Tiki Car Wash
Bellevue, WA

Work Plan/Sampling and Analysis/Quality Assurance Project Plan

FINAL

Prepared for

DEPARTMENT OF ECOLOGY
State of Washington

Toxics Cleanup Program
Northwest Regional Office
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1.0 Introduction

The Tiki Property is occupied by an operating retail gasoline station and drive-through car wash at 11909 NE 8th Street, Bellevue, Washington. The gas station and car wash at the Tiki Property were constructed in 1971. Three (3) underground storage tanks (USTs) were installed at that time and a fourth UST was installed in 1979. All the USTs are single-wall steel tanks. The Tiki Property has been owned by Tiki Enterprises, Inc. since 1973.

In 1993, Ecology and Tiki Enterprises, Inc. entered Consent Decree No. 93-2077106 in Superior Court of the State of Washington for King County. The consent decree identified the work that was required to be performed in a phased approach. Phase I was a Remedial Investigation and Feasibility Study (RI/FS), Phase II was development of a Cleanup Action Plan and Phase III consisted of the Implementation of the Cleanup Action Plan.

An air sparging and soil vapor extraction (AS/SVE) soil and groundwater remediation system was installed in 1995 by Ecology as part of an interim action along the west and south edges of the Tiki Property. Operation of the AS/SVE system was discontinued in 1996 due to a lack of funding. Confirmation soil or groundwater samples were not collected to assess the effectiveness of this phase of the cleanup action after operation of the remediation system was discontinued. No additional remedial actions to date have been conducted at the Tiki Car Wash Site by Ecology.

Ecology has tasked Leidos with the completion of the remedial investigation and feasibility study for the Site.

This Work Plan describes the soil sampling, well installation, and groundwater sampling and analysis activities to be conducted as part of this investigation. A separate Work Plan memo detailing vapor intrusion activities will be submitted following the analysis of the soil and groundwater data.

The Sampling and Analysis Plan (SAP), which details field and sampling procedures for the project. The SAP also includes the monitoring well construction details and waste management and disposal procedures.

The objective of the Quality Assurance Project Plan (QAPP) is to establish the practices and procedures necessary to ensure that data collected as part of the field investigation activities are of the type and quality needed. The quality of data collected must be documented in order to ensure that the data are scientifically and legally defensible.

The SAP and QAPP were prepared in accordance with the requirements outlined in Washington Administrative Code (WAC) 173-340-820. Analytical procedures are identified in the SAP/ QAPP in accordance with WAC 173-340-830.

2.0 Work Plan

This site assessment includes installation and monitoring of groundwater wells, and collection of soil and groundwater and vapor samples. As detailed in the Site Health and Safety Plan, an exclusion zone will be established around any work that poses a risk of exposure to: hazardous contaminants, hazardous chemicals, or physical hazards, in order to exclude unauthorized personnel. In addition, a combination of barricades, traffic cones and flaggers will be used to protect both the site workers and the public.

Remedial investigation activities are detailed in the following sections.

2.1 Proposed Soil Boring Locations

The proposed location for each of the soil borings are shown on Figure 1. Previously completed soil borings that exceeded MTCA Method A Cleanup levels are shaded red and those below cleanup levels are shaded green. The proposed locations and selection rationale are as follows:

- Proposed borings SB-1 and SB-2 are located near the northwest corner of the station property. These borings will be used to delineate the northwest limits of the contaminated soil plume.
- Soil boring SB-3 is located along the northern property line between Tiki and Bartell. This boring is placed to delineate the eastern edge of the soil plume. Bartell borings HC-1, HC-2 and HC-3 did not detect soil impacts exceeding MTCA Method A Cleanup Levels therefore with the exception of SB-3 no additional soil borings are needed along the eastern Tiki property line.
- Soil boring SB-4 is located on the Infiniti of Bellevue property near the western property line with Tiki. This boring will be used to assess current soil impacts on the property.
- Soil boring SB-5 is located on the station property. This boring was specifically placed to be out of the traffic pattern for the pump islands and the car wash.

The soil boring locations shown on Figure 1 are proposed; therefore, actual locations may differ based on permit conditions, utilities, or other conditions encountered in the field. Ecology will be consulted if locations are changed.

2.2 Proposed Monitoring Well Locations

The proposed location for each of the groundwater monitoring wells are shown on Figure 1. The proposed locations and selection rationale are as follows:

- Proposed monitoring wells MW-37 and MW-39 are located in the Bartell parking lot. These wells are placed to evaluate the groundwater impacts detected in samples collected from HC-7 and HC-9. MW-39 is a contingent location. MW-39 will be installed only if samples collected from MW-37 exceed MTCA Method A cleanup levels.
- Proposed monitoring well MW-38 and MW-40 is located downgradient of impacted well MW-30, in the TRF parking lot. This well will be used to delineate the downgradient extent of the groundwater plume.

- MW-40 and MW-41 are contingent locations. MW-40 and MW-41 will be installed if samples collected from MW-38 and MW-37 do not meet MTCA Method A cleanup levels.

The groundwater monitoring well locations shown on Figure 1 are proposed; therefore, actual locations may differ based on permit conditions, utilities, or other conditions encountered in the field. Ecology will be consulted if well locations are changed.

No monitoring wells are proposed inside the Infiniti of Bellevue parking garage due to low ceiling clearance. In addition, no wells are proposed to the north (up gradient) of MW-34 due to utilities and safety issues with drilling in the NE 8th Street right of way.

The screen intervals for the wells are anticipated to be from approximately 3 to 13 feet bgs, but exact depths will depend on the water table at that location.

2.3 Site Access

Property access is up to date through Access Agreements between the property owners and Ecology.

2.4 Utility Locate

Prior to beginning soil borings and groundwater monitoring well installation, Leidos will contact the Utilities Underground Location Center to request location of all public utilities in the vicinity of the proposed locations. In addition, Leidos will subcontract a private utility locating contractor (ULS) to locate other potential infrastructure or other buried objects that would not typically be identified through the public utility locating process.

2.5 Soil Sampling and Analysis

Soil samples will be collected during the installation of the new groundwater monitoring wells and will be submitted for analysis of the following:

- TPH-G by Northwest Method NWTPH-Gx; and
- BTEX by U.S. Environmental Protection Agency (USEPA) Method 8260B.

Soil collected for analysis will be submitted under proper sample chain of custody procedures to Eurofins Lancaster Laboratories of Lancaster, Pennsylvania.

Sampling procedures, analytical and QA/QC details as well as decontamination and IDW procedure details are in included in Sections 3 and 4.

2.6 Groundwater Sampling and Analysis

Groundwater samples will be collected from all Site groundwater monitoring wells. The groundwater samples will be submitted for analysis of the following:

- TPH-G by Northwest Method NWTPH-Gx; and
- BTEX by USEPA Method 8260B.

Soil and groundwater samples collected for analysis will be submitted under proper sample chain of custody procedures to Eurofins Lancaster Laboratories of Lancaster, Pennsylvania.

Sampling procedures, analytical and QA/QC details as well as decontamination and IDW procedure details are in included in Sections 3 and 4.

2.7 Monitoring Well Elevation Survey

Following installation, monitoring well elevation measurements will be made to the nearest 0.01 foot at the ground surface (i.e., top of well-box lid) and at the top of the well casing, relative to the North American Vertical Datum of 1988. Monitoring well location measurements will be made relative to the North American Datum 1983 High Accuracy Reference Network [NAD83 (HARN)].

3.0 Vapor Intrusion Study

Following the completion of the soil borings and groundwater well installation and sampling, and discussions with Ecology, the data will be evaluated and based on the contamination distance from buildings, a decision will be made as to whether a Tier 1 vapor intrusion investigation will be completed. The Tier 1 investigation will consist of shallow vapor points installed as close to the subject buildings as practicable. The vapor point locations will be discussed with the respective property owners prior to installation.

The results of the Tier 1 investigation will be evaluated and if the samples exceed the screening level concentrations then with consultation and approval of the respective property owners, a Tier 2 vapor intrusion investigation will be proposed. A Tier 2 investigation typically involves sub slab/crawl space and/or indoor air sampling.

If a vapor intrusion study is deemed necessary then a Vapor Intrusion Work Plan memo will be submitted detailing proposed vapor sampling locations and procedures.

4.0 Sampling and Analysis Plan

4.1.1 Sample Frequency

Soil sampling in the borings will be performed using a split spoon stainless steel hand auger at approximately 1-foot sampling interval above 8 feet and continuous with a direct-push probe rig between 8 feet and the base of the boring.

Soil samples will be classified in accordance with the Unified Soil Classification System (USCS). In addition, each sample will be field screened for the presence of petroleum hydrocarbons by headspace vapor measurements using a PID, and sheen testing.

At a minimum, two soil samples from each boring will be submitted for laboratory analysis: one from the capillary fringe, and the second from the bottom-most sample interval attained in the boring. Additional soil samples may also be submitted based on field-screening observations. For example, the sample producing the highest PID readings, strongest sheen, or otherwise having the greatest visual or olfactory indication of hydrocarbon impacts may also be submitted for laboratory analysis.

4.1.2 Field Screening

Headspace Vapor

Each sample will be field screened to obtain a relative estimate of its volatile organic compounds (VOC) concentration. This field screening will be performed by measuring the concentration of VOCs in the headspace above the sample in a closed container using a field flame-ionization detector (FID) or PID. The field screening will be performed by placing the soil into a sealed plastic bag (e.g. Ziploc), disaggregating the soil by hand, allowing the sample to equilibrate for at least five minutes, and then opening the bag slightly, inserting the instrument probe, and measuring the VOC concentration in the headspace. If the ambient temperature is below 65ºF, the sample will be warmed (e.g., in a heated vehicle) before the headspace measurement is made.

Sheen Testing

Sheen testing will be conducted by placing soil in a pan of water and observing the water surface for signs of sheen. Sheens are classified as follows:

- Slight Sheen: Light, colorless, dull sheen. The spread is irregular and dissipates rapidly.
- Moderate Sheen: Light to heavy sheen, may show color/iridescence. The spread is irregular to flowing. Few remaining areas of no sheen are evident on the water surface.
- Heavy Sheen: Heavy sheen with color/iridescence. The spread is rapid and the entire water surface may be covered with sheen.

4.1.3 Soil Chemical Analyses

Selected soil samples will be submitted to Eurofins Lancaster Laboratories, LLC of Lancaster, Pennsylvania (Lancaster) for the following analyses:

- TPH-G by Northwest Method NWTPH-Gx; and
- BTEX by USEPA Method 8260B.

4.2 Monitoring Well Installation and Sampling Procedures

4.2.1 Monitoring Well Construction

Each monitoring well will be completed monitoring well in accordance with the Washington Administrative Code (WAC) Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC).

Wells will be constructed using a 2-inch-diameter PVC casing with 0.020-inch, factory-slotted screen. The screen-intervals for the wells are anticipated to be from approximately 3 to 13 feet bgs, but exact depths will depend on the water table and the depth to till at that location. Each well screen will be positioned to straddle the water table during anticipated seasonal fluctuations. The annular space around the well screen will be filled with #10/20 Colorado silica sand to a minimum of 2 feet above the top of the well screen. The remaining annular space will be sealed with hydrated bentonite chips and completed with a steel monument set in concrete and finished flush with the surrounding surface.

4.2.2 Monitoring Well Development

The purpose of the development activities is to set the sand pack and to remove fine-grained material from the sand pack and casing. This is done to enable the collection of ground water samples with a low turbidity. Wells will not be developed until at least 24 hours after being installed in order to allow the surface seal to adequately cure.

Well development will consist of surging for 10 minutes and pumping at least 10 well-casing volumes of ground water from the well using an electric submersible pump until water produced from the well is clear and free of sediment.

4.2.3 Groundwater Sampling

Proper sampling protocol must be followed to ensure that representative samples of ground water are provided for analysis and that the act of sampling does not contribute to further impact at the site or cross-contamination of samples. Techniques employed shall be thoroughly documented.

The pump (or intake hose) will be placed near the middle or slightly above the middle of the screened interval. The well will be purged at a rate of 100 to 500 ml/min; the goal is to minimize drawdown in the well (ideally less than 10 cm drawdown).

Purge-water temperature, pH, specific conductance, dissolved oxygen, oxidation-reduction (redox) potential, and turbidity will be monitored using an in-line flow cell. Readings will be taken every 3 to 5 minutes.

Purging will cease when the following parameters have stabilized as defined below for three successive readings or when at least one well casing volume has been purged:

- Temperature: + 1 ºC;
- pH: + 0.1 units;
- Specific conductance: + 10 percent; and
- Dissolved oxygen or turbidity: + 10 percent.

To minimize delays in field parameter stabilization and potential bias in analytical testing results, any vents or other potential sources of air bubbles in the pump discharge tubing or in-line flow cell should be identified and sealed off (or otherwise isolated) prior to purging or as soon as possible after purging begins.

If well yield is so low that continuous flow is lost during well purging even at the minimum sustainable purge rate, turn the pump off and allow the well to recover as much as possible (but not longer than 24 hours). If only unfiltered samples will be collected for metals/inorganics, allow the well to recover overnight. Do not attempt to maximize purge volume by lowering the pump to the bottom of the well. After the water level in the well has recovered, collect the required samples with the pump placed near the middle of the screened interval. If using a non-dedicated pump, be sure to minimize disturbance of the water column by lowering the pump slowly into the well.

4.2.4 Groundwater Chemical Analyses

Ground water samples will be submitted to Lancaster for the following analyses:

- Gasoline-range hydrocarbons by Northwest Method NWTPH-Gx; and
- BTEX by USEPA method 8260B.

4.3 Decontamination of Equipment Procedures

Field equipment used during drilling soil borings and sampling will be decontaminated prior to use and during sampling to reduce the potential for the introduction of contamination and cross-contamination in accordance with the guidelines and procedures set forth in this document. These procedures are necessary to ensure quality control in decontamination of field equipment and to serve as a means to identify and correct potential errors in sample collection and sample handling procedures.

4.3.1 Equipment and Materials

Equipment and materials that will be used to decontaminate sampling equipment are listed below.

4.4 Investigation Derived Waste Management Procedures

4.4.1 IDW Storage

Residual soil from this investigation will be contained in 55-gallon Department of Transportation (DOT) approved drums, which will remain on-site for temporary storage while awaiting laboratory results. All decontamination and purge water will be stored in 55-gallon DOT approved waste drums.

Each drum will be labeled immediately before waste is placed into the container using a non-hazardous waste or pending analysis label. The following information, at a minimum, will be written in indelible, waterproof ink on each label: container number, date of generation, facility address, contact information and a brief description of the contents of the container. Each drum will be secured after every addition of waste and prior to departing the site on each work day.

4.4.2 IDW Sampling

For waste profiling purposes, waste samples will be collected and submitted under a separate COC. For soil waste, a 3-point composite sample will be collected. For liquid waste, one sample will be collected from the container where the liquid is stored.

4.4.3 IDW Disposal

Following receipt of laboratory analytical data, the waste soil and water will be transported for disposal at a permitted facility by Veolia.

5.0 Quality Assurance Project Plan

The purpose of this QAPP is to provide confidence in the analytical results through a system of QA/QC performance checks with respect to data collection methods, laboratory analysis, data reporting, and appropriate corrective actions to achieve compliance with established performance and data quality criteria. This section presents the QA/QC protocols used to ensure that the data obtained during the investigation are legally defensible and usable for their intended purpose.

Leidos is the lead project consultant, involved with data generation. Key roles on this project are as follows:

Project Manager (Don Wyll – Leidos): The project manager is responsible for the successful completion of all aspects of this project, including day-to-day management, production of reports, liaison with party and regulatory agencies, and coordination with the project team members. The project manager is also responsible for resolution of non-conformance issues, is the lead author on project plans and reports, and will provide regular, up-to-date progress reports and other requested information to project team and Ecology.

Field Manager (Chris Wildt): The field manager is responsible for overseeing the field sampling program outlined in the Work Plan, including collecting representative samples and ensuring that they are handled properly prior to transfer of custody to the project laboratory. The field manager will manage procurement of necessary field supplies, and will assure that monitoring equipment is operational and calibrated in accordance with the specifications provided herein.

Data Quality Manager (Don Wyll). The data quality manager is responsible for developing data quality objectives, selecting analytical methods, coordinating with the analytical laboratory, overseeing laboratory performance, and approving quality assurance/quality control (QA/QC) procedures.

Laboratory Project Manager – Eurofins Lancaster Laboratories. The laboratory project manager is responsible for ensuring that all laboratory analytical work for soil and water media complies with project requirements, and acting as a liaison with the project manager, field manager, data quality manager, and data validation manager to fulfill project needs on the analytical laboratory work. This responsibility also applies to analyses the laboratory project manager subcontracts to another laboratory.

5.1 Measurements of Data Quality

The quality of the data reported by the laboratories will be evaluated for accuracy, precision, representativeness, completeness, and comparability as described below.

Accuracy is a measure of the closeness of an individual measurement or an average of a number of measurements to the true value. Accuracy is calculated in terms of percent recovery (%R) of a known value. The “known” can take the form of USEPA or National Institute of Standards and Technology-traceable standards, laboratory-prepared solutions of target analytes or solutions of surrogate compounds spiked into each sample.

Precision is the agreement between a set of replicate measurements without assumption of knowledge of the true value. It is a measure of the variability in repeated measurements of the sample compared to the average value. The precision assessment should represent the variability of sampling, sample handling, preservation, storage, and analysis of the sample data. Precision is reported as relative percent difference (RPD), the difference divided by the average of two positive sample results.

The overall precision is a mixture of sampling and laboratory variability. Laboratory and field duplicates analyses are used to determine precision. Laboratory duplicate RPDs provide a measurement of analytical precision and field duplicates RPDs provide a measure of overall precision.

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of population, parameter variations at a sampling point, a process condition, or an environmental condition.

Representativeness of the data is addressed qualitatively in the Work Plan to assure that rationale of sampling locations is adequate to account for all site variations and the sampling and analytical techniques.

Completeness refers to the amount of acceptable data points collected relative to the amount needed to achieve the project's technical objectives. Completeness is calculated as the number of valid data points achieved divided by the total number of data points expected for all requested analyses.

Comparability expresses the confidence with which one data set can be compared to another data set. All data in the project should be internally directly comparable. Whenever possible, data produced during the project should be comparable to other data produced from other similar site investigations using similar techniques and analytical procedures.

5.2 Quality Assurance and Quality Control

The following QA/QC procedures will be utilized during this investigation to ensure that accurate, reproducible, and defensible data is collected.

5.3 Monitoring Equipment Calibration

The portable PID used for screening soil vapor headspace will be calibrated at the beginning of each day according to the manufacturer's recommended procedure using a laboratory-certified isobutylene gas standard. The PID may also be calibrated during the course of the day.

All instruments and equipment (field meters including pH, conductivity, dissolved oxygen, temperature probe, and PID) used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer's guidelines. Operation, calibration, and maintenance will be performed by personnel properly trained in these procedures. Documentation of all routine and special maintenance and calibration conducted during the duration of the field activities will be recorded in the project logbook.

The PID will be calibrated daily in the field in accordance with the manufacturer's recommended procedure using a laboratory-certified isobutylene gas standard. A calibration test will be

performed as necessary in the field using the calibration gas to check if the instrument remains properly calibrated throughout the day.

5.3.1 Sample Collection

The specific methods for sample container size and type, sample preservation requirements and holding times are determined by the contact laboratory chosen for the project. The laboratory will provide the sample containers. The Consultant will verify that the laboratory has supplied the proper containers and that they are pre-cleaned and shipped in sealed boxes.

All samples (with the exception of trip blanks) will be prepared and sealed in the field. Sample collection procedures, locations and protocols will be documented in a bound field notebook.

5.3.2 Sample Identifiers and Labels

Sample identifiers and labels will be assigned by the sampling team as described in the SAP. The unique sample identifier will be clearly written on the sample label affixed to each sample container. Sample labels will be affixed to each sample container in such a way so as to not obscure any QA/QC lot numbers on the containers. Sample information will be printed clearly on each label. Field identification will be sufficient to enable cross-reference with the project field book.

5.4 QA/QC Sampling

QC data are necessary to determine precision and accuracy and to demonstrate the absence of interference and/or contamination of sampling equipment glassware and reagents, etc. All field QC samples will be submitted as blind samples to the laboratory. Specific QC requirements for laboratory analyses will be the responsibility of the project laboratory. Field QC will include the following:

- Trip Blanks are blank samples prepared to assess ambient transport conditions. The contract laboratory will prepare them. The blanks will be handled like a sample and shipped to the laboratory for analyses. One trip blank will accompany each sample cooler containing water samples.
- Equipment Rinsate Blanks are blank samples designed to demonstrate that sampling equipment has been properly prepared and cleaned before field use and that cleaning procedures between samples are sufficient to minimize cross contamination. Rinsate blanks will be collected at a rate of one blank per site, per sampling activity.
- Field Duplicate samples consist of a set of two samples collected independently of one another at the same sampling location during the same sampling event. Field duplicates are designed to assess actual field variability as compared to analytical duplicate or matrix spike duplicate (MSD) analyses which measure laboratory variability. Duplicate samples will be collected at a rate of one for each 20 (soil and groundwater) samples.
- Matrix spike (MS)/MSDs are environmental samples that are spiked, in the laboratory, with a known concentration of a target analyte. The MS/MSDs are used to check sample matrix interferences and evaluate error due to laboratory bias and precision. Additional

sample volume will be submitted for water samples. The project laboratory will perform MS/MSD analyses at a rate of one for each 20 samples of a particular matrix.

5.5 Sample Storage

All soil and groundwater samples will be stored in an ice chest while at the site and during transportation to the laboratory. Samples will be sub-packed by sample location in new Ziploc plastic bags and stored in the dark at approximately 4°C.

5.6 Chain of Custody Records and Procedures

The primary objective of chain of custody (COC) protocol is to provide an accurate written record that can trace the possession and handling of a sample from collection to the completion of all required analyses. A sample is in custody if it is in someone's possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel only.

The COC will be fully completed in the field and signed by the sample collector. The samples will be entered onto the COC as they are collected.

5.6.1 Custody Seals

Custody seals will be used on all coolers and sample shipping containers. The number of seals per container is dependent upon the nature of each container. Seals will be signed and dated prior to use. Clear strapping tape will be placed over each seal to ensure that seals are not accidentally broken during shipment.

5.6.2 Field Custody Procedures

The following guidance will be used to ensure proper control of samples while in the field:

- As few persons as possible will handle samples.
- Coolers or boxes containing cleaned bottles will be sealed with a custody tape seal during transport to the field or while in storage prior to use. Sample bottles from unsealed coolers or boxes, or bottles that appear to have been tampered with will not be used.
- The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under COC rules.
- The sample collector will record sample data in the field logbook.
- The site team leader will determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required.

When transferring custody (i.e., releasing samples to a shipping agent), the following will apply:

- The coolers in which the samples are packed will be sealed and accompanied by COC records. When transferring samples, the individuals relinquishing and receiving them must sign, date and note the time on the COC record. This record documents sample custody transfer.

- Samples will be dispatched to the laboratory for analysis with separate COC records accompanying each shipment. Shipping containers will be sealed with custody seals for shipment to the laboratory. The method of shipment, name of courier and other pertinent information will be entered in the COC record.
- All shipments will be accompanied by COC records identifying their contents. The original record will accompany the shipment. The other copies will be distributed appropriately to the project manager.
- Sent by common carrier, a bill of lading will be used. Freight bills and bills of lading will be retained as part of the permanent documentation.

5.6.3 Laboratory Custody Procedures

The laboratories receiving the samples will receive and document samples in accordance with their respective Standard Operation Procedures (SOPs).

This section addresses procedures that will be used to identify samples and document the samples' COC. These procedures are necessary to ensure that the quality of the samples is maintained during their collection, transportation, storage and analysis. Procedures for custody, documentation, handling, packaging and shipping environmental samples are described below.

5.7 Sample Packaging, Handling, and Shipping

The transportation and handling of samples must be accomplished in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects to sample handlers due to the possible hazardous nature of samples. Regulations for packaging, marking, labeling and shipping hazardous materials are promulgated by Department of Transportation (DOT) in the Code of Federal Regulations, 49 CFR 171 through 177 and/or the International Air Transport Association regulations for Dangerous Goods.

5.7.1 Sample Packaging

Samples must be packaged carefully to avoid breakage or contamination and must be shipped to the laboratory at proper temperatures. The following sample package requirements will be followed:

- Sample bottle lids must never be mixed. All sample lids must stay with the original containers.
- All sample bottles will be placed in a plastic bag to minimize leakage in the event a bottle breaks during shipment.
- The environmental samples will be cooled. Ice sealed in plastic bags or artificial icing materials may be used. Ice is not to be used as a substitute for packing materials.
- Approximately 2 inches of inert packing material, such as closed-cell foam or bubble wrap, should be placed in the bottom of all coolers. Any remaining space in the cooler should be filled with inert packing material. Under no circumstances should material, such as saw-dust, newspaper, or sand be used.

- The custody record must be placed in a plastic bag and placed inside of the cooler lid. Signed and dated custody seals must be affixed to the sample cooler and must be covered with clear tape.
- Cooler lids must be secured with strapping tape at a minimum of two locations without covering any labels and the cooler drain must be taped shut.
- Completed shipping labels must be attached to the top of the cooler, with "This Side Up" labels.

5.7.2 Shipping Containers

Shipping containers are to be custody-sealed for shipment as appropriate. The container will be secured with clear tape wrapped around the package at least twice in at least two locations. Custody seals will be affixed in such a way that access to the container can be gained only by cutting the tape and breaking a seal.

- The custody seals will be covered with clear tape.
- Field personnel will make arrangements for transportation of samples to the laboratory. When custody is relinquished to a shipper, field personnel will telephone the laboratory sample custodian, to inform him/her of the expected time of arrival of the sample shipment and to advise him/her of any time constraints on sample analysis.

5.7.3 Marking and Labeling

The marking and labeling for shipping containers should follow the guidance presented below:

- Use abbreviations only where specified.
- The words "This End Up" or "This Side Up" must be clearly printed on the top of the outer package. Upward pointing arrows should be placed on the sides of the package.
- After a shipping container has been sealed, two COC seals are placed on the container, one on the front and one on the back. The seals are protected from accidental damage by placing clear tape over them.

5.8 Analytical Procedures

The analytical methodologies to be used for generation of field analytical data (pH, temperature, conductivity, dissolved oxygen and static water level) are summarized in the Work Plan and the SAP. Field analytical data will be used to augment information generated through laboratory analysis and aid in delineating the groundwater impacts during field investigations. Equipment for monitoring groundwater conditions during well development and purging prior to sampling will meet the specifications of methods specified.

Tables 1 and 2 provide the laboratory analytical methods to be used for completing the laboratory analytical tasks defined in the Work Plan and the SAP. Table 3 summarizes sample containers, preservation, and holding times.

5.9 Data Validation, Reporting, and Assessment

5.9.1 Data Validation

All data generated from sampling will be reviewed by comparing calibration, accuracy, and precision to the QC criteria listed in the method description. The validation procedures are generally composed of, but not limited to, the following steps:

- Verifying the correct samples were analyzed and reported in appropriate units.
- Verifying preservation and holding times.
- Verifying that initial and continuing calibrations were performed and met QC criteria.
- Verifying that no analytes were present in the method blanks and that one blank was run every 10 samples.
- Verifying that a duplicate and matrix spike, or MS/MSD were run every 20 samples and that QC criteria were met.

5.9.2 Data Reporting

All laboratory data calculations and reductions will be performed as described in the applicable method references. Raw data, including laboratory worksheets, notebooks, sample tracking records, instrument logs, standard and sample preparation logs, calibration data and associated QC records, should be retained by the laboratory for a minimum of 10 years and be available for inspection if necessary. While the laboratory data management system may store records electronically, provision should be made for hard copies as necessary to validate results.

Electronic laboratory data will be submitted to Ecology per Policy 840.

Deliverables by the contract laboratory shall be in standard data reporting format. The report shall include the following:

- Cover sheet listing the sample types received, tests performed, and a case narrative describing problems encountered and identifying any analyses not meeting QC criteria and general comments.
- Chain-of-custody forms and cooler receipt forms;
- Analytical data reported by sample or by test and containing pertinent information (i.e., field identification number, contract laboratory identification number, date of sample collection, receipt, extracted/digested/analyzed, batch number(s), dilution factors, all analytes and their reporting limits, data qualifiers, matrix units, percent of solids for soil samples, and sample description).
- Analytical information for QC sample spikes, laboratory duplicates, initial and continuing calibration verifications of standards and laboratory blanks, standard procedural blanks, LCS, surrogates, laboratory reference materials, ICP interference check samples, and detection limit check samples.
- Copies of any other forms pertinent to the data review process (corrective action forms, validation forms, raw data, etc.)

- The contract laboratory shall maintain on file all the supporting data and documentation for these samples.

5.10 Data Assessment

The project data assessment procedures are generally composed of but not limited to the following steps:

- Review the COC and verify that all samples were received and analyzed.
- Review laboratory sample delivery group narrative for potential deficiencies in the data.
- Identify and organize the data according to laboratory data packages.
- Apply appropriate data qualifiers to the data.
- Verify the usability of the qualified data.

The Project Manager conducts a critical review of the comments provided in the summary report to determine if they are sufficient to describe and explain any associated problems with the data. If any data gaps are identified in the summary, the project manager resolves them using professional judgment based on the application of the USEPA Functional Guidelines for Data Validation or USEPA Functional Guidelines for Inorganic Data Review.

Data qualifiers will be assigned to the data as identified in the summary report. The data qualifiers or flags are assigned by the consultant in accordance with USEPA Functional Guidelines for Data Validation or USEPA Functional Guidelines for Inorganic Data Review.

5.11 Internal Quality Control Checks

5.11.1 Performance and System Audits

Performance and systems audits include careful evaluation of both field and laboratory QC. Performance and system audits are performed on a regularly scheduled basis during the lifetime of the project to assess the accuracy of the measurement systems.

Performance and system audits may be performed through split sampling in the field and/or by issuing the laboratory periodic blind samples. Audits of field activities can be carried out to evaluate sampling activities such as sample identification, sample control, COC procedures, field documentation and general sampling operations.

5.11.2 Project Analytical QA Preventative Maintenance

All field instruments and equipment used for analysis will be serviced and maintained only by qualified personnel. All repairs, adjustments and calibrations will be documented in an appropriate logbook or data sheet that will be kept on file. The instrument maintenance logbooks will clearly document the date, a description of the problem, the corrective action taken, the result and who performed the work.

All equipment used in the field is subject to standard preventative maintenance schedules. When in use, equipment is inspected at least twice daily, once before start-up in the morning and again at the end of the work shift prior to overnight storage or return to the equipment supplier.

Regular maintenance such as cleaning lenses, replacement of in-line filters and removal of accumulated dust is to be conducted according to manufacturer's recommendations and in-field need, whichever is appropriate. All preventive maintenance performed will be entered in the individual equipment's logbook and the field notebook.

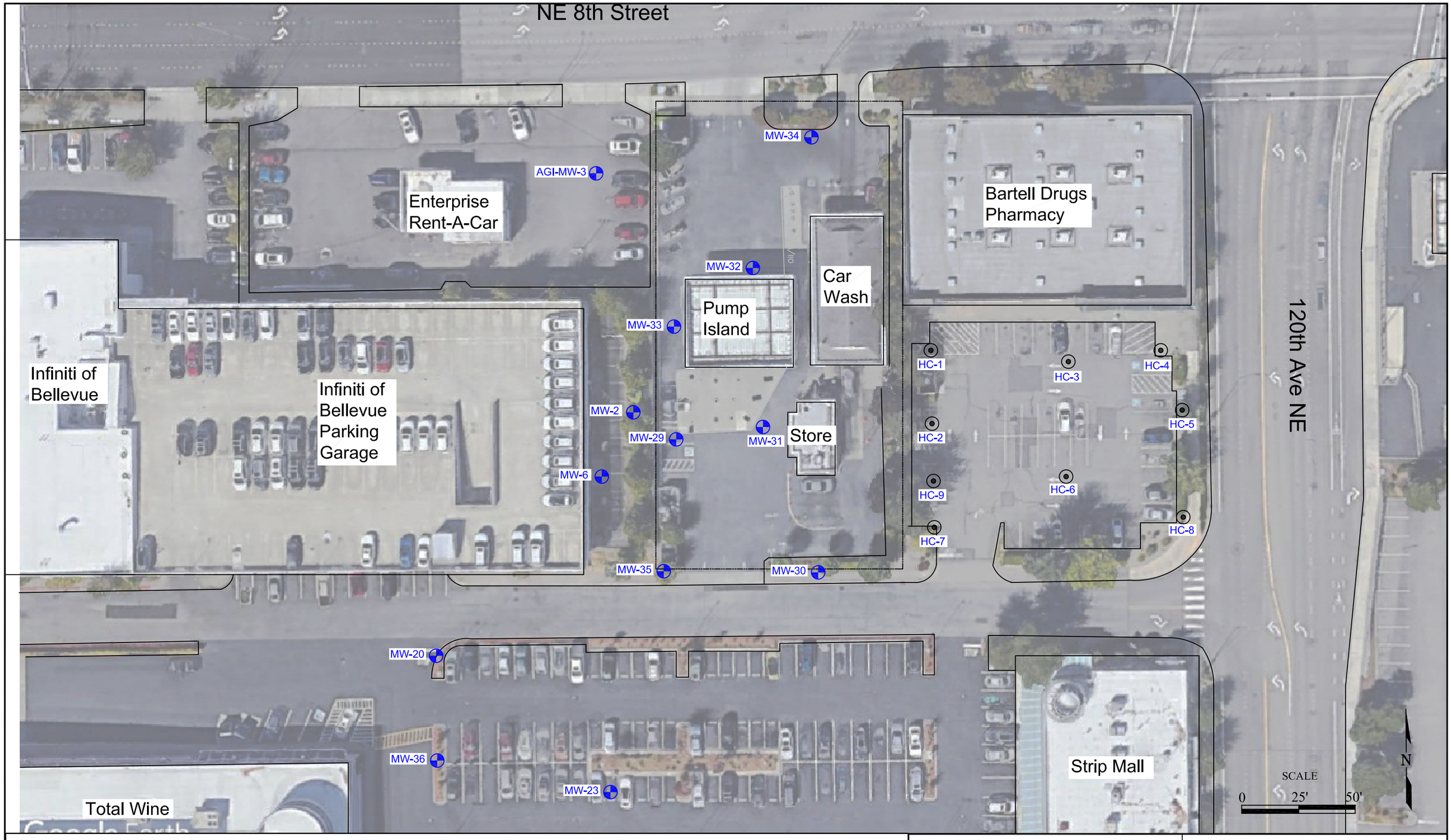
In addition to preventive maintenance procedures, daily calibration checks will be performed at least once a day in the morning prior to use and recorded in the field notebook. Additional calibration checks will be performed as required. All field notebooks will become part of the permanent site file.

5.11.3 Corrective Action

Corrective actions are procedures that may be implemented on samples that do not meet QA specifications. The need for corrective action will be based on the limits of acceptability as specified in the appropriate sections of this QAPP. Corrective actions will depend on the problem(s) encountered and, in many cases, may have to be defined as the need arises. Persons responsible for initiating actions and procedures for identifying, documenting and reporting corrective actions include the project manager and QA officer.

5.11.4 QA/QC Reports

Serious analytical problems will be reported to Ecology. The time and type of corrective action, if needed, will depend on the severity of the problem and relative overall project importance. Corrective actions may include altering procedures in the field, conducting an audit, or modifying laboratory protocol.



LEGEND

- MW-25 Monitoring Well
- HC-1 Soil Boring
- Concrete Surface
- Current Buildings and Structures
- Parcel Boundary

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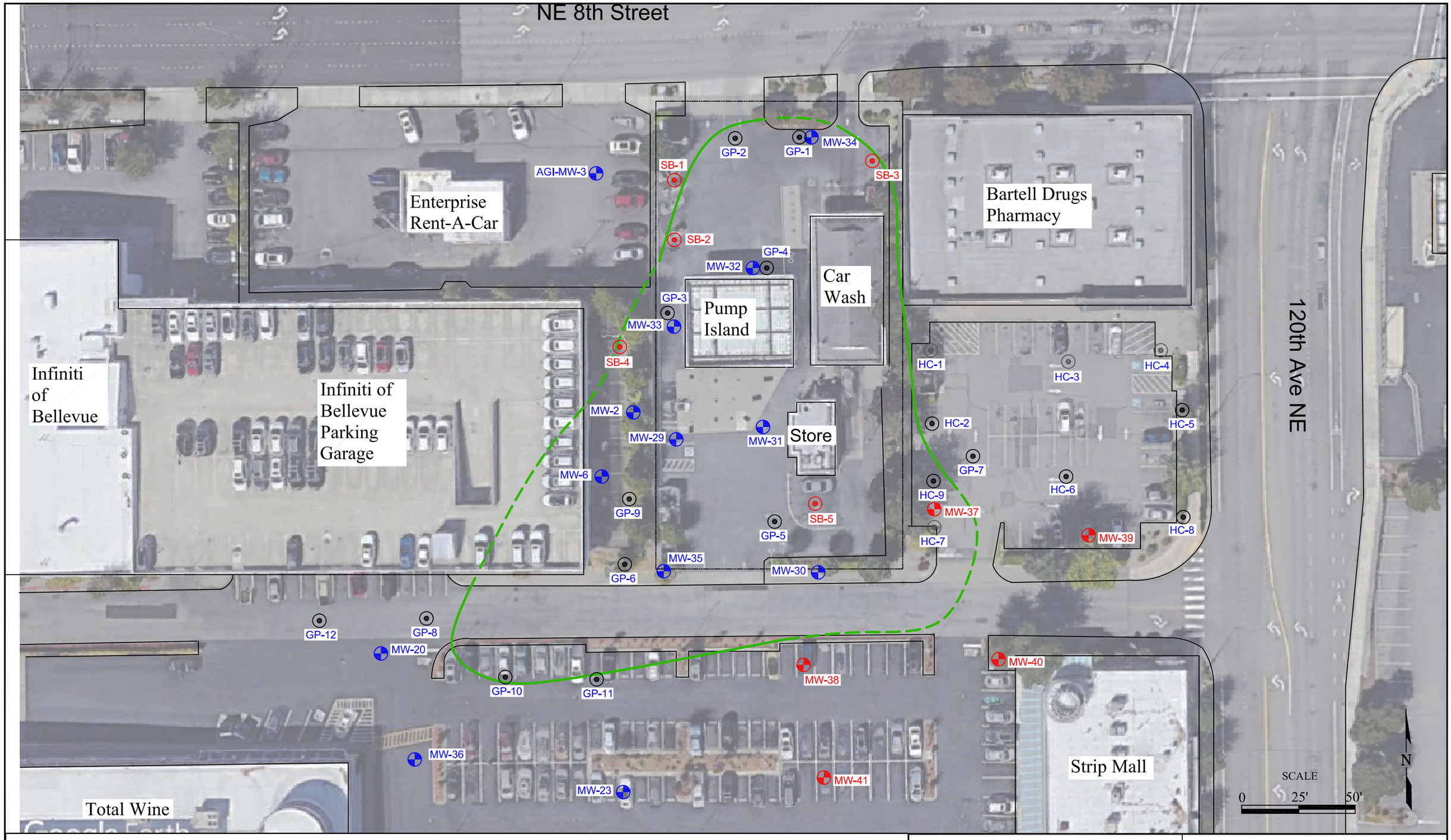
Tiki Car Wash
11909 NE 8th Street
Bellevue, WA 98005

Figure 1
Basemap

DATE: 9/1/2021 | DRAWING: Bellevue_Tiki.dwg



LEGEND

- Concrete Surface
- Current Buildings and Structures
- MW-25 Monitoring Well
- HC-1 Soil Boring
- Parcel Boundary
- MW-37 Proposed Monitoring Well Location
- SB-1 Proposed Soil Boring Location
- Extent of Contamination in Groundwater (dashed where inferred)

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Bellevue, WA 98005

Figure 2
Proposed Soil Borings and Well Locations

DATE: 03/04/2022 | DRAWING: Bellevue_Tiki.dwg

Tables

Tables

TABLE 1
Analytical Methods and Detection Limits for Soil Samples

Analyte	Soil					
	Analytical Method	MDL	LOD	LOQ	LCS	RPD
		(mg/kg)			(%)	
Petroleum Hydrocarbons						
GRO	NWTPH-Gx	1	2	5	80-120	≤ 30
Volatile Organic Compounds						
Benzene	USEPA 8260B	0.0005	0.002	0.005	80-120	≤ 30
Ethylbenzene	USEPA 8260B	0.001	0.002	0.005	80-120	≤ 30
Toluene	USEPA 8260B	0.001	0.002	0.005	80-120	≤ 30
Total Xylenes	USEPA 8260B	0.001	0.002	0.005	80-120	≤ 30

Notes:
GRO = gasoline-range hydrocarbons
LCS = laboratory control sample (supplied by Eurofins Lancaster)
LOD = limit of detection (supplied by Eurofins Lancaster)
LOQ = limit of quantitation (supplied by Eurofins Lancaster; equivalent to PQLs or RLs)
MDL = method detection limit (supplied by Eurofins Lancaster)
RPD = relative percent difference (supplied by Eurofins Lancaster)
USEPA = United States Environmental Protection Agency

TABLE 2
Analytical Methods and Detection Limits for Groundwater Samples

Analyte	Groundwater					
	Analytical Method	MDL	LOD	LOQ	LCS	RPD
		(µg/L)			(%)	
Petroleum Hydrocarbons						
GRO	NWTPH-Gx	50	100	250	75-135	≤ 30
Volatile Organic Compounds						
Benzene	USEPA 8260B	0.5	1	1	78-120	≤ 30
Ethylbenzene	USEPA 8260B	0.5	1	1	78-120	≤ 30
Toluene	USEPA 8260B	0.5	1	1	80-120	≤ 30
Total Xylenes	USEPA 8260B	0.5	1	1	80-120	≤ 30

Notes:
GRO = gasoline-range hydrocarbons
LCS = laboratory control sample (supplied by Eurofins Lancaster)
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RPD = relative percent difference (supplied by Eurofins Lancaster)
USEPA = United States Environmental Protection Agency
µg/L = Micrograms per liter

TABLE 3
Sampling Containers, Preservatives, and Holding Times

Sample Matrix	Analytical Parameter	Analytical Method	Sample Container	No. of Containers (per sample)	Preservation Requirements	Holding Time
Soil	GRO	NWTPH-Gx	Method 5035A, 40-mL VOA vials	4	4°C ±2°C, Freeze within 48 hours to <-7°C	14 days
	BTEX	USEPA 8260B	Method 5035A, 40-mL VOA vials	4	4°C ±2°C, Freeze within 48 hours to <-7°C	14 days
Water	GRO	NWTPH-Gx	40-mL VOA vials	3	4°C ±2°C, HCl pH < 2	14 days
	BTEX	USEPA 8260B	40-mL VOA vials	3	4°C ±2°C	14 days

Notes:
HCL = hydrochloric acid
USEPA = United States Environmental Protection Agency
GRO = gasoline-range hydrocarbons
VOA = volatile organic analysis