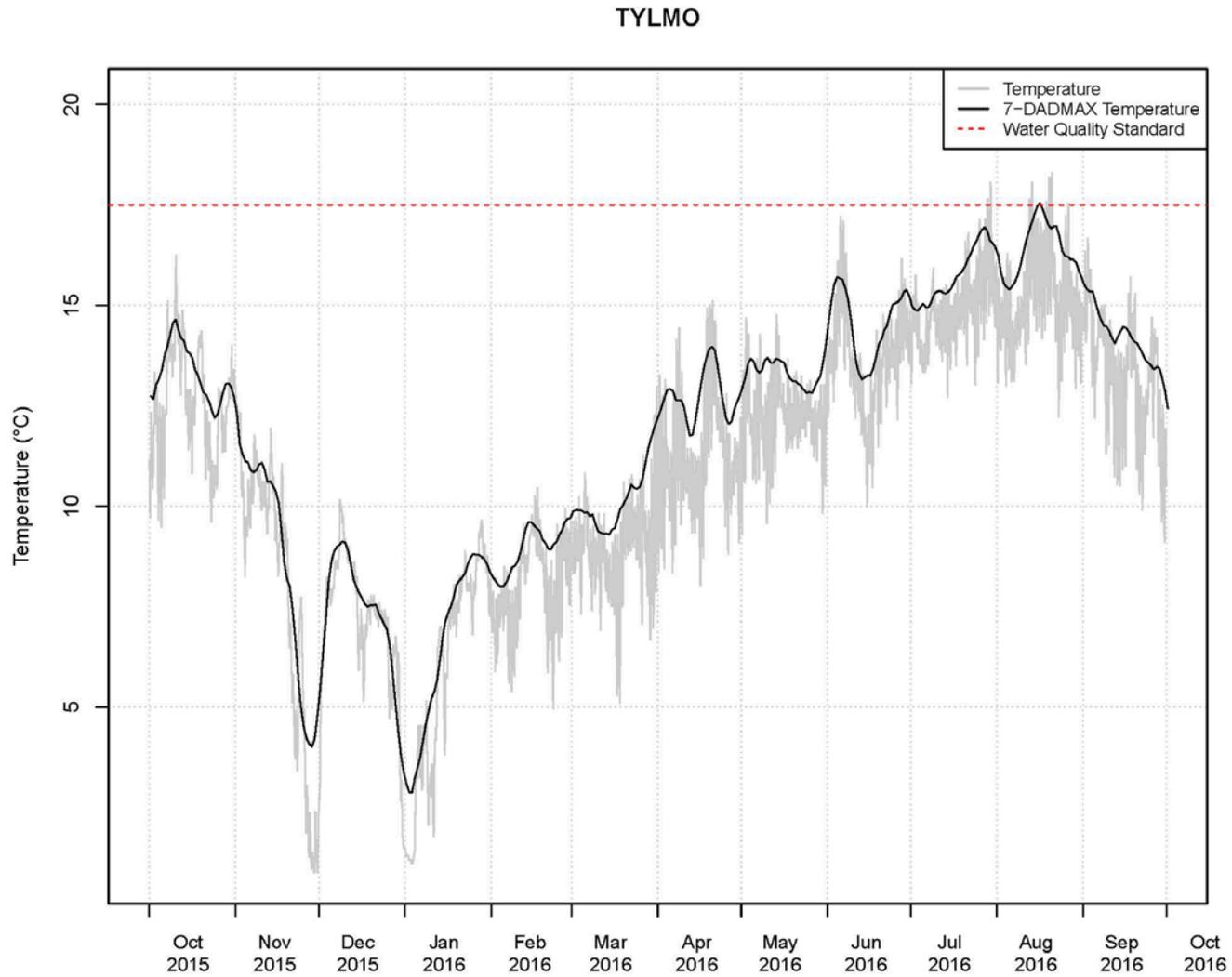


Figure J-13. Continuous Temperature and 7-DADMAX Measured at the TYLMO Station.

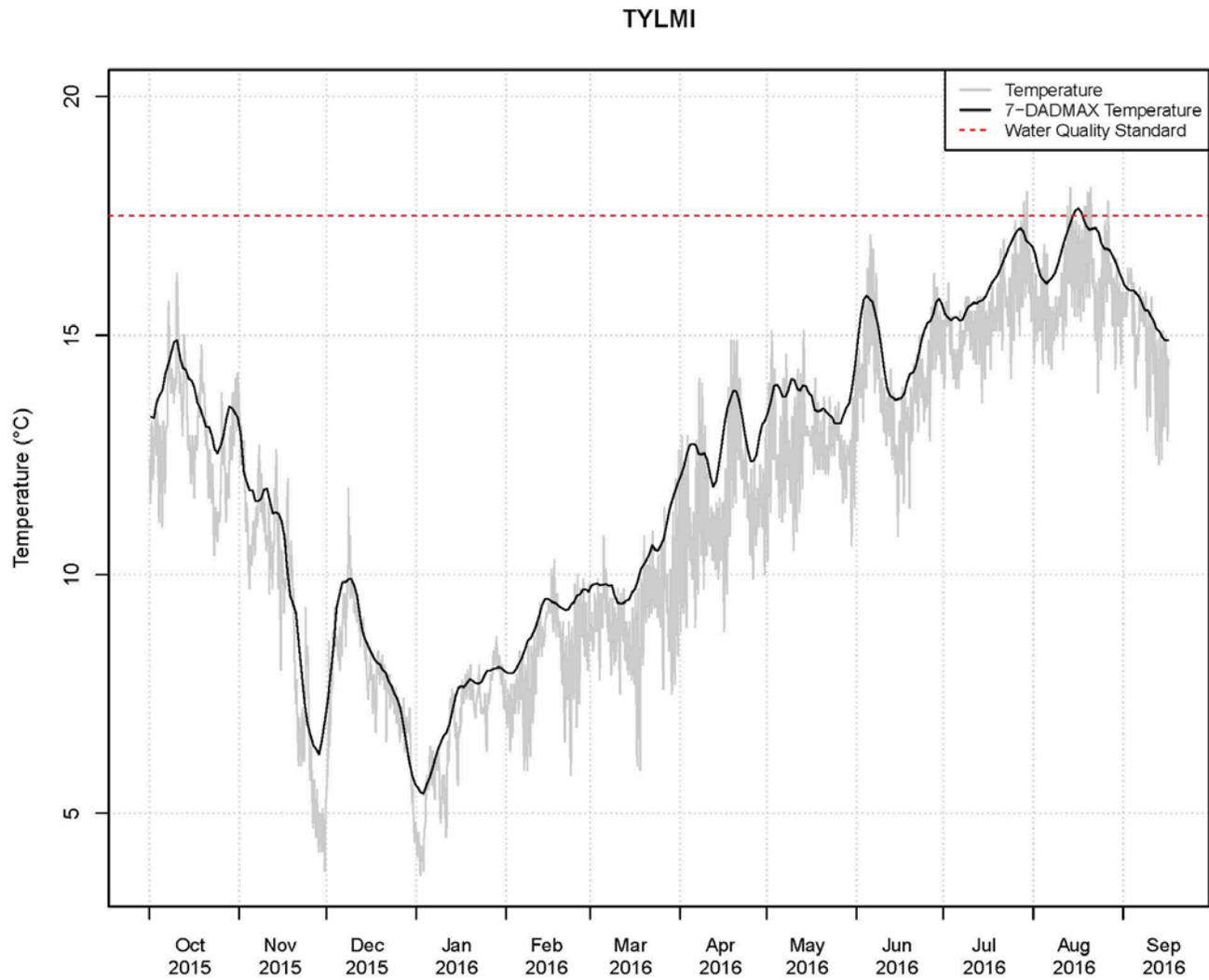


Figure J-14. Continuous Temperature and 7-DADMAX Measured at the TYLMI Station.

APPENDIX K

Line Plots Showing Continuous Conductivity Data

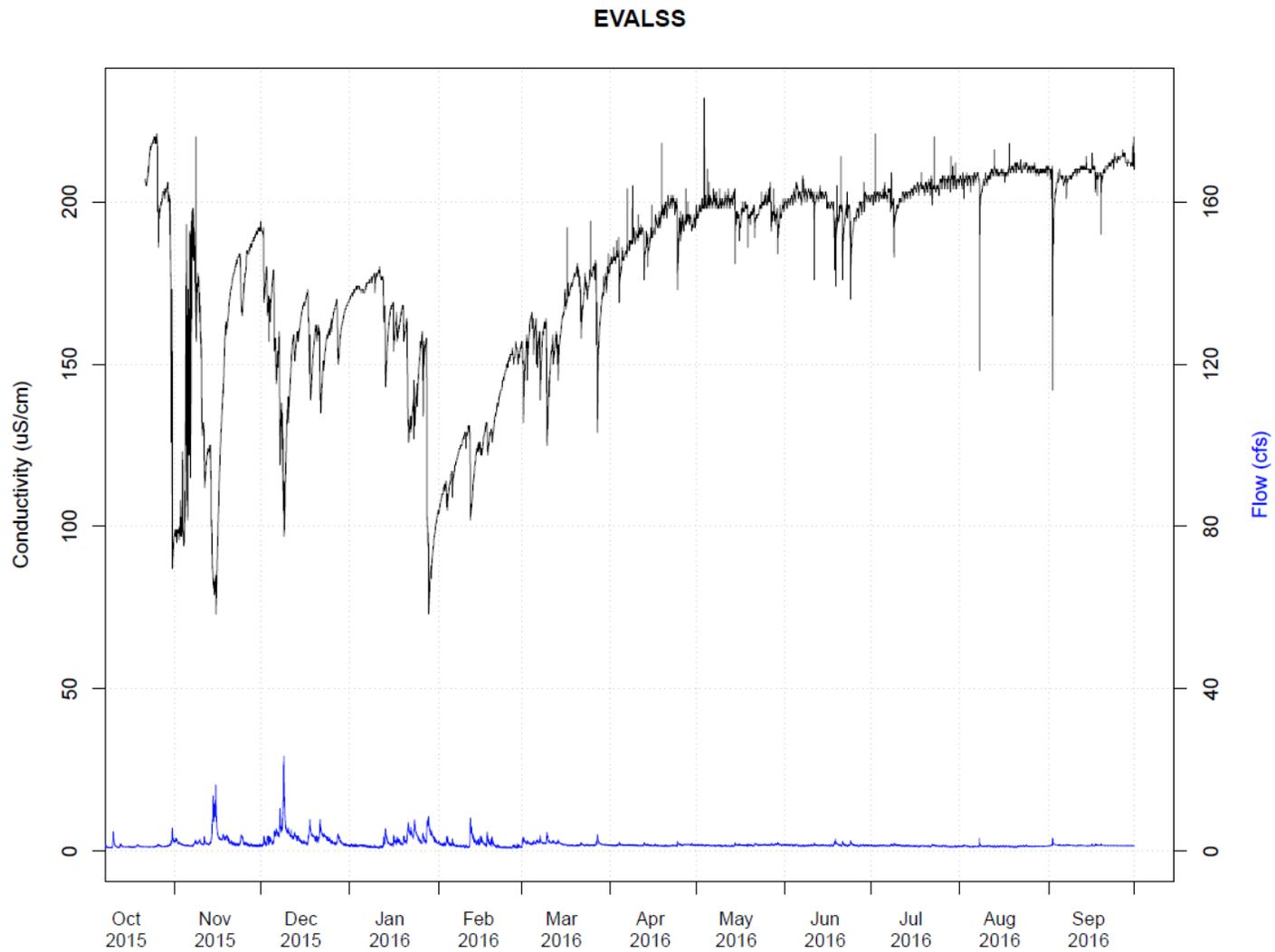


Figure K-1. Continuous Conductivity Measured at the EVALSS Station.

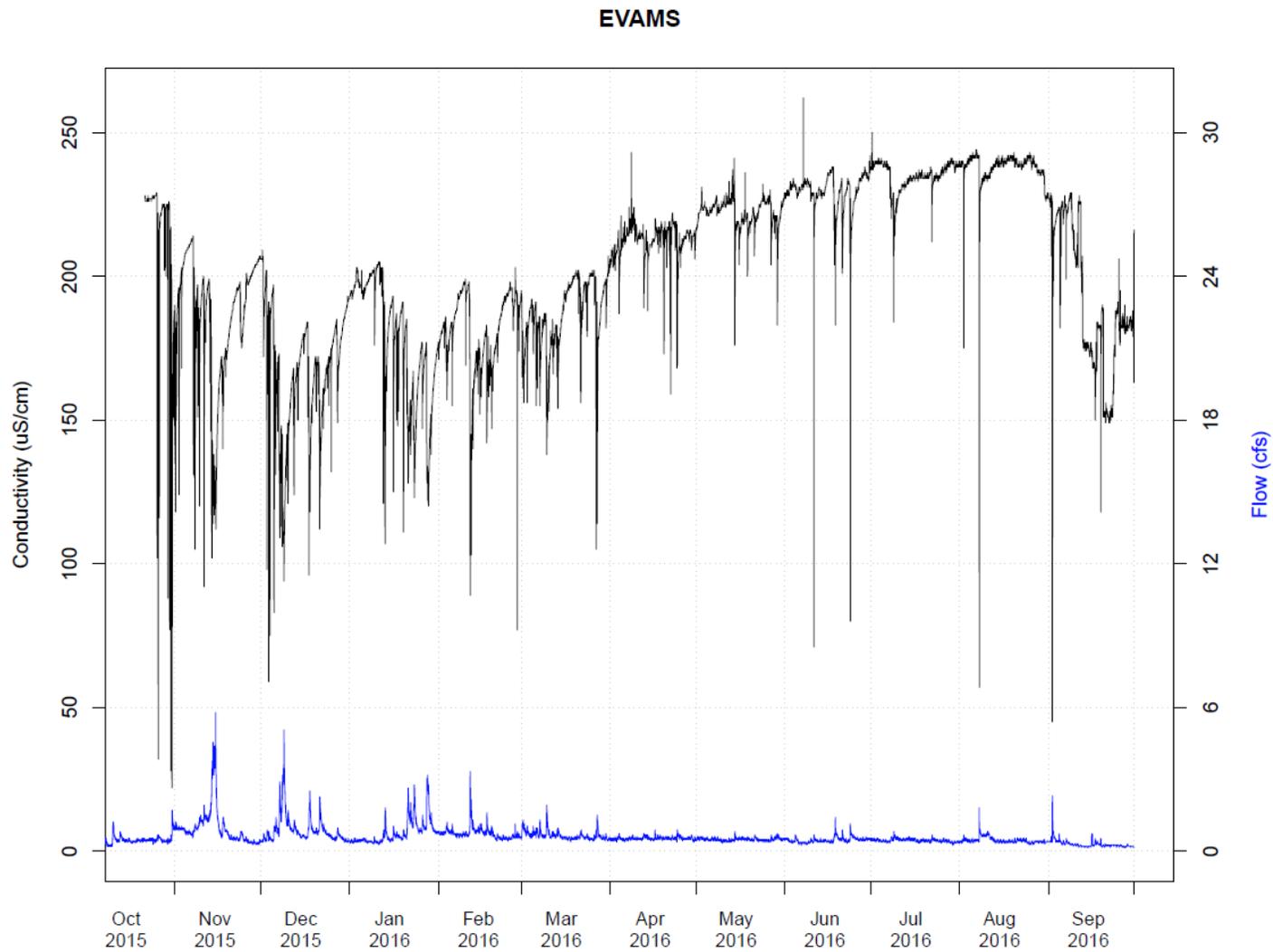


Figure K-2. Continuous Conductivity Measured at the EVAMS Station.

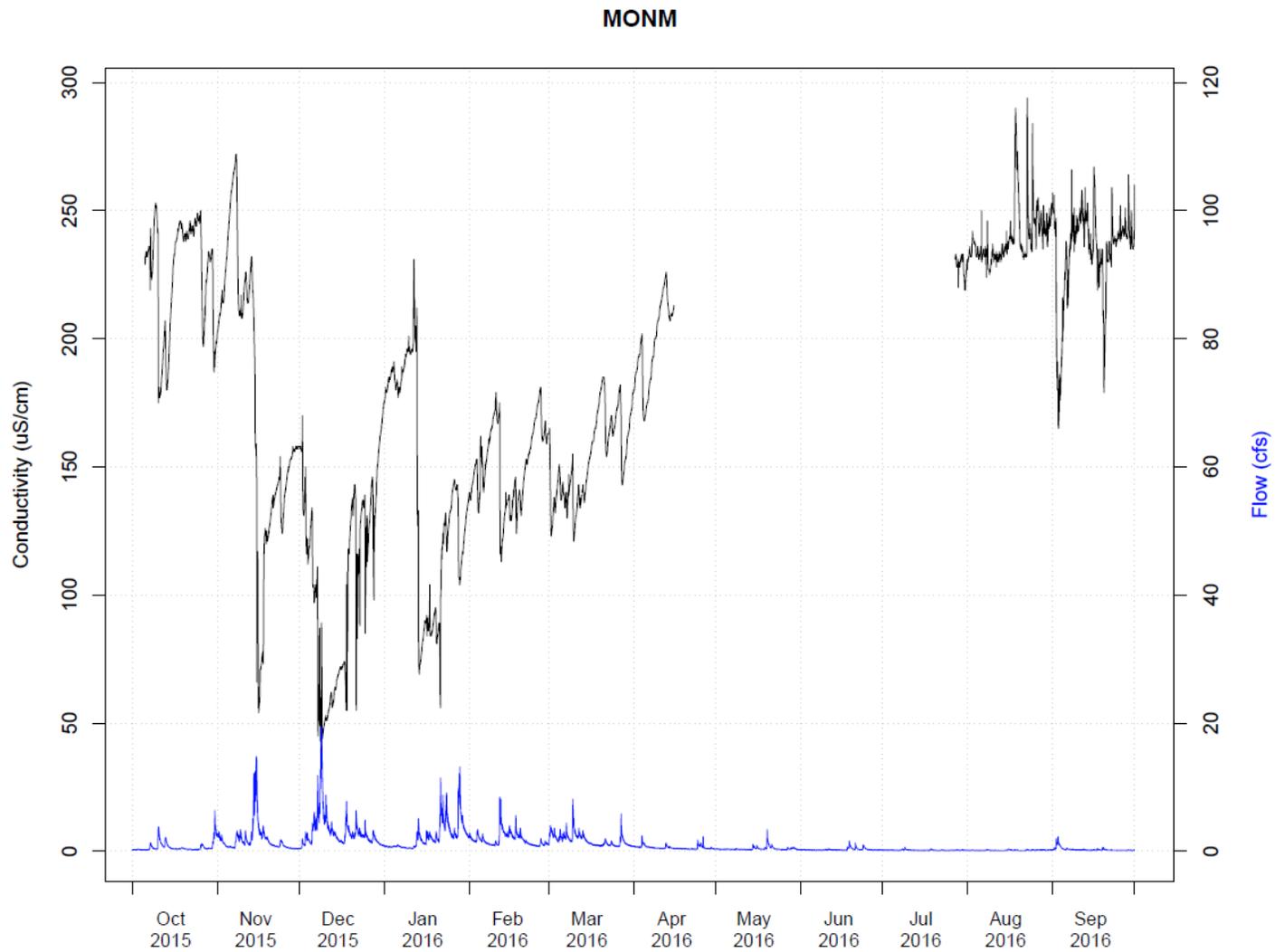


Figure K-3. Continuous Conductivity Measured at the MONM Station.

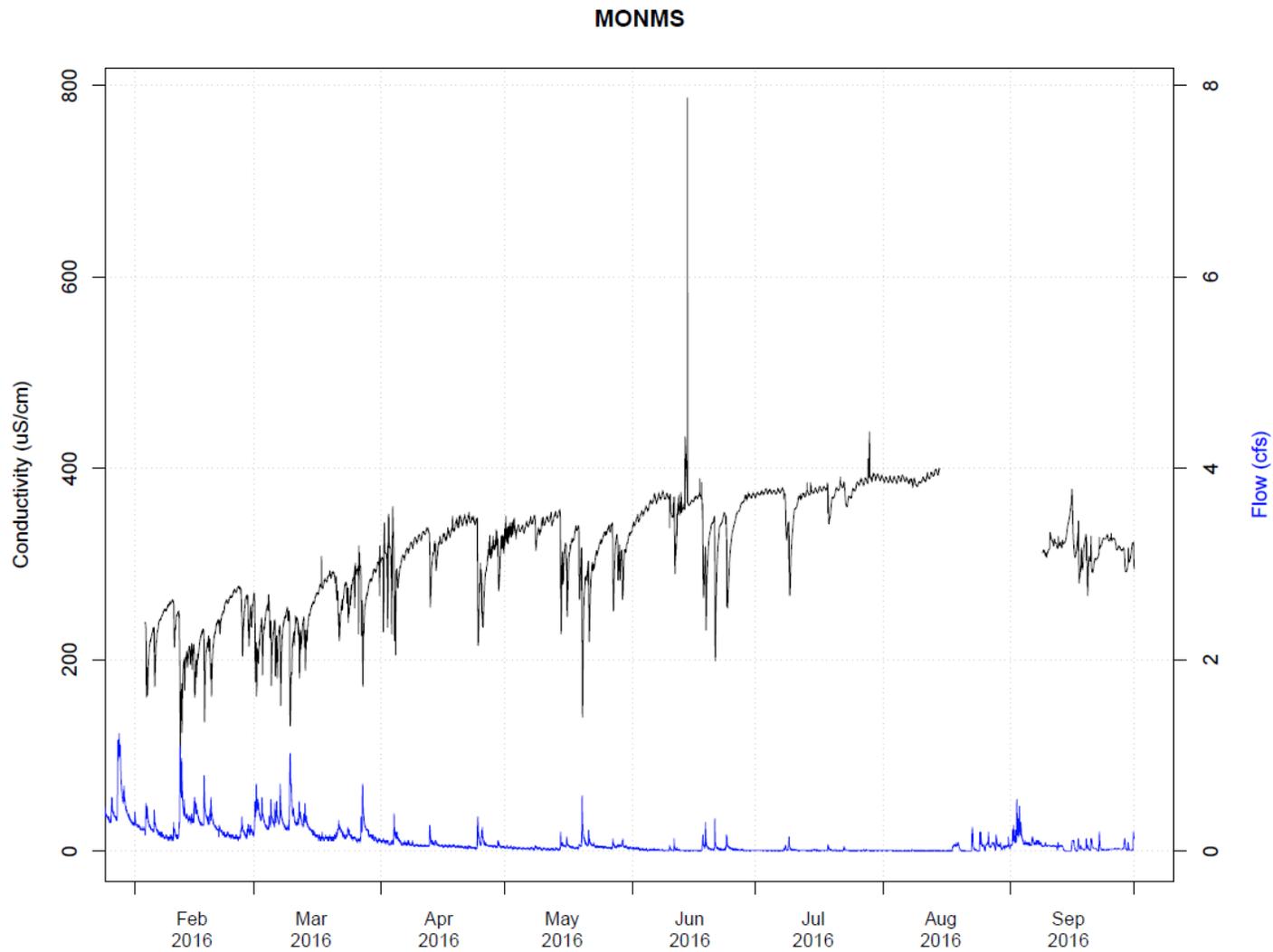


Figure K-4. Continuous Conductivity Measured at the MONMS Station.

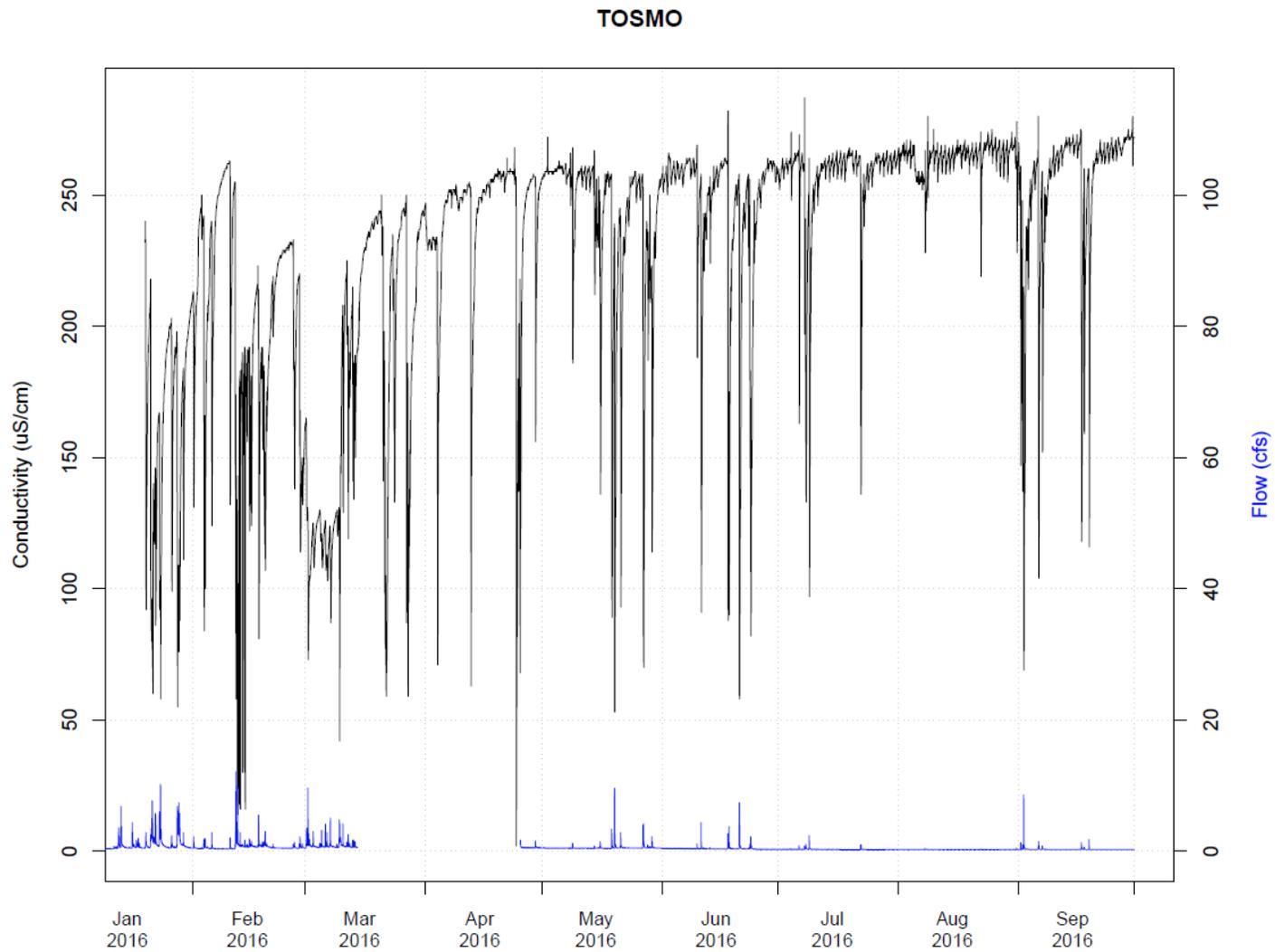


Figure K-5. Continuous Conductivity Measured at the TOSMO Station.

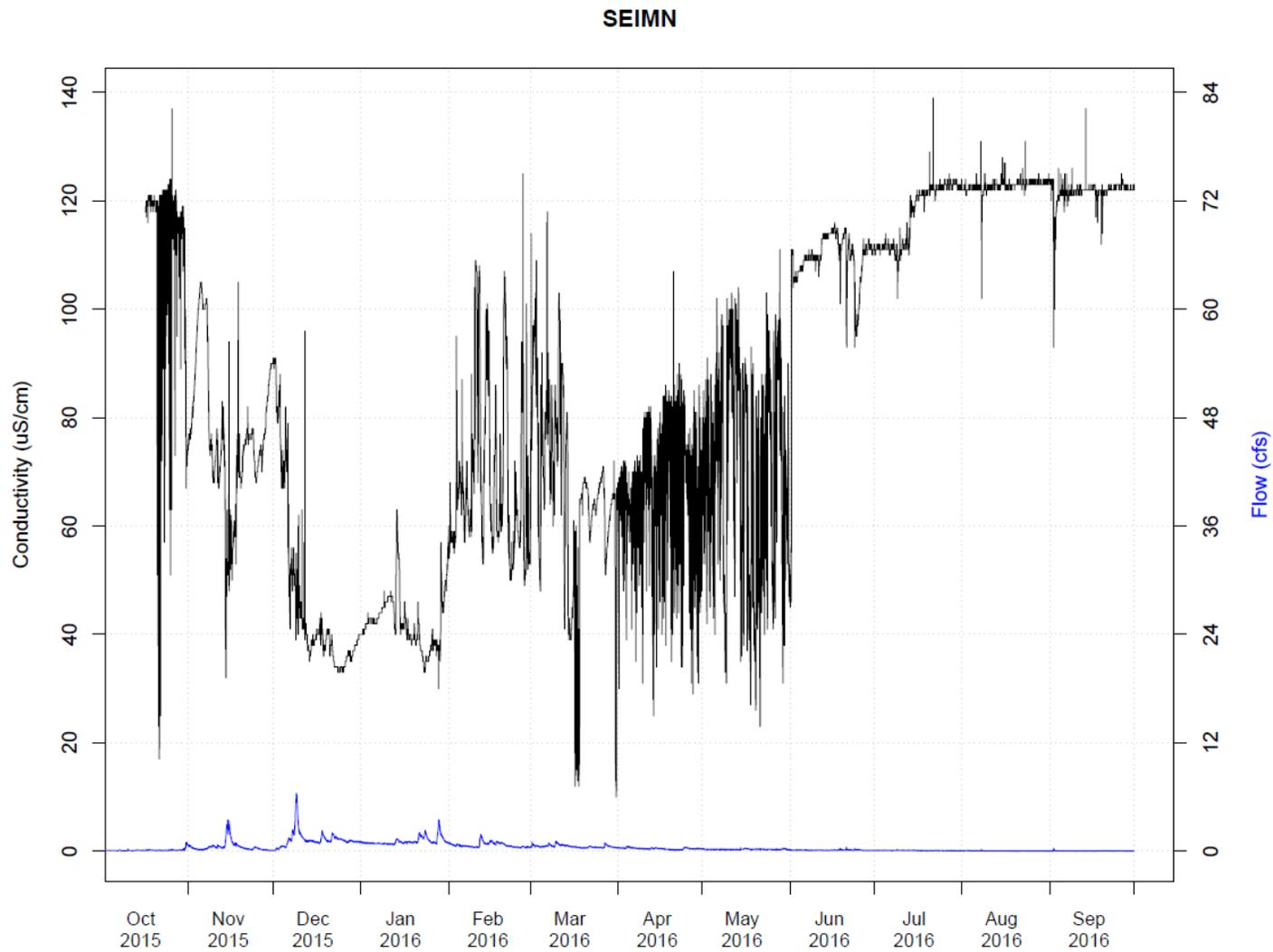


Figure K-6. Continuous Conductivity Measured at the SEIMN Station.

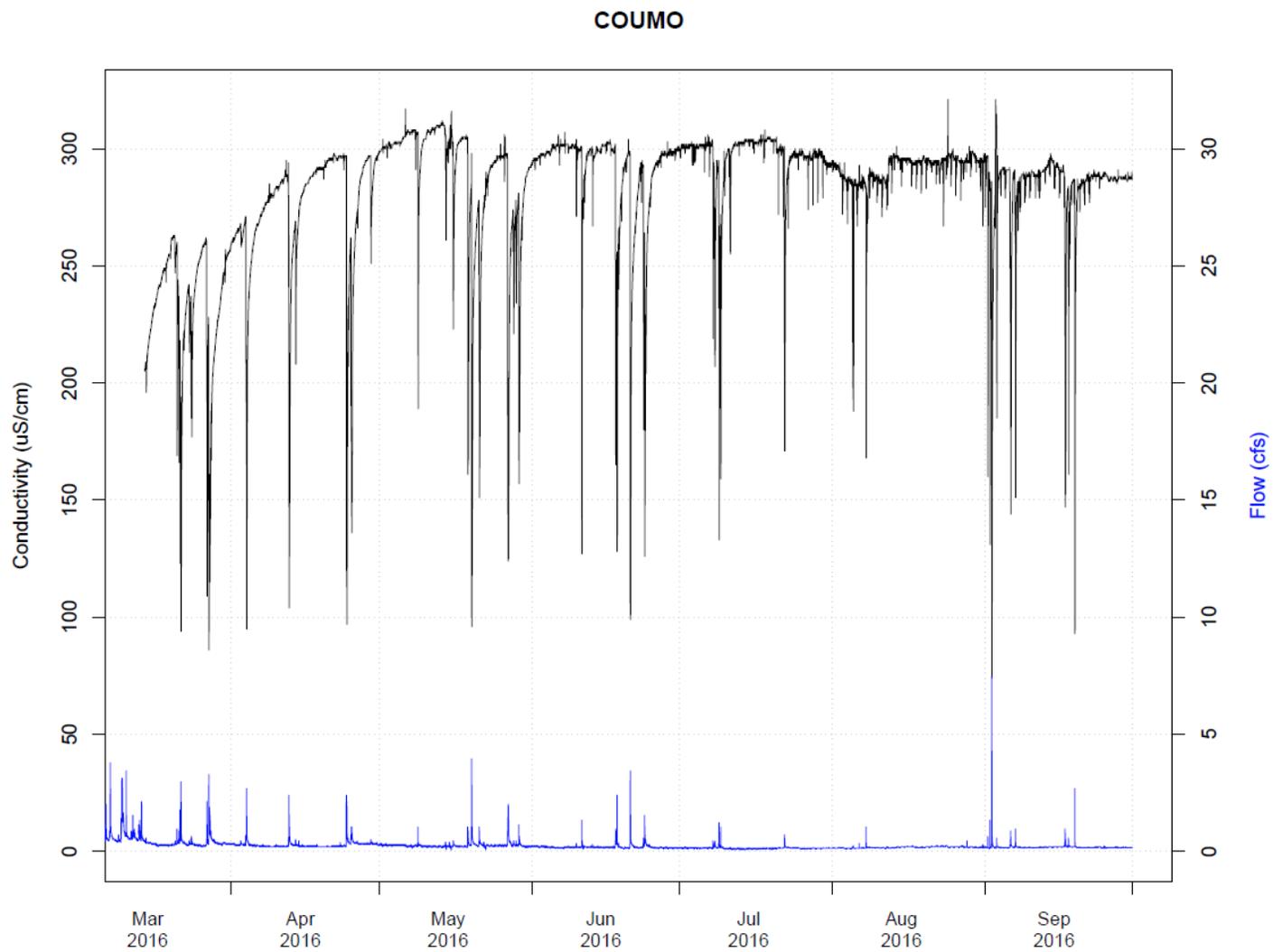


Figure K-7. Continuous Conductivity Measured at the COUMO Station.

APPENDIX L

Compiled Field Data from Physical Habitat Monitoring

The contents of this appendix are provided in an electronic file only.

APPENDIX M

Computed Physical Habitat Quality Indicators

The contents of this appendix are
provided in an electronic file only.

APPENDIX N

Summary Statistics for Evaluating Physical Habitat Quality Indicators

The contents of this appendix are provided in an electronic file only.

APPENDIX O

Laboratory Reports and Data Quality Assurance Audit Forms for Sediment Quality Monitoring



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 29, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1608-173

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on August 12, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: September 29, 2016
Samples Submitted: August 12, 2016
Laboratory Reference: 1608-173
Project: 14-05806-000

Case Narrative

Samples were collected on August 12, 2016 and received by the laboratory on August 12, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Samples were centrifuged and water decanted before dry weight and extraction process.



Date of Report: September 29, 2016
 Samples Submitted: August 12, 2016
 Laboratory Reference: 1608-173
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEI-1R-2016					
Laboratory ID:	08-173-02					
Naphthalene	ND	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
2-Methylnaphthalene	ND	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
1-Methylnaphthalene	ND	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Dimethylphthalate	ND	0.036	EPA 8270D	8-24-16	8-24-16	
Acenaphthylene	0.0083	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Acenaphthene	ND	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Diethylphthalate	ND	0.18	EPA 8270D	8-24-16	8-24-16	
Fluorene	ND	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Phenanthrene	0.023	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Anthracene	0.011	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Di-n-butylphthalate	ND	0.18	EPA 8270D	8-24-16	8-24-16	
Fluoranthene	0.029	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Pyrene	0.046	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Butylbenzylphthalate	ND	0.036	EPA 8270D	8-24-16	8-24-16	
Benzo[a]anthracene	0.029	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Chrysene	0.032	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
bis(2-Ethylhexyl)phthalate	0.12	0.036	EPA 8270D	8-24-16	8-24-16	
Di-n-octylphthalate	ND	0.036	EPA 8270D	8-24-16	8-24-16	
Benzo[b]fluoranthene	0.035	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo(j,k)fluoranthene	0.010	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[a]pyrene	0.034	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Indeno[1,2,3-cd]pyrene	0.012	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Dibenz[a,h]anthracene	ND	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[g,h,i]perylene	0.016	0.0073	EPA 8270D/SIM	8-24-16	8-25-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>43</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>53</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>48</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>59</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>68</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>57</i>	<i>39 - 121</i>				



Date of Report: September 29, 2016
 Samples Submitted: August 12, 2016
 Laboratory Reference: 1608-173
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEI-2R-2016					
Laboratory ID:	08-173-04					
Naphthalene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
2-Methylnaphthalene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
1-Methylnaphthalene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Dimethylphthalate	ND	0.028	EPA 8270D	8-24-16	8-24-16	
Acenaphthylene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Acenaphthene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Diethylphthalate	ND	0.14	EPA 8270D	8-24-16	8-24-16	
Fluorene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Phenanthrene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Anthracene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Di-n-butylphthalate	ND	0.14	EPA 8270D	8-24-16	8-24-16	
Fluoranthene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Pyrene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Butylbenzylphthalate	ND	0.028	EPA 8270D	8-24-16	8-24-16	
Benzo[a]anthracene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Chrysene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
bis(2-Ethylhexyl)phthalate	0.066	0.028	EPA 8270D	8-24-16	8-24-16	
Di-n-octylphthalate	ND	0.028	EPA 8270D	8-24-16	8-24-16	
Benzo[b]fluoranthene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo(j,k)fluoranthene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[a]pyrene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Indeno[1,2,3-cd]pyrene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Dibenz[a,h]anthracene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[g,h,i]perylene	ND	0.0056	EPA 8270D/SIM	8-24-16	8-25-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>47</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>53</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>51</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>64</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>71</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>60</i>	<i>39 - 121</i>				



Date of Report: September 29, 2016
 Samples Submitted: August 12, 2016
 Laboratory Reference: 1608-173
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0824S3					
Naphthalene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Dimethylphthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Diethylphthalate	ND	0.10	EPA 8270D	8-24-16	8-24-16	
Fluorene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Anthracene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Di-n-butylphthalate	ND	0.10	EPA 8270D	8-24-16	8-24-16	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Pyrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Butylbenzylphthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Chrysene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
bis(2-Ethylhexyl)phthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Di-n-octylphthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[j,k]fluoranthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>60</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>62</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>54</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>72</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>71</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>70</i>	<i>39 - 121</i>				



Date of Report: September 29, 2016
 Samples Submitted: August 12, 2016
 Laboratory Reference: 1608-173
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB0824S3									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.505	0.522	0.800	0.800	63	65	41 - 110	3	36	
2-Chlorophenol	0.508	0.516	0.800	0.800	64	65	42 - 112	2	39	
1,4-Dichlorobenzene	0.230	0.234	0.400	0.400	58	59	37 - 104	2	39	
n-Nitroso-di-n-propylamine	0.222	0.237	0.400	0.400	56	59	39 - 102	7	34	
1,2,4-Trichlorobenzene	0.234	0.239	0.400	0.400	59	60	34 - 107	2	37	
4-Chloro-3-methylphenol	0.544	0.550	0.800	0.800	68	69	54 - 104	1	28	
Acenaphthene	0.233	0.244	0.400	0.400	58	61	52 - 103	5	30	
4-Nitrophenol	0.497	0.577	0.800	0.800	62	72	51 - 125	15	25	
2,4-Dinitrotoluene	0.222	0.252	0.400	0.400	56	63	53 - 118	13	29	
Pentachlorophenol	0.601	0.611	0.800	0.800	75	76	25 - 141	2	28	
Pyrene	0.267	0.256	0.400	0.400	67	64	57 - 120	4	22	
<i>Surrogate:</i>										
2-Fluorophenol					59	61	24 - 117			
Phenol-d6					63	65	30 - 120			
Nitrobenzene-d5					58	62	27 - 112			
2-Fluorobiphenyl					68	69	35 - 113			
2,4,6-Tribromophenol					76	72	21 - 120			
Terphenyl-d14					72	69	39 - 121			



Date of Report: September 29, 2016
Samples Submitted: August 12, 2016
Laboratory Reference: 1608-173
Project: 14-05806-000

**TOTAL ORGANIC CARBON
EPA 9060A**

Matrix: Sediment
Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEI-1R-2016					
Laboratory ID:	08-173-02					
Total Organic Carbon	1.2	0.40	EPA 9060	9-6-16	9-6-16	
Client ID:	SEI-2R-2016					
Laboratory ID:	08-173-04					
Total Organic Carbon	1.2	0.40	EPA 9060	9-6-16	9-6-16	



Date of Report: September 29, 2016
 Samples Submitted: August 12, 2016
 Laboratory Reference: 1608-173
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0906S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-6-16	9-6-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-173-02							
	ORIG	DUP						
Total Organic Carbon	1.20	1.13	NA	NA	NA	NA	6	26

SPIKE BLANK								
Laboratory ID:	SB0906S1							
	SB	SB		SB				
Total Organic Carbon	46.3	42.1	NA	110	85-131	NA	NA	



Date of Report: September 29, 2016
 Samples Submitted: August 12, 2016
 Laboratory Reference: 1608-173
 Project: 14-05806-000

TOTAL SOLIDS
SM 2540G

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEI-1R-2016					
Laboratory ID:	08-173-02					
Total Solids	55	0.50	SM 2540G	8-23-16	8-24-16	
Client ID:	SEI-2R-2016					
Laboratory ID:	08-173-04					
Total Solids	71	0.50	SM 2540G	8-23-16	8-24-16	



Date of Report: September 29, 2016
 Samples Submitted: August 12, 2016
 Laboratory Reference: 1608-173
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-224-02							
	ORIG	DUP						
Total Solids	33.6	30.5	NA	NA	NA	NA	10	20





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 8/12/2016 / SEI-1 and SEI-2

By G. Catarra
 Date 10/27/2016 Page 1 of 1
 Checked: initials JL
 date 11/16/2016

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	25	≤14	≤0.1% 0.1%	NA	NA	110	±20	6	≤20	NS	≤35	OK	NONE. EPA HOLDING TIME 28 DAYS
Copper	OK / EPA 6020	NA	NA		≤180	≤0.5 MG/KG 0.5 MG/KG		±25		±15		≤20	NS	≤35	OK	NOT REPORTED – LAB DISPOSED OF SAMPLE BEFORE ANALYSIS
Zinc	OK / EPA 6020	NA	NA		≤180	≤5.0 mg/kg 5.0 MG/KG		±25		±15		≤20	NS	≤35	OK	NOT REPORTED – LAB DISPOSED OF SAMPLE BEFORE ANALYSIS
PAHs	OK / EPA 8270D/SIM	12	≤14	2	≤40	≤70 ug/kg 7.3 UG/KG	43-72	NA / 21- 120	56-76	25- 141	1-15	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	12	≤14	1	≤40	≤70-250 UG/KG 36-180	43-72	NA / 21- 120	56-76	25- 141	1-15	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 1, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1608-224

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on August 17, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 1, 2016
Samples Submitted: August 17, 2016
Laboratory Reference: 1608-224
Project: 14-05806-000

Case Narrative

Samples were collected on August 17, 2016 and received by the laboratory on August 17, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all Sediment sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

The samples were centrifuged and the water was decanted before analysis.



Date of Report: October 1, 2016
Samples Submitted: August 17, 2016
Laboratory Reference: 1608-224
Project: 14-05806-000

TOTAL ORGANIC CARBON
EPA 9060A

Matrix: Sediment
Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLIN-1R-2016					
Laboratory ID:	08-224-02					
Total Organic Carbon	5.9	0.38	EPA 9060	9-6-16	9-6-16	



Date of Report: October 1, 2016
 Samples Submitted: August 17, 2016
 Laboratory Reference: 1608-224
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0906S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-6-16	9-6-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-173-02							
	ORIG	DUP						
Total Organic Carbon	1.20	1.13	NA	NA	NA	NA	6	26

SPIKE BLANK								
Laboratory ID:	SB0906S1							
	SB	SB		SB				
Total Organic Carbon	46.3	42.1	NA	110	85-131	NA	NA	



Date of Report: October 1, 2016
Samples Submitted: August 17, 2016
Laboratory Reference: 1608-224
Project: 14-05806-000

**TOTAL METALS
EPA 6010C**

Matrix: Sediment
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-224-01					
Client ID:	COLIN-1M-2016					
Copper	17	3.9	6010C	9-30-16	9-30-16	
Zinc	70	9.7	6010C	9-30-16	9-30-16	



Date of Report: October 1, 2016
Samples Submitted: August 17, 2016
Laboratory Reference: 1608-224
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB0930SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 1, 2016
Samples Submitted: August 17, 2016
Laboratory Reference: 1608-224
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.60	9.85	3	1.0	
Zinc	51.1	51.9	2	2.5	



Date of Report: October 1, 2016
 Samples Submitted: August 17, 2016
 Laboratory Reference: 1608-224
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.1	101	61.0	103	2	
Zinc	100	146	95	147	96	1	



Date of Report: October 1, 2016
 Samples Submitted: August 17, 2016
 Laboratory Reference: 1608-224
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLIN-1R-2016					
Laboratory ID:	08-224-02					
Naphthalene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
2-Methylnaphthalene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
1-Methylnaphthalene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Dimethylphthalate	ND	0.059	EPA 8270D	8-24-16	8-24-16	
Acenaphthylene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Acenaphthene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Diethylphthalate	ND	0.30	EPA 8270D	8-24-16	8-24-16	
Fluorene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Phenanthrene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Anthracene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Di-n-butylphthalate	ND	0.30	EPA 8270D	8-24-16	8-24-16	
Fluoranthene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Pyrene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Butylbenzylphthalate	ND	0.059	EPA 8270D	8-24-16	8-24-16	
Benzo[a]anthracene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Chrysene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
bis(2-Ethylhexyl)phthalate	0.21	0.059	EPA 8270D	8-24-16	8-24-16	
Di-n-octylphthalate	ND	0.059	EPA 8270D	8-24-16	8-24-16	
Benzo[b]fluoranthene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo(j,k)fluoranthene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[a]pyrene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Indeno[1,2,3-cd]pyrene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Dibenz[a,h]anthracene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[g,h,i]perylene	ND	0.012	EPA 8270D/SIM	8-24-16	8-25-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>60</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>69</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>69</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>65</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>70</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>66</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: August 17, 2016
 Laboratory Reference: 1608-224
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0824S3					
Naphthalene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Dimethylphthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Diethylphthalate	ND	0.10	EPA 8270D	8-24-16	8-24-16	
Fluorene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Anthracene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Di-n-butylphthalate	ND	0.10	EPA 8270D	8-24-16	8-24-16	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Pyrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Butylbenzylphthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Chrysene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
bis(2-Ethylhexyl)phthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Di-n-octylphthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[j,k]fluoranthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>60</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>62</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>54</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>72</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>71</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>70</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: August 17, 2016
 Laboratory Reference: 1608-224
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB0824S3									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.505	0.522	0.800	0.800	63	65	41 - 110	3	36	
2-Chlorophenol	0.508	0.516	0.800	0.800	64	65	42 - 112	2	39	
1,4-Dichlorobenzene	0.230	0.234	0.400	0.400	58	59	37 - 104	2	39	
n-Nitroso-di-n-propylamine	0.222	0.237	0.400	0.400	56	59	39 - 102	7	34	
1,2,4-Trichlorobenzene	0.234	0.239	0.400	0.400	59	60	34 - 107	2	37	
4-Chloro-3-methylphenol	0.544	0.550	0.800	0.800	68	69	54 - 104	1	28	
Acenaphthene	0.233	0.244	0.400	0.400	58	61	52 - 103	5	30	
4-Nitrophenol	0.497	0.577	0.800	0.800	62	72	51 - 125	15	25	
2,4-Dinitrotoluene	0.222	0.252	0.400	0.400	56	63	53 - 118	13	29	
Pentachlorophenol	0.601	0.611	0.800	0.800	75	76	25 - 141	2	28	
Pyrene	0.267	0.256	0.400	0.400	67	64	57 - 120	4	22	
<i>Surrogate:</i>										
2-Fluorophenol					59	61	24 - 117			
Phenol-d6					63	65	30 - 120			
Nitrobenzene-d5					58	62	27 - 112			
2-Fluorobiphenyl					68	69	35 - 113			
2,4,6-Tribromophenol					76	72	21 - 120			
Terphenyl-d14					72	69	39 - 121			



Date of Report: October 1, 2016
 Samples Submitted: August 17, 2016
 Laboratory Reference: 1608-224
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	COLIN-1M-2016					
Laboratory ID:	08-224-01					
Total Solids	26	0.50	SM 2540G	9-29-16	9-30-16	
Client ID:	COLIN-1R-2016					
Laboratory ID:	08-224-02					
Total Solids	34	0.50	SM 2540G	8-23-16	8-24-16	



Date of Report: October 1, 2016
 Samples Submitted: August 17, 2016
 Laboratory Reference: 1608-224
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-224-02								
	ORIG	DUP							
Total Solids	33.6	30.5	NA	NA	NA	NA	10	20	
Laboratory ID:	09-118-02								
	ORIG	DUP							
Total Solids	18.9	19.1	NA	NA	NA	NA	1	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: Jeremy Bunn

CHAIN OF CUSTODY

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. **08-224**

Requested Analyses

Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates														Total Solids
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates									Total Solids
	SIDL-3M-2016			Sediment			X	X											
	SIDL-3R-2016			Sediment		X			X	X									
1	COLIN-1M-2016	8.17.16	9:00	Sediment	1		X	X											X
2	COLIN-1R-2016	8.17.16	9:00	Sediment	↓	X			X	X									↓

Relinquished by Miriam [Signature] Date 8/17/16 Received by [Signature] Date 8/17/16
 Firm Herrera Env. Consult. Time 3:15:10 Firm OnSite Env Time 15:15

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 8/17/2016 / COLIN-1

By G. Catarra
 Date 11/02/2016 Page 1 of 1
 Checked: initials JL
 date 11/16/2016

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	20	≤14	≤0.042% 0.1 %	NA	NA	110	±20	6	≤20	NS	≤35	OK	NONE. EPA HOLDING TIME 28 DAYS
Copper	OK / EPA 6010C	NA	NA	44	≤180	≤1.0 MG/KG 1.0 MG/KG	101,103	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6010C	NA	NA	44	≤180	≤2.5 mg/kg 2.5 MG/KG	95,96	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	7	≤14	1	≤40	≤10 ug/kg 12 UG/KG	SURR 60-70	NA / 21- 120	56-76	25- 141	BS/BSD 1-15	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	7	≤14	<1	≤40	≤20-100 UG/KG 59-300	SURR 60-70	NA / 21- 120	56-76	25- 141	BS/BSD 1-15	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 1, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1608-258

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on August 19, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 1, 2016
Samples Submitted: August 19, 2016
Laboratory Reference: 1608-258
Project: 14-05806-000

Case Narrative

Samples were collected on August 19, 2016 and received by the laboratory on August 19, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all Sediment sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

The samples were centrifuged and the water was decanted before analysis.



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-3R-2016					
Laboratory ID:	08-258-02					
Total Organic Carbon	4.3	0.39	EPA 9060	9-6-16	9-6-16	

Client ID:	MONT-1R-2016					
Laboratory ID:	08-258-04					
Total Organic Carbon	10	0.40	EPA 9060	9-6-16	9-6-16	



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0906S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-6-16	9-6-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-173-02							
	ORIG	DUP						
Total Organic Carbon	1.20	1.13	NA	NA	NA	NA	6	26

SPIKE BLANK								
Laboratory ID:	SB0906S1							
	SB	SB		SB				
Total Organic Carbon	46.3	42.1	NA	110	85-131	NA	NA	



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-258-01					
Client ID:	SIDL-3M-2016					
Copper	20	4.4	6010C	9-30-16	9-30-16	
Zinc	81	11	6010C	9-30-16	9-30-16	

Lab ID:	08-258-03					
Client ID:	MONT-1M-2016					
Copper	30	3.0	6010C	9-30-16	9-30-16	
Zinc	420	7.5	6010C	9-30-16	9-30-16	



Date of Report: October 1, 2016
Samples Submitted: August 19, 2016
Laboratory Reference: 1608-258
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB0930SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 1, 2016
Samples Submitted: August 19, 2016
Laboratory Reference: 1608-258
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.60	9.85	3	1.0	
Zinc	51.1	51.9	2	2.5	



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.1	101	61.0	103	2	
Zinc	100	146	95	147	96	1	



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-3R-2016					
Laboratory ID:	08-258-02					
Naphthalene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
2-Methylnaphthalene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
1-Methylnaphthalene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Dimethylphthalate	ND	0.033	EPA 8270D	8-24-16	8-24-16	
Acenaphthylene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Acenaphthene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Diethylphthalate	ND	0.17	EPA 8270D	8-24-16	8-24-16	
Fluorene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Phenanthrene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Anthracene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Di-n-butylphthalate	ND	0.17	EPA 8270D	8-24-16	8-24-16	
Fluoranthene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Pyrene	0.0076	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Butylbenzylphthalate	ND	0.033	EPA 8270D	8-24-16	8-24-16	
Benzo[a]anthracene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Chrysene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
bis(2-Ethylhexyl)phthalate	0.043	0.033	EPA 8270D	8-24-16	8-24-16	
Di-n-octylphthalate	ND	0.033	EPA 8270D	8-24-16	8-24-16	
Benzo[b]fluoranthene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo(j,k)fluoranthene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[a]pyrene	0.0068	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Indeno[1,2,3-cd]pyrene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Dibenz[a,h]anthracene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[g,h,i]perylene	ND	0.0066	EPA 8270D/SIM	8-24-16	8-25-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>53</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>63</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>57</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>54</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>68</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>61</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-1R-2016					
Laboratory ID:	08-258-04					
Naphthalene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
2-Methylnaphthalene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
1-Methylnaphthalene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Dimethylphthalate	ND	0.070	EPA 8270D	8-24-16	8-24-16	
Acenaphthylene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Acenaphthene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Diethylphthalate	ND	0.35	EPA 8270D	8-24-16	8-24-16	
Fluorene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Phenanthrene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Anthracene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Di-n-butylphthalate	ND	0.35	EPA 8270D	8-24-16	8-24-16	
Fluoranthene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Pyrene	0.014	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Butylbenzylphthalate	ND	0.070	EPA 8270D	8-24-16	8-24-16	
Benzo[a]anthracene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Chrysene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
bis(2-Ethylhexyl)phthalate	0.21	0.070	EPA 8270D	8-24-16	8-24-16	
Di-n-octylphthalate	ND	0.070	EPA 8270D	8-24-16	8-24-16	
Benzo[b]fluoranthene	0.015	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo(j,k)fluoranthene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[a]pyrene	0.026	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Indeno[1,2,3-cd]pyrene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Dibenz[a,h]anthracene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[g,h,i]perylene	ND	0.014	EPA 8270D/SIM	8-24-16	8-25-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>61</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>73</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>69</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>89</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>89</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>85</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0824S3					
Naphthalene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Dimethylphthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Diethylphthalate	ND	0.10	EPA 8270D	8-24-16	8-24-16	
Fluorene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Anthracene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Di-n-butylphthalate	ND	0.10	EPA 8270D	8-24-16	8-24-16	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Pyrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Butylbenzylphthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Chrysene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
bis(2-Ethylhexyl)phthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Di-n-octylphthalate	ND	0.020	EPA 8270D	8-24-16	8-24-16	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	8-24-16	8-25-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>60</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>62</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>54</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>72</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>71</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>70</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
	SB	SBD	SB	SBD	SB	SBD				
SPIKE BLANKS										
Laboratory ID:	SB0824S3									
Phenol	0.505	0.522	0.800	0.800	63	65	41 - 110	3	36	
2-Chlorophenol	0.508	0.516	0.800	0.800	64	65	42 - 112	2	39	
1,4-Dichlorobenzene	0.230	0.234	0.400	0.400	58	59	37 - 104	2	39	
n-Nitroso-di-n-propylamine	0.222	0.237	0.400	0.400	56	59	39 - 102	7	34	
1,2,4-Trichlorobenzene	0.234	0.239	0.400	0.400	59	60	34 - 107	2	37	
4-Chloro-3-methylphenol	0.544	0.550	0.800	0.800	68	69	54 - 104	1	28	
Acenaphthene	0.233	0.244	0.400	0.400	58	61	52 - 103	5	30	
4-Nitrophenol	0.497	0.577	0.800	0.800	62	72	51 - 125	15	25	
2,4-Dinitrotoluene	0.222	0.252	0.400	0.400	56	63	53 - 118	13	29	
Pentachlorophenol	0.601	0.611	0.800	0.800	75	76	25 - 141	2	28	
Pyrene	0.267	0.256	0.400	0.400	67	64	57 - 120	4	22	
<i>Surrogate:</i>										
<i>2-Fluorophenol</i>					<i>59</i>	<i>61</i>	<i>24 - 117</i>			
<i>Phenol-d6</i>					<i>63</i>	<i>65</i>	<i>30 - 120</i>			
<i>Nitrobenzene-d5</i>					<i>58</i>	<i>62</i>	<i>27 - 112</i>			
<i>2-Fluorobiphenyl</i>					<i>68</i>	<i>69</i>	<i>35 - 113</i>			
<i>2,4,6-Tribromophenol</i>					<i>76</i>	<i>72</i>	<i>21 - 120</i>			
<i>Terphenyl-d14</i>					<i>72</i>	<i>69</i>	<i>39 - 121</i>			



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SIDL-3M-2016					
Laboratory ID:	08-258-01					
Total Solids	23	0.50	SM 2540G	9-29-16	9-30-16	

Client ID:	SIDL-3R-2016					
Laboratory ID:	08-258-02					
Total Solids	60	0.50	SM 2540G	8-23-16	8-24-16	

Client ID:	MONT-1M-2016					
Laboratory ID:	08-258-03					
Total Solids	33	0.50	SM 2540G	9-29-16	9-30-16	

Client ID:	MONT-1R-2016					
Laboratory ID:	08-258-04					
Total Solids	29	0.50	SM 2540G	8-23-16	8-24-16	



Date of Report: October 1, 2016
 Samples Submitted: August 19, 2016
 Laboratory Reference: 1608-258
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-224-02								
	ORIG	DUP							
Total Solids	33.6	30.5	NA	NA	NA	NA	10	20	
Laboratory ID:	09-118-02								
	ORIG	DUP							
Total Solids	18.9	19.1	NA	NA	NA	NA	1	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: Jeremy Bunn

CHAIN OF CUSTODY

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. **08-258**
 Requested Analyses

Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates															Total Solids
----------------------	--------	------	----------------------------------	------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--------------

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates									Total Solids
1	SIDL-3M-2010	8.19.10	12:00	Sediment	1		X	X											X
2	SIDL-3R-2010	8.19.10	12:00	Sediment	1	X			X	X									←
	COLIN-3M-2010			Sediment															
	COLIN-3R-2010			Sediment															
3	MONT-1M-2010	8.19.10	14:00	Sediment	1		X	X											X
4	MONT-1R-2010	8.19.10	14:00	↓	1	X			X	X									←

Relinquished by Micah Herrera Date 8.19.10 Received by [Signature] Date 8/19/10
 Firm Herrera Time 14:40 Firm [Signature] Time 1440

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 8/19/2016 / SIDL-3 and MONT-1

By G. Catarra
 Date 11/02/2016 Page 1 of 1
 Checked: initials JL
 date 11/16/2016

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	18	≤14	≤0.042% 0.4 %	NA	NA	110	±20	6	≤20	NS	≤35	OK	NONE. EPA HOLDING TIME 28 DAYS
Copper	OK / EPA 6010C	NA	NA	42	≤180	≤1.0 MG/KG 1.0 MG/KG	101,103	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6010C	NA	NA	42	≤180	≤2.5 mg/kg 2.5 MG/KG	95,96	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	5	≤14	1	≤40	≤4 ug/kg 6.6-14 UG/KG	SURR 53-89	NA / 21- 120	56-76	25- 141	BS/BSD 1-15	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	5	≤14	<1	≤40	≤20-100 UG/KG 33-350	SURR 53-89	NA / 21- 120	56-76	25- 141	BS/BSD 1-15	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 1, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1608-376

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on August 30, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 1, 2016
Samples Submitted: August 30, 2016
Laboratory Reference: 1608-376
Project: 14-05806-000

Case Narrative

Samples were collected on August 30, 2016 and received by the laboratory on August 30, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all Sediment sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

The samples were centrifuged and the water was decanted before analysis.



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLR 1-R-2016					
Laboratory ID:	08-376-02					
Total Organic Carbon	3.0	0.41	EPA 9060	9-22-16	9-22-16	
Client ID:	TYLR 2-R-2016					
Laboratory ID:	08-376-04					
Total Organic Carbon	5.9	0.39	EPA 9060	9-22-16	9-22-16	



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0922S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-22-16	9-22-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-376-02							
	ORIG	DUP						
Total Organic Carbon	2.96	2.70	NA	NA	NA	9	26	

SPIKE BLANK								
Laboratory ID:	SB0922S1							
	SB	SB		SB				
Total Organic Carbon	42.7	42.1	NA	101	85-131	NA	NA	



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 08-376-01 Client ID: TYLR 1-M-2016						
Copper	36	2.7	6010C	9-30-16	9-30-16	
Zinc	300	6.8	6010C	9-30-16	9-30-16	
Lab ID: 08-376-03 Client ID: TYLR 2-M-2016						
Copper	120	3.6	6010C	9-30-16	9-30-16	
Zinc	720	9.0	6010C	9-30-16	9-30-16	



Date of Report: October 1, 2016
Samples Submitted: August 30, 2016
Laboratory Reference: 1608-376
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB0930SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 1, 2016
Samples Submitted: August 30, 2016
Laboratory Reference: 1608-376
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.60	9.85	3	1.0	
Zinc	51.1	51.9	2	2.5	



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.1	101	61.0	103	2	
Zinc	100	146	95	147	96	1	



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLR 1-R-2016					
Laboratory ID:	08-376-02					
Naphthalene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
2-Methylnaphthalene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
1-Methylnaphthalene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Dimethylphthalate	ND	0.031	EPA 8270D	9-6-16	9-6-16	
Acenaphthylene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Acenaphthene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Diethylphthalate	ND	0.15	EPA 8270D	9-6-16	9-6-16	
Fluorene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Phenanthrene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Anthracene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Di-n-butylphthalate	ND	0.15	EPA 8270D	9-6-16	9-6-16	
Fluoranthene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Pyrene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Butylbenzylphthalate	ND	0.031	EPA 8270D	9-6-16	9-6-16	
Benzo[a]anthracene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Chrysene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
bis(2-Ethylhexyl)phthalate	0.12	0.031	EPA 8270D	9-6-16	9-6-16	
Di-n-octylphthalate	ND	0.031	EPA 8270D	9-6-16	9-6-16	
Benzo[b]fluoranthene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo(j,k)fluoranthene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[a]pyrene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Indeno[1,2,3-cd]pyrene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Dibenz[a,h]anthracene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[g,h,i]perylene	ND	0.0061	EPA 8270D/SIM	9-6-16	9-6-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>47</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>59</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>48</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>52</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>43</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>53</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLR 2-R-2016					
Laboratory ID:	08-376-04					
Naphthalene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
2-Methylnaphthalene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
1-Methylnaphthalene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Dimethylphthalate	ND	0.039	EPA 8270D	9-6-16	9-6-16	
Acenaphthylene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Acenaphthene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Diethylphthalate	ND	0.20	EPA 8270D	9-6-16	9-6-16	
Fluorene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Phenanthrene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Anthracene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Di-n-butylphthalate	ND	0.20	EPA 8270D	9-6-16	9-6-16	
Fluoranthene	0.013	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Pyrene	0.013	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Butylbenzylphthalate	ND	0.039	EPA 8270D	9-6-16	9-6-16	
Benzo[a]anthracene	0.0093	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Chrysene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
bis(2-Ethylhexyl)phthalate	0.16	0.039	EPA 8270D	9-6-16	9-6-16	
Di-n-octylphthalate	ND	0.039	EPA 8270D	9-6-16	9-6-16	
Benzo[b]fluoranthene	0.017	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo(j,k)fluoranthene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[a]pyrene	0.018	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Indeno[1,2,3-cd]pyrene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Dibenz[a,h]anthracene	ND	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[g,h,i]perylene	0.013	0.0078	EPA 8270D/SIM	9-6-16	9-6-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>41</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>57</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>45</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>49</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>47</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>53</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0906S2					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Dimethylphthalate	ND	0.020	EPA 8270D	9-6-16	9-6-16	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Diethylphthalate	ND	0.10	EPA 8270D	9-6-16	9-6-16	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-6-16	9-6-16	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Butylbenzylphthalate	ND	0.020	EPA 8270D	9-6-16	9-6-16	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
bis(2-Ethylhexyl)phthalate	ND	0.020	EPA 8270D	9-6-16	9-6-16	
Di-n-octylphthalate	ND	0.020	EPA 8270D	9-6-16	9-6-16	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>72</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>77</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>63</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>68</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>54</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>66</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB0906S2									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.669	0.658	0.800	0.800	84	82	41 - 110	2	36	
2-Chlorophenol	0.584	0.579	0.800	0.800	73	72	42 - 112	1	39	
1,4-Dichlorobenzene	0.244	0.231	0.400	0.400	61	58	37 - 104	5	39	
n-Nitroso-di-n-propylamine	0.289	0.288	0.400	0.400	72	72	39 - 102	0	34	
1,2,4-Trichlorobenzene	0.239	0.229	0.400	0.400	60	57	34 - 107	4	37	
4-Chloro-3-methylphenol	0.606	0.593	0.800	0.800	76	74	54 - 104	2	28	
Acenaphthene	0.259	0.259	0.400	0.400	65	65	52 - 103	0	30	
4-Nitrophenol	0.400	0.447	0.800	0.800	50	56	50 - 125	11	25	
Pentachlorophenol	0.496	0.481	0.800	0.800	62	60	25 - 141	3	28	
Pyrene	0.282	0.275	0.400	0.400	71	69	57 - 120	3	22	
<i>Surrogate:</i>										
2-Fluorophenol					70	72	24 - 117			
Phenol-d6					78	79	30 - 120			
Nitrobenzene-d5					67	69	27 - 112			
2-Fluorobiphenyl					70	71	35 - 113			
2,4,6-Tribromophenol					54	54	21 - 120			
Terphenyl-d14					67	68	39 - 121			



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TYLR 1-M-2016					
Laboratory ID:	08-376-01					
Total Solids	37	0.50	SM 2540G	9-29-16	9-30-16	

Client ID:	TYLR 1-R-2016					
Laboratory ID:	08-376-02					
Total Solids	65	0.50	SM 2540G	9-6-16	9-7-16	

Client ID:	TYLR 2-M-2016					
Laboratory ID:	08-376-03					
Total Solids	28	0.50	SM 2540G	9-29-16	9-30-16	

Client ID:	TYLR 2-R-2016					
Laboratory ID:	08-376-04					
Total Solids	51	0.50	SM 2540G	9-7-16	9-8-16	



Date of Report: October 1, 2016
 Samples Submitted: August 30, 2016
 Laboratory Reference: 1608-376
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-376-04								
	ORIG	DUP							
Total Solids	51.1	48.9	NA	NA	NA	NA	4	20	
Laboratory ID:	08-376-03								
	ORIG	DUP							
Total Solids	27.8	27.9	NA	NA	NA	NA	0	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 8/30/2016 / TYLR-1 and TYLR-2

By G. Catarra
 Date 11/02/2016 Page 1 of 1
 Checked: initials JL
 date 11/16/2016

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	23	≤14	≤0.042% 0.4 %	NA	NA	110	±20	6	≤20	NS	≤35	OK	NONE. EPA HOLDING TIME 28 DAYS
Copper	OK / EPA 6010C	NA	NA	42	≤180	≤1.0 MG/KG 1.0 MG/KG	101,103	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6010C	NA	NA	42	≤180	≤2.5 mg/kg 2.5 MG/KG	95,96	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	5	≤14	1	≤40	≤4 ug/kg 6.6-14 UG/KG	SURR 53-89	NA / 21- 120	56-76	25- 141	BS/BSD 1-15	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	5	≤14	<1	≤40	≤20-100 UG/KG 33-350	SURR 53-89	NA / 21- 120	56-76	25- 141	BS/BSD 1-15	≤400	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 1, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1609-014

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on September 1, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 1, 2016
Samples Submitted: September 1, 2016
Laboratory Reference: 1609-014
Project: 14-05806-000

Case Narrative

Samples were collected on September 1, 2016 and received by the laboratory on September 1, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all Sediment sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

The samples were centrifuged and the water was decanted before analysis.



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
 Laboratory Reference: 1609-014
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-3R-2016					
Laboratory ID:	09-014-01					
Total Organic Carbon	2.1	0.40	EPA 9060	9-6-16	9-6-16	
Client ID:	MONT-2R-2016					
Laboratory ID:	09-014-03					
Total Organic Carbon	3.6	0.38	EPA 9060	9-6-16	9-6-16	



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
 Laboratory Reference: 1609-014
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0906S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-6-16	9-6-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-173-02							
	ORIG	DUP						
Total Organic Carbon	1.20	1.13	NA	NA	NA	NA	6	26

SPIKE BLANK

Laboratory ID:	SB0906S1							
	SB	SB		SB				
Total Organic Carbon	46.3	42.1	NA	110	85-131	NA	NA	



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
 Laboratory Reference: 1609-014
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-014-02					
Client ID:	MONT-3M-2016					
Copper	51	3.3	6010C	9-30-16	9-30-16	
Zinc	730	8.3	6010C	9-30-16	9-30-16	

Lab ID:	09-014-04					
Client ID:	MONT-2M-2016					
Copper	38	4.7	6010C	9-30-16	9-30-16	
Zinc	790	12	6010C	9-30-16	9-30-16	



Date of Report: October 1, 2016
Samples Submitted: September 1, 2016
Laboratory Reference: 1609-014
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB0930SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 1, 2016
Samples Submitted: September 1, 2016
Laboratory Reference: 1609-014
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.60	9.85	3	1.0	
Zinc	51.1	51.9	2	2.5	



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
 Laboratory Reference: 1609-014
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.1	101	61.0	103	2	
Zinc	100	146	95	147	96	1	



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
 Laboratory Reference: 1609-014
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-3R-2016					
Laboratory ID:	09-014-01					
Naphthalene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
2-Methylnaphthalene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
1-Methylnaphthalene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Dimethylphthalate	ND	0.032	EPA 8270D	9-6-16	9-6-16	
Acenaphthylene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Acenaphthene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Diethylphthalate	ND	0.16	EPA 8270D	9-6-16	9-6-16	
Fluorene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Phenanthrene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Anthracene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Di-n-butylphthalate	ND	0.16	EPA 8270D	9-6-16	9-6-16	
Fluoranthene	0.0092	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Pyrene	0.0098	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Butylbenzylphthalate	ND	0.032	EPA 8270D	9-6-16	9-6-16	
Benzo[a]anthracene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Chrysene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
bis(2-Ethylhexyl)phthalate	0.097	0.032	EPA 8270D	9-6-16	9-6-16	
Di-n-octylphthalate	ND	0.032	EPA 8270D	9-6-16	9-6-16	
Benzo[b]fluoranthene	0.012	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo(j,k)fluoranthene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[a]pyrene	0.012	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Indeno[1,2,3-cd]pyrene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Dibenz[a,h]anthracene	ND	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[g,h,i]perylene	0.011	0.0064	EPA 8270D/SIM	9-6-16	9-6-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>45</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>57</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>43</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>40</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>40</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>44</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
 Laboratory Reference: 1609-014
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-2R-2016					
Laboratory ID:	09-014-03					
Naphthalene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
2-Methylnaphthalene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
1-Methylnaphthalene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Dimethylphthalate	ND	0.034	EPA 8270D	9-6-16	9-6-16	
Acenaphthylene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Acenaphthene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Diethylphthalate	ND	0.17	EPA 8270D	9-6-16	9-6-16	
Fluorene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Phenanthrene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Anthracene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Di-n-butylphthalate	ND	0.17	EPA 8270D	9-6-16	9-6-16	
Fluoranthene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Pyrene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Butylbenzylphthalate	ND	0.034	EPA 8270D	9-6-16	9-6-16	
Benzo[a]anthracene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Chrysene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
bis(2-Ethylhexyl)phthalate	0.067	0.034	EPA 8270D	9-6-16	9-6-16	
Di-n-octylphthalate	ND	0.034	EPA 8270D	9-6-16	9-6-16	
Benzo[b]fluoranthene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo(j,k)fluoranthene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[a]pyrene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Indeno[1,2,3-cd]pyrene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Dibenz[a,h]anthracene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[g,h,i]perylene	ND	0.0068	EPA 8270D/SIM	9-6-16	9-6-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>45</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>55</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>37</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>39</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>43</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>51</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
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 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0906S2					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Dimethylphthalate	ND	0.020	EPA 8270D	9-6-16	9-6-16	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Diethylphthalate	ND	0.10	EPA 8270D	9-6-16	9-6-16	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-6-16	9-6-16	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Butylbenzylphthalate	ND	0.020	EPA 8270D	9-6-16	9-6-16	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
bis(2-Ethylhexyl)phthalate	ND	0.020	EPA 8270D	9-6-16	9-6-16	
Di-n-octylphthalate	ND	0.020	EPA 8270D	9-6-16	9-6-16	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-6-16	9-6-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>72</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>77</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>63</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>68</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>54</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>66</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
 Laboratory Reference: 1609-014
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB0906S2									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.669	0.658	0.800	0.800	84	82	41 - 110	2	36	
2-Chlorophenol	0.584	0.579	0.800	0.800	73	72	42 - 112	1	39	
1,4-Dichlorobenzene	0.244	0.231	0.400	0.400	61	58	37 - 104	5	39	
n-Nitroso-di-n-propylamine	0.289	0.288	0.400	0.400	72	72	39 - 102	0	34	
1,2,4-Trichlorobenzene	0.239	0.229	0.400	0.400	60	57	34 - 107	4	37	
4-Chloro-3-methylphenol	0.606	0.593	0.800	0.800	76	74	54 - 104	2	28	
Acenaphthene	0.259	0.259	0.400	0.400	65	65	52 - 103	0	30	
4-Nitrophenol	0.400	0.447	0.800	0.800	50	56	50 - 125	11	25	
Pentachlorophenol	0.496	0.481	0.800	0.800	62	60	25 - 141	3	28	
Pyrene	0.282	0.275	0.400	0.400	71	69	57 - 120	3	22	
<i>Surrogate:</i>										
2-Fluorophenol					70	72	24 - 117			
Phenol-d6					78	79	30 - 120			
Nitrobenzene-d5					67	69	27 - 112			
2-Fluorobiphenyl					70	71	35 - 113			
2,4,6-Tribromophenol					54	54	21 - 120			
Terphenyl-d14					67	68	39 - 121			



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
 Laboratory Reference: 1609-014
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-3R-2016					
Laboratory ID:	09-014-01					
Total Solids	63	0.50	SM 2540G	9-2-16	9-6-16	
Client ID:	MONT-3M-2016					
Laboratory ID:	09-014-02					
Total Solids	30	0.50	SM 2540G	9-29-16	9-30-16	
Client ID:	MONT-2R-2016					
Laboratory ID:	09-014-03					
Total Solids	59	0.50	SM 2540G	9-2-16	9-6-16	
Client ID:	MONT-2M-2016					
Laboratory ID:	09-014-04					
Total Solids	21	0.50	SM 2540G	9-29-16	9-30-16	



Date of Report: October 1, 2016
 Samples Submitted: September 1, 2016
 Laboratory Reference: 1609-014
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-014-03								
	ORIG	DUP							
Total Solids	59.1	62.1	NA	NA	NA	NA	5	20	
Laboratory ID:	09-118-02								
	ORIG	DUP							
Total Solids	18.9	19.1	NA	NA	NA	NA	1	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/01/2016 / MONT-3 and MONT-2

By G. Catarra
 Date 11/08/2016 Page 1 of 1
 Checked: initials JL
 date 11/16/2016

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	5	≤14	≤0.042% 0.4 %	NA	NA	110	±20	6	≤20	NS	≤35	OK	NONE.
Copper	OK / EPA 6010C	NA	NA	29	≤180	≤1.0 MG/KG 1.0 MG/KG	101,103	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6010C	NA	NA	29	≤180	≤2.5 mg/kg 2.5 MG/KG	95,96	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	5	≤14	<1	≤40	≤4 ug/kg 6.6-14 UG/KG	SURR 53-89	NA / 21- 120	50-84	25- 141	BS/BSD 0-11	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	5	≤14	<1	≤40	≤20-100 UG/KG 33-350	SURR 37-57	NA / 21- 120	50-84	25- 141	BS/BSD 0-11	≤40	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 1, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1609-105

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on September 9, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 1, 2016
Samples Submitted: September 9, 2016
Laboratory Reference: 1609-105
Project: 14-05806-000

Case Narrative

Samples were collected on September 9, 2016 and received by the laboratory on September 9, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all Sediment sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

The samples were centrifuged and the water was decanted before analysis.

Semivolatiles EPA 8270D/SIM Analysis

Bis(2-Ethylhexyl)phthalate was found in the sample and method blank, indicating laboratory contamination. Sample results have been flagged with a "B" data qualifier.

Please note that any other QA/QC issues associated with these extractions and analyses will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.



Date of Report: October 1, 2016
Samples Submitted: September 9, 2016
Laboratory Reference: 1609-105
Project: 14-05806-000

**TOTAL ORGANIC CARBON
EPA 9060A**

Matrix: Sediment
Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	CTRY-1R-2016					
Laboratory ID:	09-105-02					
Total Organic Carbon	2.9	0.39	EPA 9060	9-22-16	9-22-16	
Client ID:	CTRY-2R-2016					
Laboratory ID:	09-105-04					
Total Organic Carbon	3.7	0.38	EPA 9060	9-22-16	9-22-16	



Date of Report: October 1, 2016
 Samples Submitted: September 9, 2016
 Laboratory Reference: 1609-105
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0922S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-22-16	9-22-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-376-02							
	ORIG	DUP						
Total Organic Carbon	2.96	2.70	NA	NA	NA	9	26	

SPIKE BLANK								
Laboratory ID:	SB0922S1							
	SB	SB		SB				
Total Organic Carbon	42.7	42.1	NA	101	85-131	NA	NA	



Date of Report: October 1, 2016
 Samples Submitted: September 9, 2016
 Laboratory Reference: 1609-105
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-105-01						
Client ID: CTRY-1M-2016						
Copper	23	1.5	6010C	9-30-16	9-30-16	
Zinc	210	3.6	6010C	9-30-16	9-30-16	
Lab ID: 09-105-03						
Client ID: CTRY-2M-2016						
Copper	16	1.9	6010C	9-30-16	9-30-16	
Zinc	130	4.7	6010C	9-30-16	9-30-16	



Date of Report: October 1, 2016
Samples Submitted: September 9, 2016
Laboratory Reference: 1609-105
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB0930SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 1, 2016
Samples Submitted: September 9, 2016
Laboratory Reference: 1609-105
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.60	9.85	3	1.0	
Zinc	51.1	51.9	2	2.5	



Date of Report: October 1, 2016
 Samples Submitted: September 9, 2016
 Laboratory Reference: 1609-105
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.1	101	61.0	103	2	
Zinc	100	146	95	147	96	1	



Date of Report: October 1, 2016
 Samples Submitted: September 9, 2016
 Laboratory Reference: 1609-105
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	CTRY-1R-2016					
Laboratory ID:	09-105-02					
Naphthalene	ND	0.0058	EPA 8270D/SIM	9-15-16	9-21-16	
2-Methylnaphthalene	ND	0.0058	EPA 8270D/SIM	9-15-16	9-21-16	
1-Methylnaphthalene	ND	0.0058	EPA 8270D/SIM	9-15-16	9-21-16	
Dimethylphthalate	ND	0.029	EPA 8270D	9-15-16	9-20-16	
Acenaphthylene	ND	0.0058	EPA 8270D/SIM	9-15-16	9-21-16	
Acenaphthene	ND	0.0058	EPA 8270D/SIM	9-15-16	9-21-16	
Diethylphthalate	ND	0.15	EPA 8270D	9-15-16	9-20-16	
Fluorene	0.0064	0.0058	EPA 8270D/SIM	9-15-16	9-21-16	
Phenanthrene	0.11	0.029	EPA 8270D	9-15-16	9-20-16	
Anthracene	0.021	0.0058	EPA 8270D/SIM	9-15-16	9-21-16	
Di-n-butylphthalate	ND	0.15	EPA 8270D	9-15-16	9-20-16	
Fluoranthene	0.22	0.029	EPA 8270D	9-15-16	9-20-16	
Pyrene	0.19	0.029	EPA 8270D	9-15-16	9-20-16	
Butylbenzylphthalate	ND	0.029	EPA 8270D	9-15-16	9-20-16	
Benzo[a]anthracene	0.081	0.029	EPA 8270D	9-15-16	9-20-16	
Chrysene	0.11	0.029	EPA 8270D	9-15-16	9-20-16	
bis(2-Ethylhexyl)phthalate	0.29	0.029	EPA 8270D	9-15-16	9-20-16	B
Di-n-octylphthalate	ND	0.029	EPA 8270D	9-15-16	9-20-16	
Benzo[b]fluoranthene	0.13	0.029	EPA 8270D	9-15-16	9-20-16	
Benzo(j,k)fluoranthene	0.045	0.029	EPA 8270D	9-15-16	9-20-16	
Benzo[a]pyrene	0.089	0.029	EPA 8270D	9-15-16	9-20-16	
Indeno[1,2,3-cd]pyrene	0.057	0.029	EPA 8270D	9-15-16	9-20-16	
Dibenz[a,h]anthracene	0.017	0.0058	EPA 8270D/SIM	9-15-16	9-21-16	
Benzo[g,h,i]perylene	0.064	0.029	EPA 8270D	9-15-16	9-20-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorophenol	41	24 - 117				
Phenol-d6	50	30 - 120				
Nitrobenzene-d5	44	27 - 112				
2-Fluorobiphenyl	51	35 - 113				
2,4,6-Tribromophenol	53	21 - 120				
Terphenyl-d14	57	39 - 121				



Date of Report: October 1, 2016
 Samples Submitted: September 9, 2016
 Laboratory Reference: 1609-105
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	CTRY-2R-2016					
Laboratory ID:	09-105-04					
Naphthalene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
2-Methylnaphthalene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
1-Methylnaphthalene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Dimethylphthalate	ND	0.037	EPA 8270D	9-15-16	9-20-16	
Acenaphthylene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Acenaphthene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Diethylphthalate	ND	0.19	EPA 8270D	9-15-16	9-20-16	
Fluorene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Phenanthrene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Anthracene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Di-n-butylphthalate	ND	0.19	EPA 8270D	9-15-16	9-20-16	
Fluoranthene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Pyrene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Butylbenzylphthalate	ND	0.037	EPA 8270D	9-15-16	9-20-16	
Benzo[a]anthracene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Chrysene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
bis(2-Ethylhexyl)phthalate	0.052	0.037	EPA 8270D	9-15-16	9-20-16	B
Di-n-octylphthalate	ND	0.037	EPA 8270D	9-15-16	9-20-16	
Benzo[b]fluoranthene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Benzo(j,k)fluoranthene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Benzo[a]pyrene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Indeno[1,2,3-cd]pyrene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Dibenz[a,h]anthracene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
Benzo[g,h,i]perylene	ND	0.0075	EPA 8270D/SIM	9-15-16	9-21-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>50</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>58</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>55</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>53</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>56</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>57</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: September 9, 2016
 Laboratory Reference: 1609-105
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0915S1					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Dimethylphthalate	ND	0.020	EPA 8270D	9-15-16	9-17-16	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Diethylphthalate	ND	0.10	EPA 8270D	9-15-16	9-17-16	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-15-16	9-17-16	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Butylbenzylphthalate	ND	0.020	EPA 8270D	9-15-16	9-17-16	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
bis(2-Ethylhexyl)phthalate	0.050	0.020	EPA 8270D	9-15-16	9-17-16	
Di-n-octylphthalate	ND	0.020	EPA 8270D	9-15-16	9-17-16	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Benzo[j,k]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-15-16	9-16-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>65</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>68</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>67</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>71</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>66</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>81</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: September 9, 2016
 Laboratory Reference: 1609-105
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB0915S1									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.486	0.527	0.800	0.800	61	66	41 - 110	8	36	
2-Chlorophenol	0.510	0.540	0.800	0.800	64	68	42 - 112	6	39	
1,4-Dichlorobenzene	0.233	0.245	0.400	0.400	58	61	37 - 104	5	39	
n-Nitroso-di-n-propylamine	0.246	0.260	0.400	0.400	62	65	39 - 102	6	34	
1,2,4-Trichlorobenzene	0.244	0.257	0.400	0.400	61	64	34 - 107	5	37	
4-Chloro-3-methylphenol	0.584	0.589	0.800	0.800	73	74	54 - 104	1	28	
Acenaphthene	0.260	0.260	0.400	0.400	65	65	52 - 103	0	30	
4-Nitrophenol	0.615	0.611	0.800	0.800	77	76	51 - 125	1	25	
2,4-Dinitrotoluene	0.262	0.260	0.400	0.400	66	65	53 - 118	1	29	
Pentachlorophenol	0.747	0.711	0.800	0.800	93	89	25 - 141	5	28	
Pyrene	0.317	0.323	0.400	0.400	79	81	57 - 120	2	22	
<i>Surrogate:</i>										
2-Fluorophenol					64	69	24 - 117			
Phenol-d6					67	72	30 - 120			
Nitrobenzene-d5					66	71	27 - 112			
2-Fluorobiphenyl					72	74	35 - 113			
2,4,6-Tribromophenol					71	70	21 - 120			
Terphenyl-d14					82	84	39 - 121			



Date of Report: October 1, 2016
 Samples Submitted: September 9, 2016
 Laboratory Reference: 1609-105
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	CTRY-1M-2016					
Laboratory ID:	09-105-01					
Total Solids	36	0.50	SM 2540G	9-29-16	9-30-16	
Client ID:	CTRY-1R-2016					
Laboratory ID:	09-105-02					
Total Solids	69	0.50	SM 2540G	9-12-16	9-14-16	
Client ID:	CTRY-2M-2016					
Laboratory ID:	09-105-03					
Total Solids	50	0.50	SM 2540G	9-29-16	9-30-16	
Client ID:	CTRY-2R-2016					
Laboratory ID:	09-105-04					
Total Solids	53	0.50	SM 2540G	9-12-16	9-14-16	



Date of Report: October 1, 2016
 Samples Submitted: September 9, 2016
 Laboratory Reference: 1609-105
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-105-04								
	ORIG	DUP							
Total Solids	53.4	53.8	NA	NA	NA	NA	1	20	
Laboratory ID:	09-118-02								
	ORIG	DUP							
Total Solids	18.9	19.1	NA	NA	NA	NA	1	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/09/2016 / CTRY-1 and CTRY-2

By G. Catarra
 Date 11/08/2016 Page 1 of 1
 Checked: initials JL
 date 11/17/2016

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	13	≤14	≤0.042% 0.4 %	NA	NA	101	±20	9	≤20	NS	≤35	OK	NONE.
Copper	OK / EPA 6010C	NA	NA	21	≤180	≤1.0 MG/KG 1.0 MG/KG	101,103	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6010C	NA	NA	21	≤180	≤2.5 mg/kg 2.5 MG/KG	95,96	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	6	≤14	6	≤40	≤4 ug/kg 6.6-14 UG/KG	SURR 41-58	NA / 21- 120	58-93	25- 141	BS/BSD 0-8	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	6	≤14	5	≤40	≤20-100 UG/KG 33-350	SURR 41-58	NA / 21- 120	58-93	25- 141	BS/BSD 0-8	≤40	NS	≤50	OK	BEHP DETECTED IN MB (50 UG/KG). RESULTS FOR BOTH SAMPLES FLAGGED J BECAUSE LESS THAN 5X BLANK CONTAMINATION.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 1, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1609-118

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on September 12, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 1, 2016
Samples Submitted: September 12, 2016
Laboratory Reference: 1609-118
Project: 14-05806-000

Case Narrative

Samples were collected on September 12, 2016 and received by the laboratory on September 12, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all Sediment sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

The samples were centrifuged and the water was decanted before analysis.



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-4R-2016					
Laboratory ID:	09-118-01					
Total Organic Carbon	12	0.40	EPA 9060	9-22-16	9-22-16	
Client ID:	MONT-5R-2016					
Laboratory ID:	09-118-03					
Total Organic Carbon	3.5	0.37	EPA 9060	9-22-16	9-22-16	
Client ID:	TOSH-4R-2016					
Laboratory ID:	09-118-05					
Total Organic Carbon	0.82	0.10	EPA 9060	9-22-16	9-22-16	



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0922S1					
Total Organic Carbon	ND	0.042	EPA 9060	9-22-16	9-22-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-376-02							
	ORIG	DUP						
Total Organic Carbon	2.96	2.70	NA	NA	NA	9	26	

SPIKE BLANK								
Laboratory ID:	SB0922S1							
	SB	SB		SB				
Total Organic Carbon	42.7	42.1	NA	101	85-131	NA	NA	



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	09-118-02					
Client ID:	MONT-4M-2016					
Copper	51	5.3	6010C	9-30-16	9-30-16	
Zinc	270	13	6010C	9-30-16	9-30-16	
Lab ID:	09-118-04					
Client ID:	MONT-5M-2016					
Copper	34	4.3	6010C	9-30-16	9-30-16	
Zinc	200	11	6010C	9-30-16	9-30-16	
Lab ID:	09-118-06					
Client ID:	TOSH-4M-2016					
Copper	29	2.0	6010C	9-30-16	9-30-16	
Zinc	410	4.9	6010C	9-30-16	9-30-16	



Date of Report: October 1, 2016
Samples Submitted: September 12, 2016
Laboratory Reference: 1609-118
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB0930SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 1, 2016
Samples Submitted: September 12, 2016
Laboratory Reference: 1609-118
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.60	9.85	3	1.0	
Zinc	51.1	51.9	2	2.5	



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.1	101	61.0	103	2	
Zinc	100	146	95	147	96	1	



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-4R-2016					
Laboratory ID:	09-118-01					
Naphthalene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
2-Methylnaphthalene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
1-Methylnaphthalene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Dimethylphthalate	ND	0.099	EPA 8270D	9-19-16	9-20-16	
Acenaphthylene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Acenaphthene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Diethylphthalate	ND	0.50	EPA 8270D	9-19-16	9-20-16	
Fluorene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Phenanthrene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Anthracene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Di-n-butylphthalate	ND	0.50	EPA 8270D	9-19-16	9-20-16	
Fluoranthene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Pyrene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Butylbenzylphthalate	ND	0.099	EPA 8270D	9-19-16	9-20-16	
Benzo[a]anthracene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Chrysene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
bis(2-Ethylhexyl)phthalate	ND	0.099	EPA 8270D	9-19-16	9-20-16	
Di-n-octylphthalate	ND	0.099	EPA 8270D	9-19-16	9-20-16	
Benzo[b]fluoranthene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo(j,k)fluoranthene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo[a]pyrene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Indeno[1,2,3-cd]pyrene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Dibenz[a,h]anthracene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo[g,h,i]perylene	ND	0.020	EPA 8270D/SIM	9-19-16	9-20-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>39</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>49</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>42</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>43</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>52</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>48</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-5R-2016					
Laboratory ID:	09-118-03					
Naphthalene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
2-Methylnaphthalene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
1-Methylnaphthalene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Dimethylphthalate	ND	0.034	EPA 8270D	9-19-16	9-20-16	
Acenaphthylene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Acenaphthene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Diethylphthalate	ND	0.17	EPA 8270D	9-19-16	9-20-16	
Fluorene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Phenanthrene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Anthracene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Di-n-butylphthalate	ND	0.17	EPA 8270D	9-19-16	9-20-16	
Fluoranthene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Pyrene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Butylbenzylphthalate	0.036	0.034	EPA 8270D	9-19-16	9-20-16	
Benzo[a]anthracene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Chrysene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
bis(2-Ethylhexyl)phthalate	0.044	0.034	EPA 8270D	9-19-16	9-20-16	
Di-n-octylphthalate	ND	0.034	EPA 8270D	9-19-16	9-20-16	
Benzo[b]fluoranthene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo(j,k)fluoranthene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo[a]pyrene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Indeno[1,2,3-cd]pyrene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Dibenz[a,h]anthracene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo[g,h,i]perylene	ND	0.0068	EPA 8270D/SIM	9-19-16	9-20-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>40</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>49</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>44</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>48</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>55</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>53</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-4R-2016					
Laboratory ID:	09-118-05					
Naphthalene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
2-Methylnaphthalene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
1-Methylnaphthalene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Dimethylphthalate	ND	0.026	EPA 8270D	9-19-16	9-19-16	
Acenaphthylene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Acenaphthene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Diethylphthalate	ND	0.13	EPA 8270D	9-19-16	9-19-16	
Fluorene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Phenanthrene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Anthracene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Di-n-butylphthalate	ND	0.13	EPA 8270D	9-19-16	9-19-16	
Fluoranthene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Pyrene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Butylbenzylphthalate	ND	0.026	EPA 8270D	9-19-16	9-19-16	
Benzo[a]anthracene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Chrysene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
bis(2-Ethylhexyl)phthalate	0.031	0.026	EPA 8270D	9-19-16	9-19-16	
Di-n-octylphthalate	ND	0.026	EPA 8270D	9-19-16	9-19-16	
Benzo[b]fluoranthene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo(j,k)fluoranthene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo[a]pyrene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Indeno[1,2,3-cd]pyrene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Dibenz[a,h]anthracene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo[g,h,i]perylene	ND	0.0052	EPA 8270D/SIM	9-19-16	9-20-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>44</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>56</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>51</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>61</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>66</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>68</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0919S1					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Dimethylphthalate	ND	0.020	EPA 8270D	9-19-16	9-19-16	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Diethylphthalate	ND	0.10	EPA 8270D	9-19-16	9-19-16	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-19-16	9-19-16	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Butylbenzylphthalate	ND	0.020	EPA 8270D	9-19-16	9-19-16	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
bis(2-Ethylhexyl)phthalate	ND	0.020	EPA 8270D	9-19-16	9-19-16	
Di-n-octylphthalate	ND	0.020	EPA 8270D	9-19-16	9-19-16	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-19-16	9-20-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>53</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>58</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>55</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>61</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>59</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>71</i>	<i>39 - 121</i>				



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 MS/MSD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Source	Percent		Recovery	RPD	RPD	Flags
	MS	MSD	MS	MSD	Result	Recovery	Limits	RPD	Limit		
MATRIX SPIKES											
Laboratory ID:	09-118-05										
	MS	MSD	MS	MSD		MS	MSD				
Phenol	0.405	0.453	0.800	0.800	ND	51	57	31 - 108	11	36	
2-Chlorophenol	0.385	0.451	0.800	0.800	ND	48	56	38 - 103	16	38	
1,4-Dichlorobenzene	0.165	0.199	0.400	0.400	ND	41	50	25 - 101	19	40	
n-Nitroso-di-n-propylamine	0.193	0.235	0.400	0.400	ND	48	59	26 - 102	20	38	
1,2,4-Trichlorobenzene	0.189	0.217	0.400	0.400	ND	47	54	27 - 101	14	40	
4-Chloro-3-methylphenol	0.547	0.592	0.800	0.800	ND	68	74	42 - 106	8	29	
Acenaphthene	0.242	0.247	0.400	0.400	ND	61	62	42 - 103	2	30	
4-Nitrophenol	0.543	0.612	0.800	0.800	ND	68	77	25 - 125	12	29	
2,4-Dinitrotoluene	0.253	0.275	0.400	0.400	ND	63	69	45 - 107	8	30	
Pentachlorophenol	0.672	0.775	0.800	0.800	ND	84	97	30 - 103	14	31	
Pyrene	0.273	0.291	0.400	0.400	ND	68	73	50 - 118	6	28	
<i>Surrogate:</i>											
2-Fluorophenol						47	55	24 - 117			
Phenol-d6						55	60	30 - 120			
Nitrobenzene-d5						50	59	27 - 112			
2-Fluorobiphenyl						65	63	35 - 113			
2,4,6-Tribromophenol						62	71	21 - 120			
Terphenyl-d14						69	75	39 - 121			



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MONT-4R-2016					
Laboratory ID:	09-118-01					
Total Solids	20	0.50	SM 2540G	9-13-16	9-14-16	
Client ID:	MONT-4M-2016					
Laboratory ID:	09-118-02					
Total Solids	19	0.50	SM 2540G	9-29-16	9-30-16	
Client ID:	MONT-5R-2016					
Laboratory ID:	09-118-03					
Total Solids	59	0.50	SM 2540G	9-13-16	9-14-16	
Client ID:	MONT-5M-2016					
Laboratory ID:	09-118-04					
Total Solids	23	0.50	SM 2540G	9-29-16	9-30-16	
Client ID:	TOSH-4R-2016					
Laboratory ID:	09-118-05					
Total Solids	77	0.50	SM 2540G	9-13-16	9-14-16	
Client ID:	TOSH-4M-2016					
Laboratory ID:	09-118-06					
Total Solids	51	0.50	SM 2540G	9-29-16	9-30-16	



Date of Report: October 1, 2016
 Samples Submitted: September 12, 2016
 Laboratory Reference: 1609-118
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-118-01								
	ORIG	DUP							
Total Solids	20.2	21.2	NA	NA	NA	NA	5	20	
Laboratory ID:	09-118-02								
	ORIG	DUP							
Total Solids	18.9	19.1	NA	NA	NA	NA	1	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: Jeremy Bunn

CHAIN OF CUSTODY

Turnaround Requested:

- 1 Day
- 2 Day
- 3 Day
- Standard

Laboratory No.

09-118

Requested Analyses

Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates											Total Solids
X			X	X											X
	X	X													↓
X			X	X											
	X	X													
X			X	X											
	X	X													

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.
1	MONT-4R-2016	9.12.16	10:30	Sediment	1
2	MONT-4M-2016	9.12.16	10:30	Sediment	1
3	MONT-SR-2016	9.12.16	12:30	Sediment	1
4	MONT-SM-2016	9.12.16	12:30	Sediment	1
5	TOSH-4R-2016	9.12.16	14:30	Sediment	1
6	TOSH-4M-2016	9.12.16	14:30	Sediment	1

Relinquished by [Signature] Date 9.12.16 Received by [Signature] Date 9/12/16
 Firm Herrera Env. Cons. Time 15:20 Firm [Signature] Time 1520

Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/12/2016 / MONT-4, MONT-5, and TOSH-4

By G. Catarra
 Date 11/08/2016 Page 1 of 1
 Checked: initials JL
 date 11/16/2017

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	10	≤14	≤0.042% 0.4 %	NA	NA	101	±20	9	≤20	NS	≤35	OK	NONE.
Copper	OK / EPA 6010C	NA	NA	18	≤180	≤1.0 MG/KG 1.0 MG/KG	101,103	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6010C	NA	NA	18	≤180	≤2.5 mg/kg 2.5 MG/KG	95,96	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	7	≤14	1	≤40	≤4 ug/kg 6.6-14 UG/KG	SURR 39-68	NA / 21- 120	41-97	25- 141	BS/BSD 2-20	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	7	≤14	1	≤40	≤20-100 UG/KG 33-350	SURR 39-68	NA / 21- 120	41-97	25- 141	BS/BSD 2-20	≤40	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 4, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1609-204

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on September 16, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 4, 2016
Samples Submitted: September 16, 2016
Laboratory Reference: 1609-204
Project: 14-05806-000

Case Narrative

Samples were collected on September 16, 2016 and received by the laboratory on September 16, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

The samples were centrifuged and the water was decanted before analysis.



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	EVALSS-1R-2016					
Laboratory ID:	09-204-01					
Total Organic Carbon	2.1	0.34	EPA 9060	10-3-16	10-3-16	
Client ID:	EVAMSS-1R-2016					
Laboratory ID:	09-204-03					
Total Organic Carbon	4.4	0.32	EPA 9060	10-3-16	10-3-16	



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1003S1					
Total Organic Carbon	ND	0.042	EPA 9060	10-3-16	10-3-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-204-01							
	ORIG	DUP						
Total Organic Carbon	2.07	1.983	NA	NA	NA	NA	4	26

SPIKE BLANK								
Laboratory ID:	SB1003S1							
	SB	SB		SB				
Total Organic Carbon	45.9	42.1	NA	109	85-131	NA	NA	



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-204-02						
Client ID: EVALSS-1M-2016						
Copper	30	4.0	6010C	9-30-16	9-30-16	
Zinc	99	10	6010C	9-30-16	9-30-16	
Lab ID: 09-204-04						
Client ID: EVAMSS-1M-2016						
Copper	21	4.8	6010C	9-30-16	9-30-16	
Zinc	85	12	6010C	9-30-16	9-30-16	



Date of Report: October 4, 2016
Samples Submitted: September 16, 2016
Laboratory Reference: 1609-204
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB0930SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 4, 2016
Samples Submitted: September 16, 2016
Laboratory Reference: 1609-204
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.60	9.85	3	1.0	
Zinc	51.1	51.9	2	2.5	



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.1	101	61.0	103	2	
Zinc	100	146	95	147	96	1	



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	EVALSS-1R-2016					
Laboratory ID:	09-204-01					
Naphthalene	ND	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
2-Methylnaphthalene	ND	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
1-Methylnaphthalene	ND	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Dimethylphthalate	ND	0.028	EPA 8270D	9-23-16	9-23-16	
Acenaphthylene	ND	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Acenaphthene	ND	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Diethylphthalate	ND	0.14	EPA 8270D	9-23-16	9-23-16	
Fluorene	ND	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Phenanthrene	ND	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Anthracene	ND	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Di-n-butylphthalate	ND	0.14	EPA 8270D	9-23-16	9-23-16	
Fluoranthene	0.026	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Pyrene	0.040	0.028	EPA 8270D	9-23-16	9-23-16	
Butylbenzylphthalate	ND	0.028	EPA 8270D	9-23-16	9-23-16	
Benzo[a]anthracene	0.031	0.028	EPA 8270D	9-23-16	9-23-16	
Chrysene	0.032	0.028	EPA 8270D	9-23-16	9-23-16	
bis(2-Ethylhexyl)phthalate	ND	0.028	EPA 8270D	9-23-16	9-23-16	
Di-n-octylphthalate	ND	0.028	EPA 8270D	9-23-16	9-23-16	
Benzo[b]fluoranthene	0.038	0.028	EPA 8270D	9-23-16	9-23-16	
Benzo(j,k)fluoranthene	0.012	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Benzo[a]pyrene	0.028	0.028	EPA 8270D	9-23-16	9-23-16	
Indeno[1,2,3-cd]pyrene	0.0099	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Dibenz[a,h]anthracene	ND	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
Benzo[g,h,i]perylene	0.012	0.0056	EPA 8270D/SIM	9-23-16	9-24-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>55</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>63</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>59</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>63</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>62</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>64</i>	<i>39 - 121</i>				



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	EVAMSS-1R-2016					
Laboratory ID:	09-204-03					
Naphthalene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
2-Methylnaphthalene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
1-Methylnaphthalene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Dimethylphthalate	ND	0.21	EPA 8270D	9-23-16	9-23-16	
Acenaphthylene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Acenaphthene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Diethylphthalate	ND	1.1	EPA 8270D	9-23-16	9-23-16	
Fluorene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Phenanthrene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Anthracene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Di-n-butylphthalate	ND	1.1	EPA 8270D	9-23-16	9-23-16	
Fluoranthene	0.052	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Pyrene	0.043	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Butylbenzylphthalate	ND	0.21	EPA 8270D	9-23-16	9-23-16	
Benzo[a]anthracene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Chrysene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
bis(2-Ethylhexyl)phthalate	ND	0.21	EPA 8270D	9-23-16	9-23-16	
Di-n-octylphthalate	ND	0.21	EPA 8270D	9-23-16	9-23-16	
Benzo[b]fluoranthene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Benzo(j,k)fluoranthene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Benzo[a]pyrene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Indeno[1,2,3-cd]pyrene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Dibenz[a,h]anthracene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
Benzo[g,h,i]perylene	ND	0.043	EPA 8270D/SIM	9-23-16	9-24-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>52</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>60</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>57</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>64</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>65</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>58</i>	<i>39 - 121</i>				



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0923S1					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Dimethylphthalate	ND	0.020	EPA 8270D	9-23-16	9-23-16	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Diethylphthalate	ND	0.10	EPA 8270D	9-23-16	9-23-16	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-23-16	9-23-16	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Butylbenzylphthalate	ND	0.020	EPA 8270D	9-23-16	9-23-16	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
bis(2-Ethylhexyl)phthalate	ND	0.020	EPA 8270D	9-23-16	9-23-16	
Di-n-octylphthalate	ND	0.020	EPA 8270D	9-23-16	9-23-16	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Benzo[j,k]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-23-16	9-24-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>69</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>72</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>65</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>73</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>64</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>78</i>	<i>39 - 121</i>				



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					Recovery	Limits	Limit			
SPIKE BLANKS										
Laboratory ID:	SB0923S1									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.486	0.516	0.800	0.800	61	65	41 - 110	6	36	
2-Chlorophenol	0.540	0.563	0.800	0.800	68	70	42 - 112	4	39	
1,4-Dichlorobenzene	0.245	0.252	0.400	0.400	61	63	37 - 104	3	39	
n-Nitroso-di-n-propylamine	0.226	0.245	0.400	0.400	57	61	39 - 102	8	34	
1,2,4-Trichlorobenzene	0.269	0.277	0.400	0.400	67	69	34 - 107	3	37	
4-Chloro-3-methylphenol	0.583	0.563	0.800	0.800	73	70	54 - 104	3	28	
Acenaphthene	0.247	0.257	0.400	0.400	62	64	52 - 103	4	30	
4-Nitrophenol	0.552	0.504	0.800	0.800	69	63	51 - 125	9	25	
2,4-Dinitrotoluene	0.229	0.217	0.400	0.400	57	54	53 - 118	5	29	
Pentachlorophenol	0.685	0.697	0.800	0.800	86	87	25 - 141	2	28	
Pyrene	0.320	0.319	0.400	0.400	80	80	57 - 120	0	22	
<i>Surrogate:</i>										
2-Fluorophenol					69	69	24 - 117			
Phenol-d6					71	73	30 - 120			
Nitrobenzene-d5					70	66	27 - 112			
2-Fluorobiphenyl					74	73	35 - 113			
2,4,6-Tribromophenol					67	70	21 - 120			
Terphenyl-d14					78	77	39 - 121			



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	EVALSS-1R-2016					
Laboratory ID:	09-204-01					
Total Solids	71	0.50	SM 2540G	9-22-16	9-26-16	
Client ID:	EVALSS-1M-2016					
Laboratory ID:	09-204-02					
Total Solids	25	0.50	SM 2540G	9-29-16	9-30-16	
Client ID:	EVAMSS-1R-2016					
Laboratory ID:	09-204-03					
Total Solids	47	0.50	SM 2540G	9-22-16	9-26-16	
Client ID:	EVAMSS-1M-2016					
Laboratory ID:	09-204-04					
Total Solids	21	0.50	SM 2540G	9-29-16	9-30-16	



Date of Report: October 4, 2016
 Samples Submitted: September 16, 2016
 Laboratory Reference: 1609-204
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	09-204-01								
	ORIG	DUP							
Total Solids	71.2	69.4	NA	NA	NA	NA	3	20	
Laboratory ID:	08-376-03								
	ORIG	DUP							
Total Solids	27.8	27.9	NA	NA	NA	NA	0	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
Telephone: 425.883.3881

Company: Herrera Environmental Consultants
Project No.: 14-05806-000
Project Name: Redmond Paired Watershed Study
Project Manager: Jeremy Bunn

CHAIN OF CUSTODY

Turnaround Requested:
 1 Day
 2 Day
 3 Day
 Standard

Laboratory No. **09-204**
 Requested Analyses

Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates							% MOISTURE		
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Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	% MOISTURE		
1	EVALSS-1R-2016	9.16.16	9:30	Sediment	1	X			X	X	X		
2	EVALSS-1M-2016	9.16.16	9:30	Sediment	1		X	X			X		
3	EVAMSS-1R-2016	9.16.16	11:00	Sediment	1	X			X	X	X		
4	EVAMSS-1M-2016	9.16.16	11:00	Sediment	1		X	X			X		
				Sediment	1								
				Sediment	1								
				Sediment	1								
				Sediment	1								
				Sediment	1								
				Sediment	1								
				Sediment	1								
				Sediment	1								
				Sediment	1								
				Sediment	1								
				Sediment	1								

Relinquished by [Signature] Date 9.16.16 Received by [Signature] Date 9.16.16
 Firm Herrera Env. Cons. Time 14:20 Firm OSE Time 14:20
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/16/2016 / EVALSS-1 and EVAMSS-1

By G. Catarra
 Date 11/10/2016 Page 1 of 1
 Checked: initials JL
 date 11/16/2016

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	17	≤14	≤0.042% 0.4 %	NA	NA	109	±20	4	≤20	NS	≤35	OK	NONE.
Copper	OK / EPA 6010C	NA	NA	14	≤180	≤1.0 MG/KG 1.0 MG/KG	101,103	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6010C	NA	NA	14	≤180	≤2.5 mg/kg 2.5 MG/KG	95,96	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	7	≤14	1	≤40	≤4 ug/kg 5.6-43 UG/KG	SURR 55-62	NA / 21- 120	54-87	25- 141	BS/BSD 0-9	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	7	≤14	<1	≤40	≤20-100 UG/KG 28-1,100	SURR 55-62	NA / 21- 120	54-87	25- 141	BS/BSD 0-9	≤40	NS	≤50	OK	NONE

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 4, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1609-292

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on September 22, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 4, 2016
Samples Submitted: September 22, 2016
Laboratory Reference: 1609-292
Project: 14-05806-000

Case Narrative

Samples were collected on September 22, 2016 and received by the laboratory on September 22, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

The samples were centrifuged and the water was decanted before analysis.

Semivolatiles EPA 8270D/SIM Analysis

Bis(2-Ethylhexyl)phthalate was found in the sample and method blank, indicating laboratory contamination. Sample results have been flagged with a "B" data qualifier.

Please note that any other QA/QC issues associated with these extractions and analyses will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-2R-2016					
Laboratory ID:	09-292-02					
Total Organic Carbon	2.1	0.33	EPA 9060	10-3-16	10-3-16	
Client ID:	TOSH-3R-2016					
Laboratory ID:	09-292-04					
Total Organic Carbon	1.3	0.37	EPA 9060	10-3-16	10-3-16	
Client ID:	TOSH-1R-2016					
Laboratory ID:	09-292-06					
Total Organic Carbon	2.7	0.33	EPA 9060	10-3-16	10-3-16	



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

**TOTAL ORGANIC CARBON
 EPA 9060A
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Carbon

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1003S1					
Total Organic Carbon	ND	0.042	EPA 9060	10-3-16	10-3-16	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-204-01							
	ORIG	DUP						
Total Organic Carbon	2.07	1.983	NA	NA	NA	4	26	

SPIKE BLANK								
Laboratory ID:	SB1003S1							
	SB	SB		SB				
Total Organic Carbon	45.9	42.1	NA	109	85-131	NA	NA	



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID: 09-292-01						
Client ID: TOSH-2M-2016						
Copper	29	1.9	6010C	9-30-16	9-30-16	
Zinc	250	4.7	6010C	9-30-16	9-30-16	
Lab ID: 09-292-03						
Client ID: TOSH-3M-2016						
Copper	40	2.3	6010C	9-30-16	9-30-16	
Zinc	420	5.8	6010C	9-30-16	9-30-16	
Lab ID: 09-292-05						
Client ID: TOSH-1M-2016						
Copper	30	1.9	6010C	9-30-16	9-30-16	
Zinc	240	4.7	6010C	9-30-16	9-30-16	



Date of Report: October 4, 2016
Samples Submitted: September 22, 2016
Laboratory Reference: 1609-292
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB0930SM2

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 4, 2016
Samples Submitted: September 22, 2016
Laboratory Reference: 1609-292
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL**

Date Extracted: 9-30-16
Date Analyzed: 9-30-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	9.60	9.85	3	1.0	
Zinc	51.1	51.9	2	2.5	



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 9-30-16

Date Analyzed: 9-30-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 09-118-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	60.1	101	61.0	103	2	
Zinc	100	146	95	147	96	1	



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-2R-2016					
Laboratory ID:	09-292-02					
Naphthalene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
2-Methylnaphthalene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
1-Methylnaphthalene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Dimethylphthalate	ND	0.029	EPA 8270D	9-29-16	9-29-16	
Acenaphthylene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Acenaphthene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Diethylphthalate	ND	0.15	EPA 8270D	9-29-16	9-29-16	
Fluorene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Phenanthrene	0.044	0.029	EPA 8270D	9-29-16	9-29-16	
Anthracene	0.011	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Di-n-butylphthalate	ND	0.15	EPA 8270D	9-29-16	9-29-16	
Fluoranthene	0.081	0.029	EPA 8270D	9-29-16	9-29-16	
Pyrene	0.064	0.029	EPA 8270D	9-29-16	9-29-16	
Butylbenzylphthalate	ND	0.029	EPA 8270D	9-29-16	9-29-16	
Benzo[a]anthracene	0.031	0.029	EPA 8270D	9-29-16	9-29-16	
Chrysene	0.038	0.029	EPA 8270D	9-29-16	9-29-16	
bis(2-Ethylhexyl)phthalate	0.049	0.029	EPA 8270D	9-29-16	9-29-16	B
Di-n-octylphthalate	ND	0.029	EPA 8270D	9-29-16	9-29-16	
Benzo[b]fluoranthene	0.044	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo(j,k)fluoranthene	0.016	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo[a]pyrene	0.036	0.029	EPA 8270D	9-29-16	9-29-16	
Indeno[1,2,3-cd]pyrene	0.022	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Dibenz[a,h]anthracene	0.0060	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo[g,h,i]perylene	0.024	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorophenol	35	24 - 117				
Phenol-d6	48	30 - 120				
Nitrobenzene-d5	45	27 - 112				
2-Fluorobiphenyl	57	35 - 113				
2,4,6-Tribromophenol	58	21 - 120				
Terphenyl-d14	64	39 - 121				



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-3R-2016					
Laboratory ID:	09-292-04					
Naphthalene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
2-Methylnaphthalene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
1-Methylnaphthalene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Dimethylphthalate	ND	0.029	EPA 8270D	9-29-16	9-29-16	
Acenaphthylene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Acenaphthene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Diethylphthalate	ND	0.14	EPA 8270D	9-29-16	9-29-16	
Fluorene	ND	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Phenanthrene	0.051	0.029	EPA 8270D	9-29-16	9-29-16	
Anthracene	0.011	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Di-n-butylphthalate	ND	0.14	EPA 8270D	9-29-16	9-29-16	
Fluoranthene	0.099	0.029	EPA 8270D	9-29-16	9-29-16	
Pyrene	0.073	0.029	EPA 8270D	9-29-16	9-29-16	
Butylbenzylphthalate	ND	0.029	EPA 8270D	9-29-16	9-29-16	
Benzo[a]anthracene	0.035	0.029	EPA 8270D	9-29-16	9-29-16	
Chrysene	0.041	0.029	EPA 8270D	9-29-16	9-29-16	
bis(2-Ethylhexyl)phthalate	0.18	0.029	EPA 8270D	9-29-16	9-29-16	B
Di-n-octylphthalate	ND	0.029	EPA 8270D	9-29-16	9-29-16	
Benzo[b]fluoranthene	0.055	0.029	EPA 8270D	9-29-16	9-29-16	
Benzo(j,k)fluoranthene	0.015	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo[a]pyrene	0.036	0.029	EPA 8270D	9-29-16	9-29-16	
Indeno[1,2,3-cd]pyrene	0.024	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Dibenz[a,h]anthracene	0.0065	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo[g,h,i]perylene	0.027	0.0058	EPA 8270D/SIM	9-29-16	9-30-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorophenol	52	24 - 117				
Phenol-d6	61	30 - 120				
Nitrobenzene-d5	60	27 - 112				
2-Fluorobiphenyl	63	35 - 113				
2,4,6-Tribromophenol	67	21 - 120				
Terphenyl-d14	64	39 - 121				



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

SEMIVOLATILES EPA 8270D/SIM

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-1R-2016					
Laboratory ID:	09-292-06					
Naphthalene	ND	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
2-Methylnaphthalene	ND	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
1-Methylnaphthalene	ND	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Dimethylphthalate	ND	0.035	EPA 8270D	9-29-16	9-29-16	
Acenaphthylene	ND	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Acenaphthene	ND	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Diethylphthalate	ND	0.18	EPA 8270D	9-29-16	9-29-16	
Fluorene	ND	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Phenanthrene	0.039	0.035	EPA 8270D	9-29-16	9-29-16	
Anthracene	0.0078	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Di-n-butylphthalate	ND	0.18	EPA 8270D	9-29-16	9-29-16	
Fluoranthene	0.075	0.035	EPA 8270D	9-29-16	9-29-16	
Pyrene	0.064	0.035	EPA 8270D	9-29-16	9-29-16	
Butylbenzylphthalate	ND	0.035	EPA 8270D	9-29-16	9-29-16	
Benzo[a]anthracene	0.031	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Chrysene	0.035	0.035	EPA 8270D	9-29-16	9-29-16	
bis(2-Ethylhexyl)phthalate	0.14	0.035	EPA 8270D	9-29-16	9-29-16	B
Di-n-octylphthalate	ND	0.035	EPA 8270D	9-29-16	9-29-16	
Benzo[b]fluoranthene	0.048	0.035	EPA 8270D	9-29-16	9-29-16	
Benzo(j,k)fluoranthene	0.015	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo[a]pyrene	0.034	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Indeno[1,2,3-cd]pyrene	0.021	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Dibenz[a,h]anthracene	ND	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo[g,h,i]perylene	0.026	0.0070	EPA 8270D/SIM	9-29-16	9-30-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorophenol	59	24 - 117				
Phenol-d6	65	30 - 120				
Nitrobenzene-d5	65	27 - 112				
2-Fluorobiphenyl	61	35 - 113				
2,4,6-Tribromophenol	67	21 - 120				
Terphenyl-d14	67	39 - 121				



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0929S1					
Naphthalene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
2-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
1-Methylnaphthalene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Dimethylphthalate	ND	0.020	EPA 8270D	9-29-16	9-29-16	
Acenaphthylene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Acenaphthene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Diethylphthalate	ND	0.10	EPA 8270D	9-29-16	9-29-16	
Fluorene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Phenanthrene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Anthracene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Di-n-butylphthalate	ND	0.10	EPA 8270D	9-29-16	9-29-16	
Fluoranthene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Pyrene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Butylbenzylphthalate	ND	0.020	EPA 8270D	9-29-16	9-29-16	
Benzo[a]anthracene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Chrysene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
bis(2-Ethylhexyl)phthalate	0.020	0.020	EPA 8270D	9-29-16	9-29-16	
Di-n-octylphthalate	ND	0.020	EPA 8270D	9-29-16	9-29-16	
Benzo[b]fluoranthene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo(j,k)fluoranthene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo[a]pyrene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Indeno[1,2,3-cd]pyrene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Dibenz[a,h]anthracene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
Benzo[g,h,i]perylene	ND	0.0040	EPA 8270D/SIM	9-29-16	9-30-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorophenol</i>	<i>60</i>	<i>24 - 117</i>				
<i>Phenol-d6</i>	<i>72</i>	<i>30 - 120</i>				
<i>Nitrobenzene-d5</i>	<i>72</i>	<i>27 - 112</i>				
<i>2-Fluorobiphenyl</i>	<i>79</i>	<i>35 - 113</i>				
<i>2,4,6-Tribromophenol</i>	<i>79</i>	<i>21 - 120</i>				
<i>Terphenyl-d14</i>	<i>85</i>	<i>39 - 121</i>				



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

**SEMIVOLATILES EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Sediment
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					SB	SBD	Limits	Limit		
SPIKE BLANKS										
Laboratory ID:	SB0929S1									
	SB	SBD	SB	SBD	SB	SBD				
Phenol	0.503	0.584	0.800	0.800	63	73	41 - 110	15	36	
2-Chlorophenol	0.567	0.609	0.800	0.800	71	76	42 - 112	7	39	
1,4-Dichlorobenzene	0.257	0.282	0.400	0.400	64	71	37 - 104	9	39	
n-Nitroso-di-n-propylamine	0.240	0.283	0.400	0.400	60	71	39 - 102	16	34	
1,2,4-Trichlorobenzene	0.264	0.307	0.400	0.400	66	77	34 - 107	15	37	
4-Chloro-3-methylphenol	0.593	0.706	0.800	0.800	74	88	54 - 104	17	28	
Acenaphthene	0.284	0.316	0.400	0.400	71	79	52 - 103	11	30	
4-Nitrophenol	0.421	0.465	0.800	0.800	53	58	51 - 125	10	25	
2,4-Dinitrotoluene	0.273	0.289	0.400	0.400	68	72	53 - 118	6	29	
Pentachlorophenol	0.490	0.480	0.800	0.800	61	60	25 - 141	2	28	
Pyrene	0.302	0.353	0.400	0.400	76	88	57 - 120	16	22	
<i>Surrogate:</i>										
2-Fluorophenol					61	67	24 - 117			
Phenol-d6					71	80	30 - 120			
Nitrobenzene-d5					72	78	27 - 112			
2-Fluorobiphenyl					75	85	35 - 113			
2,4,6-Tribromophenol					73	76	21 - 120			
Terphenyl-d14					81	89	39 - 121			



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	TOSH-2M-2016					
Laboratory ID:	09-292-01					
Total Solids	53	0.50	SM 2540G	9-29-16	9-30-16	

Client ID:	TOSH-2R-2016					
Laboratory ID:	09-292-02					
Total Solids	68	0.50	SM 2540G	9-29-16	9-30-16	

Client ID:	TOSH-3M-2016					
Laboratory ID:	09-292-03					
Total Solids	43	0.50	SM 2540G	9-29-16	9-30-16	

Client ID:	TOSH-3R-2016					
Laboratory ID:	09-292-04					
Total Solids	69	0.50	SM 2540G	9-29-16	9-30-16	

Client ID:	TOSH-1M-2016					
Laboratory ID:	09-292-05					
Total Solids	53	0.50	SM 2540G	9-29-16	9-30-16	

Client ID:	TOSH-1R-2016					
Laboratory ID:	09-292-06					
Total Solids	57	0.50	SM 2540G	9-29-16	9-30-16	



Date of Report: October 4, 2016
 Samples Submitted: September 22, 2016
 Laboratory Reference: 1609-292
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	08-376-03								
	ORIG	DUP							
Total Solids	27.8	27.9	NA	NA	NA	NA	0	20	
Laboratory ID:	09-292-02								
	ORIG	DUP							
Total Solids	68.5	69.5	NA	NA	NA	NA	1	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference





14648 NE 95th Street, Redmond, WA 98052
 Telephone: 425.883.3881

Company: Herrera Environmental Consultants
 Project No.: 14-05806-000
 Project Name: Redmond Paired Watershed Study
 Project Manager: Jeremy Bunn

CHAIN OF CUSTODY

Turnaround Requested:
 _____ 1 Day
 _____ 2 Day
 _____ 3 Day
 X Standard

Requested Analyses											
Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates							TOTAL SOLIDS

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Total Organic Carbon	Copper	Zinc	Polycyclic aromatic hydrocarbons	Phthalates	TOTAL SOLIDS
1	TOSH-2M-2016	9-22-16	11:30	Sediment	1		X	X			X
2	TOSH-2R-2016	9-22-16	11:30	Sediment	1	X			X	X	↓
3	TOSH-3M-2016	9-22-16	13:30	Sediment	1		X	X			
4	TOSH-3R-2016	9-22-16	13:30	Sediment	1	X			X	X	
5	TOSH-1M-2016	9-22-16	10:00	Sediment	1		X	X			
6	TOSH-1R-2016	9-22-16	10:00	Sediment	1	X			X	X	
				Sediment	1						
				Sediment	1						
				Sediment	1						
				Sediment	1						
				Sediment	1						
				Sediment	1						
				Sediment	1						
				Sediment	1						
				Sediment	1						

Relinquished by Miriam Date 9-22-16 Received by [Signature] Date 9/22/16
 Firm Herrera Env. Cons Time 14:25 Firm [Signature] Time 14:25
 Relinquished by _____ Date _____ Received by _____ Date _____
 Firm _____ Time _____ Firm _____ Time _____

Comments:



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : TOC, Cu, Zn, PAHs, phthalates
 Sample Date/Sample ID: 9/22/2016 / TOSH-1, TOSH-2 and TOSH-3

By G. Catarra
 Date 11/10/2016 Page 1 of 1
 Checked: initials JL
 date 11/16/2016

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC	OK / EPA 9060A	NA	NA	11	≤14	≤0.042% 0.4 %	NA	NA	109	±20	4	≤20	NS	≤35	OK	NONE.
Copper	OK / EPA 6010C	NA	NA	8	≤180	≤1.0 MG/KG 1.0 MG/KG	101,103	±25	NR	±15	3	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6010C	NA	NA	8	≤180	≤2.5 mg/kg 2.5 MG/KG	95,96	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
PAHs	OK / EPA 8270D/SIM	7	≤14	1	≤40	≤4 ug/kg 5.8-7.0 UG/KG	SURR 35-67	NA / 21- 120	53-88	25- 141	BS/BSD 2-17	≤40	NS	≤50	OK	NONE
Phthalates	OK / EPA 8270D	7	≤14	<1	≤40	≤20-100 UG/KG 29-180 UG/KG	SURR 35-67	NA / 21- 120	53-88	25- 141	BS/BSD 2-17	≤40	NS	≤50	OK	MB BEHP = 0.020 MG/KG. FLAG TOSH-2 J DUE TO <5X MB.

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.

NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.



**OnSite
Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 22, 2016

Jeremy Bunn
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 14-05806-000
Laboratory Reference No. 1610-102

Dear Jeremy:

Enclosed are the analytical results and associated quality control data for samples submitted on October 11, 2016.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

Blair Goodrow
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: October 22, 2016
Samples Submitted: October 11, 2016
Laboratory Reference: 1610-102
Project: 14-05806-000

Case Narrative

Samples were collected on October 11, 2016 and received by the laboratory on October 11, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

The samples were centrifuged and the water was decanted before analysis.



Date of Report: October 22, 2016
 Samples Submitted: October 11, 2016
 Laboratory Reference: 1610-102
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C**

Matrix: Sediment
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	10-102-01					
Client ID:	SEI-1M-2016					
Copper	27	4.9	6010C	10-21-16	10-21-16	
Zinc	86	12	6010C	10-21-16	10-21-16	
Lab ID:	10-102-02					
Client ID:	SEI-2M-2016					
Copper	23	3.7	6010C	10-21-16	10-21-16	
Zinc	51	9.2	6010C	10-21-16	10-21-16	



Date of Report: October 22, 2016
Samples Submitted: October 11, 2016
Laboratory Reference: 1610-102
Project: 14-05806-000

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 10-21-16
Date Analyzed: 10-21-16

Matrix: Sediment
Units: mg/kg (ppm)

Lab ID: MB1021SM1

Analyte	Method	Result	PQL
Copper	6010C	ND	1.0
Zinc	6010C	ND	2.5



Date of Report: October 22, 2016
 Samples Submitted: October 11, 2016
 Laboratory Reference: 1610-102
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 DUPLICATE QUALITY CONTROL**

Date Extracted: 10-21-16

Date Analyzed: 10-21-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 10-201-07

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Copper	12.2	12.0	2	1.0	
Zinc	26.7	26.3	2	2.5	



Date of Report: October 22, 2016
 Samples Submitted: October 11, 2016
 Laboratory Reference: 1610-102
 Project: 14-05806-000

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 10-21-16

Date Analyzed: 10-21-16

Matrix: Sediment

Units: mg/kg (ppm)

Lab ID: 10-201-07

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Copper	50.0	61.5	99	61.2	98	0	
Zinc	100	124	97	123	96	1	



Date of Report: October 22, 2016
 Samples Submitted: October 11, 2016
 Laboratory Reference: 1610-102
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G**

Matrix: Sediment
 Units: % Solids

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	SEI-1M-2016					
Laboratory ID:	10-102-01					
Total Solids	20	0.50	SM 2540G	10-20-16	10-21-16	

Client ID:	SEI-2M-2016					
Laboratory ID:	10-102-02					
Total Solids	27	0.50	SM 2540G	10-20-16	10-21-16	



Date of Report: October 22, 2016
 Samples Submitted: October 11, 2016
 Laboratory Reference: 1610-102
 Project: 14-05806-000

**TOTAL SOLIDS
 SM 2540G
 QUALITY CONTROL**

Matrix: Sediment
 Units: % Solids

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	10-102-01								
	ORIG	DUP							
Total Solids	20.5	21.3	NA	NA	NA	NA	4	20	





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
 - B - The analyte indicated was also found in the blank sample.
 - C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
 - E - The value reported exceeds the quantitation range and is an estimate.
 - F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
 - H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
 - I - Compound recovery is outside of the control limits.
 - J - The value reported was below the practical quantitation limit. The value is an estimate.
 - K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
 - L - The RPD is outside of the control limits.
 - M - Hydrocarbons in the gasoline range are impacting the diesel range result.
 - M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
 - N - Hydrocarbons in the lube oil range are impacting the diesel range result.
 - N1 - Hydrocarbons in diesel range are impacting lube oil range results.
 - O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
 - P - The RPD of the detected concentrations between the two columns is greater than 40.
 - Q - Surrogate recovery is outside of the control limits.
 - S - Surrogate recovery data is not available due to the necessary dilution of the sample.
 - T - The sample chromatogram is not similar to a typical _____.
 - U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
 - U1 - The practical quantitation limit is elevated due to interferences present in the sample.
 - V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
 - W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
 - X - Sample extract treated with a mercury cleanup procedure.
 - X1 - Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.
 - Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
 - Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference



Chain of Custody

Company: Herrera
 Project Number: 14-05806-000
 Project Name: Redmond Park Watershed Study
 Project Manager: Jeremy Bunn
 Sampled by: Valene Wu & Brianna Bland

Turnaround Request (in working days)
 (Check One)
 Same Day 1 Day
 2 Days 3 Days
 Standard (7 Days)
 (TPH analysis 5 Days)
 _____ (other)

Laboratory Number: **10-102**

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (<input type="checkbox"/> Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Total Copper	Total Zinc	TOTAL SOLIDS	% Moisture	
						1	SE1-1M-2016	10.11.16	11:00	Sediment	1																
2	SE1-2M-2016	10.11.16	11:30	Sediment	1																			X	X	←	

Signature	Company	Date	Time	Comments/Special Instructions
	Herrera	10.11.16	12:30	
		10.11.16	12:30	
				Data Package: Standard <input type="checkbox"/> Level III <input type="checkbox"/> Level IV <input type="checkbox"/>
Reviewed/Date	Reviewed/Date			Chromatograms with final report <input type="checkbox"/> Electronic Data Deliverables (EDDs) <input type="checkbox"/>



Data Quality Assurance Worksheet

Project Name/No./Client: Redmond Paired Watershed Study / 14-05806-000 / City of Redmond
 Laboratory/Parameters: OnSite Environmental : Cu, Zn
 Sample Date/Sample ID: 10/11/2016 / SEI-1 and SEI-2

By G. Catarra
 Date 11/09/2016 Page 1 of 1
 Checked: initials JL
 date 11/16/2016

Parameter	Completeness/ Methodology	Pre-extraction Holding Times (minutes)		Total Holding Times (days)		Method Blanks Reporting Limit	Matrix Spikes/ Surrogate Recovery (%)		Lab Control Samples Recovery (%)		Lab Duplicates RPD (%)		Field Duplicates RPD (%)		Instrument Calibration/ Performance	ACTION
		Reported	Goal	Reported	Goal		Reported	Goal	Reported	Goal	Reported	Goal ¹	Reported	Goal ¹		
TOC			NA		≤14			NA		±20		≤20		≤35		ANALYSIS NOT REQUESTED
Copper	OK / EPA 6010C	NA	NA	10	≤180	≤1.0 MG/KG 1.0 MG/KG	99,98	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
Zinc	OK / EPA 6010C	NA	NA	10	≤180	≤2.5 mg/kg 2.5 MG/KG	97,96	±25	NR	±15	2	≤20	NS	≤35	OK	NONE
PAHs			≤14		≤40			NA / 21- 120		25- 141		≤40		≤50		ANALYSIS NOT REQUESTED
Phthalates			≤14		≤40			NA / 21- 120		25- 141		≤40		≤50		ANALYSIS NOT REQUESTED

¹ If the sample or duplicate value is less than five times the reporting limit, the difference is calculated rather than the relative percent difference (RPD). The QA goal is a difference <2 times the detection limit instead of the number indicated in the goal column.
 NA – not applicable or not available; NC – not calculable due to one or more values below the detection limit; NS – field duplicate not sampled.

APPENDIX P

Data Validation Memorandum for Sediment Quality Monitoring

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 14-05806-000
From Gina Catarra, Herrera Environmental Consultants
Date December 6, 2016
Subject Data Quality Assurance Review of the Redmond Paired Watershed Stormwater Retrofit Effectiveness Sediment Quality Monitoring Data

This memorandum presents a review of data quality for 21 sediment samples collected for the Redmond Paired Watershed Stormwater Retrofit Effectiveness Study between August 12 and October 11, 2016. OnSite Environmental, Inc., of Redmond, Washington analyzed the samples for:

- Total organic carbon (TOC) by EPA method 9060A
- Total copper and zinc by EPA method 6020
- Polycyclic aromatic hydrocarbons (PAHs) by EPA method 8270D/SIM
- Phthalates by EPA method 8270D.

Results for the following samples were validated.

Date Collected	Lab SDG	Samples Collected	QC Samples Collected
8/12/2016	1608-173	SEI-1 and SEI-2 (metals not analyzed)	None
8/17/2016	1608-224	COLIN-1	None
8/09/2016	1608-258	SIDL-3 and MONT-1	None
8/30/2016	1608-379	TYLR-1 and TYLR-2	None
9/01/2016	1609-014	MONT-2 and MONT-3	None
9/09/2016	1609-105	CTRY-1 and CTRY-2	None
9/12/2016	1609-118	MONT-4, MONT-5, and TOSH-4	None
9/16/2016	1609-204	EVALSS-1 and EVAMSS-1	None
9/22/2016	1609-292	TOSH-1, TOSH-2, and TOSH-3	None
10/11/2016	1610-102	SEI-1 and SEI-2 (metals only)	None

The laboratory's performance was reviewed in accordance with quality control (QC) criteria established in the *Redmond Paired Watershed Study Quality Assurance Project Plan (QAPP)* (Herrera 2015), by the laboratory, and in the specified methods.

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data Quality Assurance Worksheets were completed for each laboratory report and are included as an Attachment to this memorandum. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable with Discussion

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. All samples were analyzed within the required method holding times. With the exception noted below, the laboratory reports were complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

For samples SEI-1 and SEI-2 collected on 8/12/2016, the laboratory disposed of the sample jars intended for metals analyses prior to analysis in error. Therefore, additional sediment was collected at these two locations on 10/11/2016 and submitted for metal analysis only. However, no data were qualified.

Laboratory Reporting Limits—Acceptable

The laboratory reporting limits met those established in the QAPP. No data were qualified based on laboratory reporting limits.

Method Blank Analysis—Acceptable with Qualification

Method blanks were analyzed at the required frequency. With the exceptions noted below, method blanks did not contain levels of target analytes above the laboratory reporting limits.

Bis (2-ethylhexyl) phthalate (BEHP) was detected in two method blanks above the reporting limit. The method blank associated with sediment samples CTRY-1 and CTRY-2 had a reported concentration of 50 µg/kg; the method blank associated with sediment samples TOSH-1, TOSH-2, and TOSH-3 had a reported concentration of 20 µg/kg. As shown in the table below, all samples with a reported concentration of less than 5X the method blank were qualified as estimated (flagged J). Samples that were not detected above the reporting limit, or those with a reported concentration greater than 5X the method blank contamination were not qualified.

Date Collected	Lab SDG	Sample Location	Parameter	Reason for Qualification	Data Flag
9/09/2016	1609-105	CTRY-1	BEHP	Method blank contamination	J
9/09/2016	1609-105	CTRY-2	BEHP	Method blank contamination	J
9/17/2016	1609-292	TOSH-2	BEHP	Method blank contamination	J

Laboratory Control Sample Analysis—Acceptable

Blank spike samples were analyzed with project samples for TOC at the required frequency; blank spike/blank spike duplicate (BS/BSD) samples were analyzed with project samples for PAHs and phthalates at the required frequency. The percent recovery values for all compounds met the criteria established in the QAPP.

Surrogate Analysis—Acceptable

Surrogates were analyzed with project samples, method blanks, and laboratory duplicates for PAHs and phthalates, as required by the analytical methods. The percent recovery values for all surrogate compounds met the criteria established by the laboratory.

Matrix Spike Analysis—Acceptable

Matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed for copper and zinc at the required frequency. The percent recovery values for copper (98 to 103 percent) and zinc (95 to 97 percent) met the control limits (75 to 125 percent) established in the QAPP.

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicates were analyzed for TOC, copper, and zinc; BS/BSD samples were analyzed for PAHs and phthalates. The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the duplicate. The relative percent difference (RPD) values or difference values met the control limits established by the QAPP.

Field Duplicate Analysis—Not Analyzed

Field duplicates were not submitted to the laboratory for analysis due to an oversight. The QAPP specified that two field duplicates would be collected and analyzed for each annual sampling event. Two field duplicate samples will be collected and submitted for analysis for each of the remaining annual sampling events.

Definition of Data Qualifiers

The following data qualifier definitions are taken from the QAPP (Herrera 2015).

- U** Value is below the reporting limit.
- J** Value is an estimate based on analytical results.

- UJ** Value is below the reporting limit and is an estimate based on analytical results.
- R** Value is rejected based on analytical results.

References

Herrera. 2015. Redmond Paired Watershed Study Quality Assurance Project Plan. Herrera Environmental Consultants, Seattle, Washington. December 31, 2015.

APPENDIX Q

Laboratory Report for Biological Monitoring

The contents of this appendix are provided in an electronic file only.

APPENDIX R

Quality Assurance Review Documentation for Biological Monitoring

Taxonomy ID QC Percent Similarity

Report Count: 4

7315.1-3

Comparison Date: 11/16/2016 09:42:58

Component: Chironomidae

Collection Date		Time	Sample ID									
08/17/2016		14:45	MONT-1									
TIN	TAXON	NOTE	Original Taxonomist - G. Wallace				QC Taxonomist - W. Hoiland				DIFF.	
			AB	L	P	A	AB	L	P	A		
831	Brillia		37	37	0	0	37	37	0	0	0	
2213	Brundiniella		4	3	1	0	3	3	0	0	1	
926	Chironomini		0	0	0	0	1	1	0	0	-1	
838	Corynoneura		5	4	1	0	5	4	1	0	0	
865	Heterotrissocladius marcidus gr.		0	0	0	0	0	0	0	0	0	
790	Macropelopia		1	1	0	0	2	1	1	0	-1	
1054	Micropsectra		98	98	0	0	96	96	0	0	2	
956	Microtendipes pedellus gr.		1	1	0	0	3	3	0	0	-2	
955	Microtendipes rydalensis gr.		0	0	0	0	0	0	0	0	0	
895	Parametricnemus		6	6	0	0	5	5	0	0	1	
988	Polypedilum		29	29	0	0	25	25	0	0	4	
825	Prodiamesa		0	0	0	0	0	0	0	0	0	
1023	Stempellinella		0	0	0	0	0	0	0	0	0	
1029	Tanytarsus		40	40	0	0	34	34	0	0	6	
805	Thienemannimyia gr.		7	7	0	0	7	7	0	0	0	
920	Tvetenia bavarica gr.		3	2	1	0	3	2	1	0	0	
			231				221				Difference = 10	
											Percent Similarity = 96.12	

Taxonomy ID QC Percent Similarity

Report Count: 4

7315.1-3

Comparison Date: 12/08/2016 11:14:56

Component: General

Collection Date		Time	Sample ID									
08/17/2016		14:45	MONT-1									
TIN	TAXON	NOTE	Original Taxonomist - B. Sloniker				QC Taxonomist - J. Pfeiffer					DIFF.
			AB	L	P	A	AB	L	P	A	NOTE	
126	Acari		6	0	0	6	5	5	0	0		1
116	Amphipoda		0	0	0	0	0	0	0	0		0
512	Arctopsychinae		1	1	0	0	1	1	0	0		0
1963	Atrichopogon		0	0	0	0	0	0	0	0		0
145	Baetis		4	4	0	0	4	4	0	0		0
144	Baetis tricaudatus		6	6	0	0	6	6	0	0		0
1032	Ceratopogoninae		0	0	0	0	0	0	0	0		0
2013	Chelifera/Metachela		2	2	0	0	2	2	0	0		0
202	Cinygma		2	2	0	0	2	2	0	0		0
1138	Cleptelmis addenda		1	0	0	1	1	0	0	1		0
2436	Crangonyx		0	0	0	0	0	0	0	0		0
608	Dicosmoecus gilvipes		1	1	0	0	1	1	0	0		0
751	Dicranota		1	1	0	0	1	1	0	0		0
709	Empididae		1	1	0	0	1	1	0	0		0
536	Glossosoma		2	2	0	0	1	1	0	0		1
201	Heptageniidae		0	0	0	0	0	0	0	0		0
565	Hydropsyche		1	1	0	0	1	1	0	0		0
217	Ironodes		1	1	0	0	1	1	0	0		0
1305	Lara		1	1	0	0	2	2	0	0		-1
587	Lepidostoma		6	6	0	0	5	5	0	0		1
588	Leptoceridae		0	0	0	0	0	0	0	0		0

Taxonomy ID QC Percent Similarity

Report Count: 4

7315.1-3

Comparison Date: 12/08/2016 11:14:56

Component: General

(Cont'd.)

Collection Date		Time	Sample ID											
08/17/2016		14:45	MONT-1											
TIN	TAXON	NOTE	Original Taxonomist - B. Sloniker				QC Taxonomist - J. Pfeiffer				DIFF.			
			AB	L	P	A	AB	L	P	A				
237	Leptophlebiidae		3	3	0	0	3	3	0	0	0			
338	Malenka		4	4	0	0	4	4	0	0	0			
457	Narpus		3	3	0	0	3	3	0	0	0			
67	Nematoda		16	16	0	0	17	17	0	0	-1			
4	Oligochaeta		36	36	0	0	36	36	0	0	0			
465	Optioservus		68	63	0	5	67	62	0	5	1			
517	Parapsyche		2	2	0	0	2	2	0	0	0			
380	Perlodidae	Not Skwala	1	1	0	0	1	1	0	0	0			
1087	Ptychoptera		4	4	0	0	5	5	0	0	-1			
678	Rhyacophila		1	1	0	0	0	0	0	0	1			
663	Rhyacophila blarina		13	13	0	0	13	13	0	0	0			
738	Simulium		9	9	0	0	9	9	0	0	0			
398	Skwala		1	1	0	0	1	1	0	0	0			
101	Sphaeriidae		11	11	0	0	10	10	0	0	1			
321	Sweltsa		2	2	0	0	2	2	0	0	0			
350	Zapada		12	12	0	0	12	12	0	0	0			
345	Zapada cinctipes		32	32	0	0	32	32	0	0	0			
			254				251				Difference = 3			
													Percent Similarity = 98.05	

Taxonomy ID QC Percent Similarity

7315.1-12

Comparison Date: 11/15/2016 04:29:47

Component: Chironomidae

Collection Date		Time	Sample ID										
09/12/2016		14:00	TOSH-4										
		Original Taxonomist - G. Wallace					QC Taxonomist - W. Hoiland						
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE	DIFF.	
838	Corynoneura		1	1	0	0	1	1	0	0		0	
858	Eukiefferiella claripennis gr.		1	1	0	0	1	1	0	0		0	
895	Parametricnemus		4	3	1	0	4	3	1	0		0	
988	Polypedilum		1	1	0	0	1	1	0	0		0	
			7				7				Difference = 0		
												Percent Similarity = 100.00	

Taxonomy ID QC Percent Similarity

Report Count: 4

7315.1-12

Comparison Date: 12/08/2016 10:56:37

Component: General

Collection Date		Time	Sample ID									
09/12/2016		14:00	TOSH-4									
TIN	TAXON	NOTE	Original Taxonomist - B. Sloniker				QC Taxonomist - J. Pfeiffer					DIFF.
			AB	L	P	A	AB	L	P	A	NOTE	
126	Acari		11	0	0	11	11	11	0	0		0
1270	Acneus		0	0	0	0	0	0	0	0		0
512	Arctopsychinae		9	9	0	0	8	8	0	0		1
1963	Atrichopogon		2	2	0	0	2	2	0	0		0
145	Baetis		5	5	0	0	5	5	0	0		0
144	Baetis tricaudatus		15	15	0	0	16	16	0	0		-1
202	Cinygma		3	3	0	0	3	3	0	0		0
2436	Crangonyx		5	5	0	0	6	6	0	0		-1
706	Dixa		2	2	0	0	2	2	0	0		0
536	Glossosoma		6	6	0	0	5	5	0	0		1
532	Glossosomatidae		1	0	1	0	1	0	1	0		0
1305	Lara		3	3	0	0	3	3	0	0		0
587	Lepidostoma		4	4	0	0	3	3	0	0		1
338	Malenka		11	11	0	0	11	11	0	0		0
4335	Meringodixa chalonensis		0	0	0	0	0	0	0	0		0
67	Nematoda		1	1	0	0	1	1	0	0		0
4	Oligochaeta		53	53	0	0	53	53	0	0		0
517	Parapsyche		12	12	0	0	12	12	0	0		0
722	Pericoma/Telmatoscopus		1	1	0	0	1	1	0	0		0
93	Physa		0	0	0	0	0	0	0	0		0
3226	Polycelis		3	3	0	0	3	3	0	0		0

Taxonomy ID QC Percent Similarity

Report Count: 4

7315.1-12
Component: General

Comparison Date: 12/08/2016 10:56:37
(Cont'd.)

Collection Date		Time	Sample ID										
09/12/2016		14:00	TOSH-4										
		Original Taxonomist - B. Sloniker					QC Taxonomist - J. Pfeiffer						
TIN	TAXON	NOTE	AB	L	P	A	AB	L	P	A	NOTE	DIFF.	
2659	Prostoma		1	1	0	0	1	1	0	0		0	
678	Rhyacophila		1	1	0	0	1	1	0	0		0	
724	Simuliidae		1	0	1	0	1	0	1	0		0	
738	Simulium		124	122	2	0	124	122	2	0		0	
101	Sphaeriidae		1	1	0	0	1	1	0	0		0	
764	Tipula		3	3	0	0	3	3	0	0		0	
350	Zapada		11	11	0	0	8	8	0	0		3	
345	Zapada cinctipes		53	53	0	0	53	53	0	0		0	
			342				338				Difference = 4		
													Percent Similarity = 98.33