

COMPLIANCE MONITORING PLAN

West Illinois/Timpson Way Street Extension Project
Bellingham, WA
(VCP Property No. NW2198)

Prepared for
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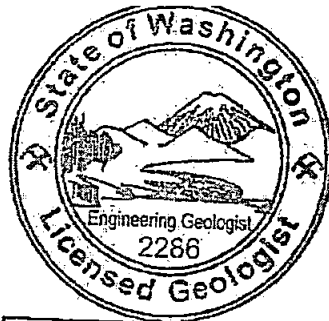
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ACRONYMS AND ABBREVIATIONS

ARI	Analytical Resources Inc.
bgs	below ground surface
BNSF	Burlington Northern Santa Fe Railway
BTC	Bellingham Technical College
CAP	Cleanup Action Plan
City	City of Bellingham, Public Works Department
Creek	Little Squalicum Creek
CUL	cleanup level
DGPS	differential global positioning system
Ecology	Washington State Department of Ecology
EIM	environmental information management
EPA	U.S. Environmental Protection Agency
FCR	field change request
FS	feasibility study
GW	groundwater (sample name prefix)
ICP/MS	inductively coupled plasma/mass spectrometry
LCS	laboratory control sample
MTCA	Model Toxics Control Act
mg/kg	milligrams per kilogram
MQO	measurement quality objective
Oeser	Oeser Company
PAH	polycyclic aromatic hydrocarbon
Park	Little Squalicum Park
PCP	pentachlorophenol
PLP	potential liable party
PPE	personal protection equipment
PQL	practical quantitation limit
QA	quality assurance
QC	quality control
RI/FS	remedial investigation and feasibility study
RPD	relative percent difference
RSD	relative standard deviation
SB	soil boring (sample name prefix)
SOP	standard operating procedure
TCP	Toxics Cleanup Program
TPH	total petroleum hydrocarbons
TSS	total suspended solids
µg/L	micrograms per liter
VCP	Voluntary Cleanup Program
WAC	Washington Administrative Code
WQC	water quality criteria

CERTIFICATION

I, Mark J. Herrenkohl, a professional engineering geologist in the State of Washington, certify that I have reviewed the geosciences portions of this document.



Mark J. Herrenkohl

A handwritten signature in black ink that reads "Mark J. Herrenkohl".

Signature and Name of Geologist: Mark J. Herrenkohl

Date: 12/08/09

1 INTRODUCTION

This plan describes the compliance monitoring proposed by the City of Bellingham (City) for the cleanup of impacted soils at the West Illinois/Timpson Way Street Extension Project property (Property) in Bellingham, Washington. The plan was developed based on information presented in the Feasibility Study/Cleanup Action Plan (FS/CAP) for the Property (Herrenkohl 2009) and satisfies the requirements of the Model Toxics Control Cleanup Act (MTCA), Chapter 70.105D RCW, administered by the Washington State Department of Ecology (Ecology) under the MTCA Cleanup Regulation, Chapter 173-340WAC, and the guidelines for a property-specific cleanup under the Voluntary Cleanup Program (VCP, Ecology 2008a).

Herrenkohl Consulting LLC has written this compliance monitoring plan in association with Wilson Engineering, LLC under contract with the City Public Works Department, and with direction from Ecology's Toxics Cleanup Program (TCP) and VCP. The City has requested Ecology's consultation on the proposed cleanup action for the Property through application to the VCP (VCP Property Number NW2198).

1.1 PROPERTY DESCRIPTION

The City Public Works Department is collaborating with the Whatcom County Public Works Department, Bellingham Technical College (BTC), and Morse Distribution on the engineering, design, and construction of a new road that would be located directly between the Oeser Company (Oeser) and Little Squalicum Park (Park), connecting West Illinois Street with Marine Driver via Timpson Way in Bellingham, Washington (Figure 1). The completed roadway will allow for traffic to access existing industrial sites in the area and BTC without traveling through the surrounding residential neighborhood. The Property covered under this monitoring plan consists of two parcels (parcel numbers 380233 381262 and 380233 330305) located within the proposed roadway with an approximate area of 30,600 square feet as shown in Figure 2.

The Oeser Superfund site, located north of the Property, is a wood-treatment facility that historically used treating solutions of creosote and pentachlorophenol (PCP) to preserve utility poles and pilings. The facility currently uses PCP. Little Squalicum Park, located to the south of the Property, is currently being investigated under an Agreed Order between the City and Ecology on the potential impacts from Oeser-related discharges and other potential sources of contamination (e.g., historical landfill) to the Park and surrounding areas. Soils and potentially groundwater at the Property have been impacted by contaminants historically released from railroad and wood-treatment activities, including arsenic associated with railroad activities and petroleum hydrocarbons (i.e., creosote and diesel) and PCP from Oeser stormwater and wastewater discharges. The source(s) of arsenic is unclear but it is likely associated with either the bedding used to construct the railroad grade or activities by the railroad during its nearly 100 year history along this spur. Oeser-related contaminants appear to be limited to subsurface soils and groundwater at the southern boundary of the Property, associated with historical discharges

through the Oeser/Birchwood stormwater culvert. A more detailed overview of the Property's history and current conditions is presented in the FS/CAP (Herrenkohl 2009).

The cleanup alternative selected for the Property is a combination of excavation, removal, and containment of arsenic-impacted soils (Herrenkohl 2009). This alternative includes the excavation of the upper three feet of soil from a 2,400 square foot area centered near the location of an underground box culvert (refer to Figure 3). This area of the Property showed the highest measured concentrations of arsenic in soils. Following excavation, the 300 cy of impacted soils would be transported to a Subtitle D landfill for disposal. The excavation would be filled with clean material and the remaining Property area would be covered with gravel bedding (as necessary), graded, and compacted in preparation for the placement of an asphalt road and pedestrian side-walk.¹

1.2 PURPOSE AND OBJECTIVES

Compliance monitoring and contingency responses (as needed) will be implemented for the Property in accordance with WAC 173-340-410. The objective of the monitoring is to confirm that cleanup levels (CUL) have been achieved and to confirm the long-term effectiveness of the cleanup action for the Property. This monitoring plan contains information on duration and frequency of monitoring, the trigger for contingency response actions, and the justification for discontinuing monitoring. The plan is subject to Ecology review as part of the engineering design for the road construction project. Two types of monitoring may be conducted in support of the cleanup action:

- **Confirmation of Soil Cleanup Levels** – Soil samples will be collected from the bottom of the excavation, along the southern boundary, and areas on the Property not covered by the road (including the western-most portion and small “triangle-shaped” portion of the property to the north), to confirm arsenic levels are below the MTCA CUL of 20 mg/kg.
- **Long-Term Monitoring of Groundwater** – Soil confirmation results will be evaluated by City and Ecology project representatives in determining the need for long-term monitoring of groundwater. Groundwater monitoring may be conducted 1 year after construction to confirm the arsenic levels (dissolved) in groundwater are below the MTCA Method A CUL for groundwater of 5 µg/L.

Construction and post-construction contingency responses are also defined in this monitoring plan. Construction contingencies may include the need to remove additional soil along the boundaries of the road alignment. A possible post-construction contingency is groundwater monitoring beyond 1-yr to provide more information on potential impacts to groundwater quality downgradient of the Property.

¹ Soils in the western-most portion of the property (~4,500 square feet) and the small “triangle-shaped” portion of the property along the northern boundary of the property will not be covered by the road.

2 ORGANIZATION AND RESPONSIBILITIES

Compliance monitoring of impacted soils and groundwater during and after construction will be the responsibility of the City and its contractors and consultants. The roles of the team members are discussed below.

Washington State Department of Ecology. The City and Ecology, through the VCP, has entered into an agreement for State regulatory oversight on the project. Jing Liu is the designated project manager for Ecology and responsible for oversight of the monitoring. Ecology will provide technical review of this plan and the results of compliance monitoring during and after construction.

City of Bellingham, Public Works Department. The Public Works Department will be responsible for overall project management and reporting tasks. Freeman Anthony, professional engineer, is the designated project manager and will coordinate all activities under this VCP with the Ecology project manager. Mr. Anthony or designee will be responsible for contracting with and directly supervising the environmental consultants that will conduct the analysis and reporting tasks for the compliance monitoring. He will direct the consultant on a day-to-day basis and provide primary review of all reports and other work products.

Coordination with Property Owners and Stakeholders. Morse Distribution, Oeser, BTC, Burlington Northern & Santa Fe (BNSF) railroad, and the general public will be kept informed of the progress made by the City on construction and compliance monitoring activities.

Herrenkohl Consulting LLC. As part of the Wilson Engineering Team, Mark Herrenkohl was selected by the City to lead the compliance monitoring for the West Illinois/Timpson Way street extension project. Mr. Herrenkohl, a licensed engineering geologist in Washington State will be responsible for implementing and executing the technical, quality assurance (QA), and administrative aspects of the monitoring. Mr. Herrenkohl is also accountable for ensuring that the field and testing investigation is conducted in accordance with applicable plans and guidelines, including this monitoring plan. In addition, Mark Herrenkohl will communicate all technical, QA and administrative matters to the project team and the City project manager. He will ensure that any deviations from the monitoring plan are documented, communicated to the City and Ecology, and approved before implementation. Mr. Herrenkohl is responsible for overseeing the preparation of project deliverables to be submitted to the Wilson Engineering project team and City.

Analytical Laboratory. Analytical Resources, Inc. (ARI) of Tukwila, Washington will perform the chemical analysis on soil and groundwater samples collected for this project. The project manager at ARI will be Ms. Susan Dunnihoo.

3 SAMPLING ACTIVITIES

Construction on the road extension project will likely begin in winter/spring 2010. Confirmation soil sampling will be conducted once soil excavation has been completed (within the first week of construction). Soil samples will be collected from the bottom of the excavation, along the southern boundary of the Property, and areas on the Property not covered by the road. If required, groundwater monitoring will begin one year from completion of construction, estimated to be in spring/summer 2011.

3.1 SAMPLE LOCATIONS

Soil and groundwater samples will be collected from station locations presented in Figure 3. A description of the station locations is described in the following subsections.

3.1.1 Soil Sampling Locations

A total of 21 soil samples will be collected from the bottom of the excavation in a grid pattern as shown on Figure 3. Up to 21 soil samples² will be collected from the southern boundary and areas on the Property not covered by the road (including the western-most portion and small "triangle-shaped" portion of the property to the north) at intervals of approximately 50 ft. All soil samples will be analyzed for total arsenic using methods described in Section 4.

3.1.2 Groundwater Sampling Locations

If necessary, groundwater samples will be collected from one upgradient well (location to-be-determined) and one or more downgradient wells (SB-21 to SB-24) located in Little Squalicum Park (Figure 3). All groundwater samples will be analyzed for total and dissolved arsenic and total suspended solids (TSS) by methods described in Section 4.

3.2 SAMPLE COLLECTION METHODS

The following sections describe the soil and groundwater sampling methods for the compliance monitoring.

3.2.1 Soil Sampling

Soil samples will be collected using a stainless-steel spoon or hand auger at locations specified in Section 3.2 and shown in Figure 3. Samples will be collected from 0 to 1 ft below ground surface (bgs) and the location of each will be documented with a hand-held differential global

² Three samples included in the total (21) will be collected along the southern boundary of the road construction project but east of the Property boundary to provide additional soil quality information to the City.

positioning system (DGPS). SOP-1 presents the procedures planned for soil sampling for compliance monitoring (Appendix A).

3.2.2 Groundwater Sampling

Groundwater will be collected from each well using either a portable peristaltic pump equipped with Teflon-lined tubing or disposable bailer, as described in SOP-2 (Appendix A).

3.2.3 Field Documentation

The primary types of documentation that will be used for compliance monitoring include site logbook, photo logs, sample log forms, and sample tracking forms. Copies of field forms planned for use in the monitoring are presented in Appendix B. The site logbooks are vital for documenting all onsite activities. Photo documentation will be used to provide an accurate account of the material sampled, sample locations, and environmental conditions. Sample log forms are used to summarize sampling data collected for various sample locations. Sample tracking forms include the chain-of-custody form, sample labels, and custody seals. The chain-of-custody form is used to track sample custody, which is an important aspect of field investigation activities that documents the proper handling and integrity of the samples. Sample labels are used to provide essential information and identification for all samples collected during field activities. Custody seals are used on all sample shipment containers to detect any tampering that may have occurred during transport or shipment.

3.2.4 Decontamination Procedures

Equipment decontamination will be performed using procedures outlined below and in SOP-3 (Appendix A). Site personnel will perform decontamination of all equipment prior to removal from the Property and between sample locations.

All non-disposable components of the soil sampling equipment (e.g., stainless steel spoons) will be decontaminated as follows:

- Potable water rinse
- Alconox/Liquinox detergent wash
- Potable water rinse
- Deionized water rinse
- Air dry.

Groundwater sampling will be accomplished using either dedicated disposable bailers or Teflon-coated tubing with peristaltic pump. Equipment should be "seasoned" or rinsed with site water before sampling at a designated station.

3.3 MANAGEMENT OF INVESTIGATION-DERIVED WASTES

The primary waste streams to be generated during the monitoring include excess soil and groundwater during sampling and decontamination fluids. The management of each is described in the following subsections.

3.3.1 Excess/Rejected Soil Samples

Soil samples that are rejected and/or determined to be in excess of what is required to conduct analytical sampling will be returned to the project area that it was collected.

3.3.2 Groundwater Purging and Decontamination Waters

Groundwater monitoring wells are located both upgradient and downgradient of the road construction project. Liquid wastes (i.e., purging groundwaters and decontamination waters) will be potentially contaminated with petroleum hydrocarbons (TPH) and PAHs. The presence of any hazardous constituents in the wastewaters is expected to be diluted; therefore, the wastewaters are not expected to be classified as dangerous or hazardous waste. Consequently, the wastewaters are not likely to contain hazardous waste pursuant to the contained-in policy (i.e., environmental media that contain a listed hazardous waste are to be managed as a hazardous waste). Decontamination waters will be disposed of in the project area.

3.3.3 Personal Protective Equipment/Miscellaneous Debris

Personal Protective Equipment (PPE) and miscellaneous debris will be generated during sampling activities. Interim storage of these materials in plastic bags is acceptable. The bags are to be disposed of at an appropriate solid waste facility dumpster after the completion of each sampling event.

3.4 FIELD QUALITY ASSURANCE

Field duplicates will be collected for each sampling period at a frequency of 1 per 20 field samples or 1 per sampling event. Duplicate samples will be analyzed for arsenic and TSS (groundwater sampling only). No field blank samples (e.g., equipment rinsate) will be required for the compliance monitoring program.

4 ANALYTICAL METHODS

Compliance monitoring samples will be analyzed for arsenic and TSS (groundwater samples only). Detailed analyte lists and method reporting limits are provided in Table 1. Method reporting limits are equivalent to the concentration of the lowest calibration standard (i.e., the practical quantitation limit) and represent the low end of the calibration range. Analytes that are detected at concentrations below the reporting limit will be reported, but will be qualified as estimated (a "J" qualifier will be applied to the result by the laboratory).

4.1 TSS

Groundwater samples will be analyzed for TSS by method SM 2540 D-97.

4.2 ARSENIC

Soil samples will be analyzed for arsenic by EPA Method 6020 (Table 1). Strong acid digestion with nitric acid and hydrogen peroxide will be used to prepare soil samples for analysis of arsenic. Analysis will be completed by inductively coupled plasma/mass spectrometry (ICP/MS). For groundwater samples, both total and dissolved arsenic will be analyzed by EPA Method 200.8, also by ICP/MS. The samples will be prepared before analysis with a nitric acid digestion as required by EPA Method 200.8.

4.3 CORRECTIVE ACTIONS

Corrective actions may be initiated in response to deviations from this monitoring plan or laboratory protocols. If deviations from this monitoring plan or unexpected conditions are encountered in the field, the field manager will immediately institute the necessary corrective actions, complete a field change request (FCR) form (refer to Appendix B), and conduct an evaluation to ensure that the correct procedures continue to be followed. In circumstances where sampling conditions are unexpected, the appropriate sampling actions consistent with project objectives will be conducted. The procedural change will be noted in the field log and a corrective action report will be completed for the project files.

At the laboratory, any deviations from the monitoring plan or laboratory protocols will be addressed by the laboratory's project manager and QA officer. The laboratory's project manager is responsible for maintaining records of QC issues related to laboratory work and for notifying the project QA manager of the QC issues. The project QA manager will be responsible for evaluating all reported non-conformances, conferring with the project manager, and verifying that the corrective action is implemented as developed and scheduled by the laboratory's project manager or QA officer. Corrective action records generated at the laboratory will be included with the data package and discussed in the case narrative.

Table 1. Recommended Sampling Preparation Methods, Cleanup Methods, Analytical Methods, and Detection Limits for Soil and Groundwater Samples

Chemical	Recommended Sample Preparation Methods	Recommended Analytical Methods	MTCA A Cleanup Level	Recommended Practical Quantitation Limits
Metals				
Arsenic (Soil)	SW 3050B	SW 6010B	20 mg/kg	5 mg/kg
Arsenic (Groundwater)	EPA 200.8	EPA 200.8	5 µg/L	0.5 µg/L
Conventional Groundwater Variable				
Total Suspended Solids	—	SM 2540 D-97	—	0.1 mg/L

4.4 QUALITY ASSURANCE AND QUALITY CONTROL

Extensive and detailed requirements for laboratory QC procedures are provided in the method protocols that will be used for this study (refer to Tables 1-3). Every method protocol includes descriptions of QC procedures, and many incorporate additional QC requirements by reference to separate QC sections. QC requirements include control limits and, in many cases, requirements for corrective action. QC procedures will be completed by the laboratories, as required in each method protocol and as indicated in this plan.

The frequency of analysis for laboratory control samples, matrix spike samples, matrix spike duplicates or laboratory duplicates, and method blanks will be one for every 20 samples or one per extraction batch, whichever is more frequent. Surrogate spikes and internal standards will be added to every field sample and QC sample, as required by the method. Calibration procedures will be completed at the frequency specified in each method description. As required for EPA SW-846 methods (USEPA 2008), performance-based control limits have been established by each laboratory. These and all other control limits specified in the method descriptions will be used by the laboratories to establish the acceptability of the data or the need for reanalysis of the samples (refer to Tables 1-3).

4.5 DATA QUALITY REVIEW PROCEDURES

Field and laboratory data for this project will undergo a formal verification and validation process. All entries into the database will be verified. All errors found during the verification of field data, laboratory data, and the database will be corrected prior to release of the final data.

Data verification and validation for arsenic will be completed according to methods described in the guidelines for inorganic data review (USEPA 2002). Data will be qualified as estimated if results for laboratory control samples, matrix spike samples, and matrix spike or laboratory duplicates do not meet measurement quality objectives (refer to Table 2). Data will also be qualified as estimated as applicable if control limits for other QC samples or procedures do not meet performance-based control limits established periodically by the laboratory.

No guidelines are available for validation of data for conventional analytes (e.g., TSS). These data will be validated using procedures described in the guidelines for inorganic data review (USEPA 2002), as applicable. The measurement quality objectives (MQOs) for accuracy (Table 3) will be used as control limits for matrix spike recovery, and the MQO for precision will be used as the control limit for laboratory duplicate or triplicate analyses. Performance-based control limits will be used to qualify these data if results for other quality control samples do not meet control limits.

Results for field duplicates will be evaluated using the MQOs provided in Tables 2 and 3. Data will not be qualified as estimated if the MQOs are exceeded, but relative percent difference (RPD) results will be tabulated, and any exceedances will be discussed in the data report.

Data will be rejected if control limits for acceptance of data are not met (Ecology 2008b, USEPA 2002).

Table 2. Quality Control Procedures for Metal Analyses (from Ecology 2008b)

Quality Control Procedure	Frequency	Control Limit	Corrective Action
Instrument Quality Assurance/Quality Control			
Initial Calibration	Daily	Correlation coefficient ≥ 0.995	Laboratory to optimize and recalibrate the instrument and reanalyze any affected samples
Initial Calibration Verification	Immediately after initial calibration	90–110 percent recovery for ICP-MS or performance based intralaboratory control limits, whichever is lower	Laboratory to resolve discrepancy prior to sample analysis
Continuing Calibration Verification	After every 10 samples or every 2 hours, whichever is more frequent, and after the last sample	85–115% for ICP-MS	Laboratory to recalibrate and reanalyze affected samples
Initial and Continuing Calibration Blanks	Immediately after initial calibration, then 10 percent of samples or every 2 hours, whichever is more frequent, and after the last sample	Analyte concentration $< \text{PQL}$	Laboratory to recalibrate and reanalyze affected samples
ICP Interelement Interference Check Samples	At the beginning and end of each analytical sequence or twice per 8 hour shift, whichever is more frequent	80–120 percent of the true value	Laboratory to correct problem, recalibrate, and reanalyze affected samples
Method Quality Assurance/Quality Control			
Holding Times	Not applicable	Soils: 6 months (4°C) or 2 years (frozen); Groundwater:	Qualify data or collect fresh

Table 2. Quality Control Procedures for Metal Analyses (from Ecology 2008b)

Quality Control Procedure	Frequency	Control Limit	Corrective Action
		6 months (4°C)	samples
Detection Limits	Not applicable	See Table 1	Laboratory must initiate corrective actions and contact the QA/QC coordinator and/or the project manager immediately
Method Blanks	With every sample batch or every 20 samples, whichever is more frequent	Analyte concentration \leq PQL	Laboratory to redigest and reanalyze samples with analyte concentrations <10 times the highest method blank
Laboratory Replicates and Matrix Spike Duplicates	With every sample batch or every 20 samples, whichever is more frequent; Use analytical replicates when samples are expected to contain target analytes. Use matrix spike replicates when samples are not expected to contain target analytes	RPD \leq 20% applied when the analyte concentration is >PQL	Laboratory to correct problem and redigest and reanalyze affected samples if analytical problems suspected, or to qualify the data if sample homogeneity problems suspected and the project manager consulted
Matrix Quality Assurance/Quality Control			
Matrix Spikes	With every sample batch or every 20 samples, whichever is more frequent	75–125 percent recovery applied when the sample concentration is <4 times the spiked concentration for a particular analyte	Laboratory may be able to correct or minimize problem; or qualify and accept data
Laboratory Control Samples, Blind Certified Reference Material	Overall frequency of 5 percent of field samples	80–120 percent recovery, or performance based intralaboratory control limits, whichever is lower	Project Manager decision: discuss results with laboratory; qualify sample results
Field Quality Assurance/Quality Control			
Field Replicates	At project manager's discretion	Not applicable	Not Applicable
Field Blanks	At project manager's discretion	Analyte concentration \leq PQL	Compare to method blank results to rule out laboratory contamination; modify sample collection and equipment decontamination procedures

Table 3. Quality Control Procedures for Conventional Analyses (from Ecology 2008b)

Analyte	Suggested Control Limit						
	Initial Calibration	Continuing Calibration	Calibration Blanks	Laboratory Control Samples	Matrix Spikes	Laboratory Triplicates	Method Blank
Total Suspended Solids	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	20% RSD	Analyte concentration \leq PQL

5 DATA ANALYSIS AND REPORTING

This section provides information on the approach for data analysis and evaluation of compliance for the project. Reporting requirements are also provided.

5.1 COMPLIANCE EVALUATION

This section provides information on data analysis and evaluation procedures used to demonstrate and confirm compliance for the project.

5.1.1 Soil Compliance

Soil sample results will be evaluated using the three-part statistical test demonstrating compliance with the CUL as described in WAC 173-340-740(7)(d)(i)(A) and -740(7)(e)). Specific requirements include:

- The upper one sided 95 percent confidence limit on the true mean soil concentration shall be less than the soil CUL of 20 mg/kg;
- No single sample concentration shall be greater than two times the soil CUL; and
- Less than 10 percent of the sample concentrations shall exceed the soil CUL.

This evaluation will be followed separately for soil compliance samples collected from (1) the bottom of the excavation and (2) the southern boundary of the Property and areas not covered by the road (including the western-most portion and small "triangle-shaped" portion of the property to the north).

5.1.2 Groundwater Compliance

If groundwater monitoring is required, sample results will be evaluated for compliance with the CUL as described in WAC 173-340-720(9)(d)(i)(A) and -720(9)(e)(i)). Specific requirements include:

- The upper one-sided 95 percent confidence limit on the true mean groundwater concentration (dissolved) for all downgradient wells combined shall be less than the groundwater CUL of 5 µg/L; and
- No single sample concentration (dissolved) shall be greater than two times the groundwater CUL.

Groundwater samples will be collected from one upgradient well (location to-be-determined) and one or more wells (SB-21 to SB-24) located downgradient of the road extension project. Dissolved arsenic concentrations in downgradient wells will be evaluated for the compliance

requirements above. Total arsenic concentrations will also be compared to the CUL following the requirements described above but will not be used in the compliance evaluation because groundwater samples collected from these wells are very turbid (Integral 2008). Turbid samples are not representative of groundwater conditions.

5.2 LABORATORY REPORTS

Final laboratory reports will be required for chemical analyses. Key elements of these reports are described below. It is expected that these reports, or summaries of these reports (as appropriate), will be appended to the compliance monitoring reports or letters, as appropriate.

Data will be delivered in both hard-copy and electronic format to the consultant project manager, who will be responsible for oversight of data verification and validation and for archiving the final data and data quality reports in the project file. Electronic data deliverables will be compatible with the project team Microsoft Access-based database and Ecology's Environmental Information Management (EIM) database.

Final written laboratory reports and data deliverables will contain the following:

- A cover letter discussing analytical procedures and any difficulties that were encountered
- A case narrative referencing or describing the procedures used and discussing any analytical problems and deviations from SOPs and quality assurance requirements
- Chain-of-custody and cooler receipt forms
- A summary of analyte concentrations (to two significant figures, unless otherwise justified), method reporting limits, and method detection limits
- Laboratory data qualifier codes appended to analyte concentrations, as appropriate, and a summary of code definitions
- Sample preparation, extraction, dilution, and cleanup logs
- Instrument tuning data
- Initial and continuing calibration data, including instrument printouts and quantification reports, for all analytes
- Results for method and calibration blanks
- Results for all QA/QC checks, including surrogate spikes, internal standards, laboratory control samples (LCSs), matrix spike samples, matrix spike duplicate samples, laboratory duplicate or triplicate samples, and any additional QC procedures
- Original data quantification reports for all analyses and samples
- All laboratory worksheets and standards preparation logs
- Supporting documentation on any corrective actions.

Initial calibration information must include concentrations of each standard analyzed, response factors for each analyte at each standard concentration, relative standard deviation (RSD) (or correlation coefficient for metals analytes) over all standards for individual analytes. The RSD control limit range must also be indicated in the initial calibration summary data. Control limits for each analyte must also be indicated on each continuing calibration summary data sheet.

Method blank and field sample data pages must indicate the method reporting limit and the dilution factor. Surrogate reporting forms must list control limits for surrogate recovery. Spike reporting forms (blank and matrix spikes) must indicate spike percent recovery and relative percent difference control limits (if spikes are analyzed in duplicate).

Documentation of detection limits (detection limit studies) and results of performance evaluation samples (supplied by regulatory agencies or purchased from certified vendors) are not required for the data deliverable. However, these records must be supplied upon request. Total measurement error determination for field duplicate samples will be calculated by the project team.

5.3 QUALITY ASSURANCE REPORT

Data validation reports will be prepared by the project team or a contracted validation firm for chemical data and provided to the consultant project manager. Results of the validation reports will be summarized in a quality assurance report. This report will also identify any field and laboratory activities that deviated from the approved sampling plan and the referenced protocols and will make a statement regarding the overall validity of the data collected. Any limitations to the usability of the data will be discussed in this report. The quality assurance report will be incorporated into the final report either as a section or appendix.

5.4 COMPLIANCE MONITORING REPORT

A draft and final compliance monitoring report will be prepared after the initial sampling event and submitted to the City and Ecology³. The report will include the following components:

- Introduction/Purpose;
- Summary of field activities and sample collection;
- Results of soil chemistry tests;
- Quality Assurance/Quality Control (QA/QC);
- Discussion and interpretation of results with respect to compliance; and

³ No formal report will be completed for groundwater monitoring after road construction, if required. The City will provide a copy of the analytical data, quality assurance report, with cover letter to Ecology. Also, groundwater data will be entered into the project database and Ecology EIM format.

- Conclusions and recommendations.

Figure(s) showing the final sample locations using the project basemap created for this work will be included in the report. Chemical laboratory data will be entered into Ecology EIM templates and be submitted with the final report.

6 CONTINGENCY

In the event that soil and groundwater (if necessary) compliance monitoring do not meet the CUL evaluation requirements presented in Section 5.1, the following contingencies may be conducted for the road extension project.

- **Soil Excavation** – Additional soil may be removed from the bottom of the excavation, along the boundaries of the Property, and/or areas on the Property not covered by the road where arsenic concentrations exceed CUL. Upon removal, additional soil samples will be collected from excavated areas and evaluated as described in Section 5.1.1.
- **Groundwater Monitoring** – If, after 1-yr of monitoring, dissolved arsenic levels do not meet the compliance requirements in Section 5.1.2, the monitoring may be extended until concentrations are observed to decrease below these requirements.

These contingencies will be coordinated with City and Ecology project representatives. Coordination and review will be conducted in a timely manner, concurrent with construction activities.

7. REFERENCES

Ecology. 2008a. Guidelines for Property Cleanups under the Voluntary Cleanup Program. Prepared by the Washington State Department of Ecology, Toxics Cleanup Program. Publication No. 08-09-044. July 2008.

Ecology. 2008b. Sediment Sampling and Analysis Plan Appendix. Guidance on the Development of Sediment Sampling and Analysis Plans Meeting the Requirements of the Sediment Management Standards (Chapter 173-204 WAC). Prepared by the Washington State Department of Ecology, Olympia, WA. Ecology Publication No. 03-09-043, Last updated February 2008.

Ecology. 2007. Model Toxics Control Act (MTCA) Cleanup Regulation Chapter 173-340 WAC. Washington State Department of Ecology. Publication No. 94-06. Olympia, WA. Last updated October 12, 2007.

Integral. 2008. Draft Final. Little Squalicum Park Remedial Investigation Report, Bellingham, Washington. Prepared for the Washington State Department of Ecology, Bellingham, WA and City of Bellingham, Parks & Recreation and Public Works Departments, Bellingham, Washington. Prepared by Integral Consulting Inc., Bellingham, Washington. December 2008.

Herrenkohl. 2009. Feasibility Study and Cleanup Action Plan, West Illinois/Timpson Way Street Extension Project, Bellingham, WA. Prepared for the City of Bellingham Public Works Department, Bellingham, WA. Prepared by Herrenkohl Consulting LLC of Bellingham, WA in association with Wilson Engineering Inc., of Bellingham, WA. October 15, 2009.

MTCA. Model Toxics Control Act (Chapter 173-340). Prepared by the Washington State Department of Ecology, Toxics Cleanup Program. Last Updated November 2007.

USEPA. 2008. SW-846 On-line, Test Methods for Evaluating Solid Waste - Physical/Chemical Methods. U.S. Environmental Protection Agency.
<http://www.epa.gov/epaoswer/hazwaste/test/main.htm>.

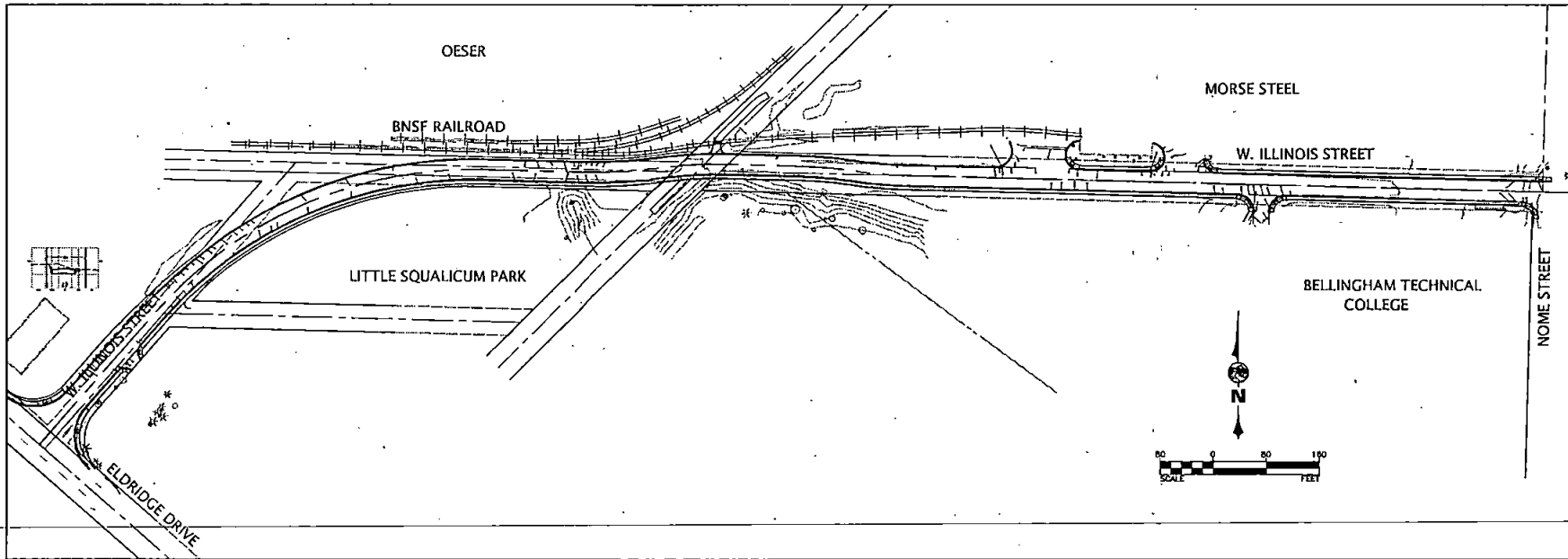
USEPA. 2002. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. 540-R-01-008. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC.

A:\2007\2007-019A COB West Illinois(Dwg)CAP-EXHIBITS\CAP-Final 9-09\Compliance Monitoring Plan\CMP FIG 01.dwg, 11/5/2009 2:17:35 PM, JEFF S

CITY OF BELLINGHAM, WASHINGTON

WEST ILLINOIS STREET EXTENSION COMPLIANCE MONITORING PLAN

NO.	REVISIONS	BY	DATE



CONTROL NOTES

VERTICAL CONTROL:

REFERENCE BENCHMARK IS CITY OF BELLINGHAM BM# 2834
 FOUND COTTON GIN SPIKE IN POWER POLE #3126, BENCHMARK IS LOCATED AT THE SOUTHEAST
 CORNER OF ELDRIDGE AVENUE & LINDBERGH AVENUE
 ELEVATION = 85.29 (COB DATUM)
 83.64 (NAVD 88)

HORIZONTAL CONTROL:

REFERENCE CONTROL IS BASED UPON THE CITY OF BELLINGHAM 2005 HORIZONTAL CONTROL
 NETWORK. SURVEY HELD CITY OF BELLINGHAM CONTROL POINTS:

- COB 2998 - FOUND ENCASED 8" DIA. CONCRETE MONUMENT WITH BRASS PIN ON NORTH
 RIGHT-OF-WAY LINE OF ELDRIDGE AVENUE
 NORTHING: 649653.2812
 EASTING: 1234329.4484
 DATUM: NAD83/08
- COB 1208 - FOUND 2"-DIA. SURFACE BRASS MONUMENT SET IN CONCRETE FLUSH WITH ASPHALT -
 AT THE INTERSECTION OF W. ILLINOIS STREET AND PATTON STREET
 NORTHING: 648412.0207
 EASTING: 1236884.8377
 DATUM: NAD 83/98

SURVEY NOTES

THIS TOPOGRAPHIC SURVEY WAS PERFORMED BY WILSON ENGINEERING, LLC FROM JULY 2007 TO
 AUGUST 2008. ALL MONUMENTATION SHOWN HEREON WAS VISITED AT THE TIME OF THIS SURVEY
 UNLESS NOTED OTHERWISE.

ANGULAR AND LINEAR MEASUREMENTS WERE MADE WITH A TRIMBLE S8 THREE SECOND ROBOTIC TOTAL
 STATION CALIBRATED AT A N.G.S. BASELINE WITHIN THE LAST YEAR.

PROCEDURES USED IN THIS SURVEY MEET OR EXCEED STANDARDS SET FORTH BY WAC 332-130-090.

THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT.

NO ATTEMPT HAS BEEN MADE BY WILSON ENGINEERING, LLC WHILE CONDUCTING THIS SURVEY, TO
 DETERMINE THE EXISTENCE OR LOCATION OF ANY EASEMENTS WHICH MAY SERVE OR ENCUMBER
 SUBJECT SITE.

PROJECT DATUM

VERTICAL DATUM: CITY OF BELLINGHAM
HORIZONTAL DATUM: NAD 83/98

WILSON ENGINEERING, LLC
 203 DUPONT STREET
 BELLINGHAM, WA 98225
 (360) 733-4404 FAX (360) 641-9511
 www.wilsonengineering.com



DESIGNED BY	EAS
DRAWN BY	JCS
CHECKED BY	

CITY OF BELLINGHAM	WASHINGTON
BELLINGHAM	WEST ILLINOIS/TIMPSON WAY
	STREET EXTENSION - COMPLIANCE MONITORING PLAN
	FIGURE 1 - PROJECT PLAN LAYOUT

SHEET	DATE	SCALE	AS SHOWN	JOB NUMBER
	OCT, 2009			2007-019A
FIG 1	OF	3		

W:\2007\2007-019A COB West Illinois(Dwg)\CAP EXHIBITS\CAP-Final 9-09\Compliance Monitoring Plan\CMP FIG 02.dwg, 11/5/2009 2:17:55 PM, JEFF S

LEGAL DESCRIPTION OF PROPERTY

ALL THAT PORTION OF THE ELDRIDGE DONATION CLAIM SITUATE IN SECTION 23, TOWNSHIP 38 NORTH, RANGE 2 EAST, W.M. AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE INTERSECTION OF THE CENTERLINE OF WEST ILLINOIS STREET WITH THE WESTERLY RIGHT-OF-WAY LINE OF NOME STREET AS SHOWN ON THE MORSE INDUSTRIAL PARK SHORT PLAT, RECORDED IN VOLUME 28 OF SHORT PLATS, PAGE 8, RECORDS OF WHATCOM COUNTY, WASHINGTON;

THENCE N.88°32'04"W, ALONG SAID CENTERLINE AND THE WESTERLY EXTENSION THEREOF, A DISTANCE OF 1236.73 FEET TO A POINT ON THE SOUTHEASTERLY LINE OF A 50 FOOT STRIP OF LAND CONVEYED TO THE CITY OF BELLINGHAM BY DEED RECORDED UNDER AUDITOR'S FILE NO. 2020400482, RECORDS OF SAID COUNTY AND STATE;

THENCE S.45°41'47"W, ALONG SAID SOUTHEASTERLY LINE A DISTANCE OF 41.87 FEET TO THE WESTERLY EXTENSION OF THE SOUTH LINE OF SAID WEST ILLINOIS STREET, SAID POINT BEING THE TRUE POINT OF BEGINNING;

THENCE S.89°34'46"W, A DISTANCE OF 72.13 FEET TO THE NORTHWESTERLY LINE OF SAID 50 FOOT STRIP, SAID POINT ALSO BEING THE SOUTHEASTERLY CORNER OF THE NORTH 15 FEET OF LOIS 5 AND 6, "ELDRIDGE INDUSTRIAL SITES," ACCORDING TO THE PLAT THEREOF, RECORDED IN VOLUME 7 OF PLATS, PAGE 20, RECORDS OF WHATCOM COUNTY, WASHINGTON;

THENCE N.88°39'13"W, ALONG THE SOUTHERLY LINE OF SAID NORTH 15.00 FEET, A DISTANCE OF 539.25 FEET TO A POINT ON THE SOUTHEASTERLY RIGHT-OF-WAY LINE OF TIMPSON WAY;

THENCE N.41°13'40"E, ALONG SAID SOUTHEASTERLY LINE AND THE NORTHEASTERLY PROLONGATION THEREOF, A DISTANCE OF 58.84 FEET TO THE NORTH LINE OF A 30 FOOT STRIP OF LAND CONVEYED TO THE CITY OF BELLINGHAM BY DEED RECORDED UNDER AUDITOR'S FILE NO. 2020400482, RECORDS OF SAID COUNTY AND STATE;

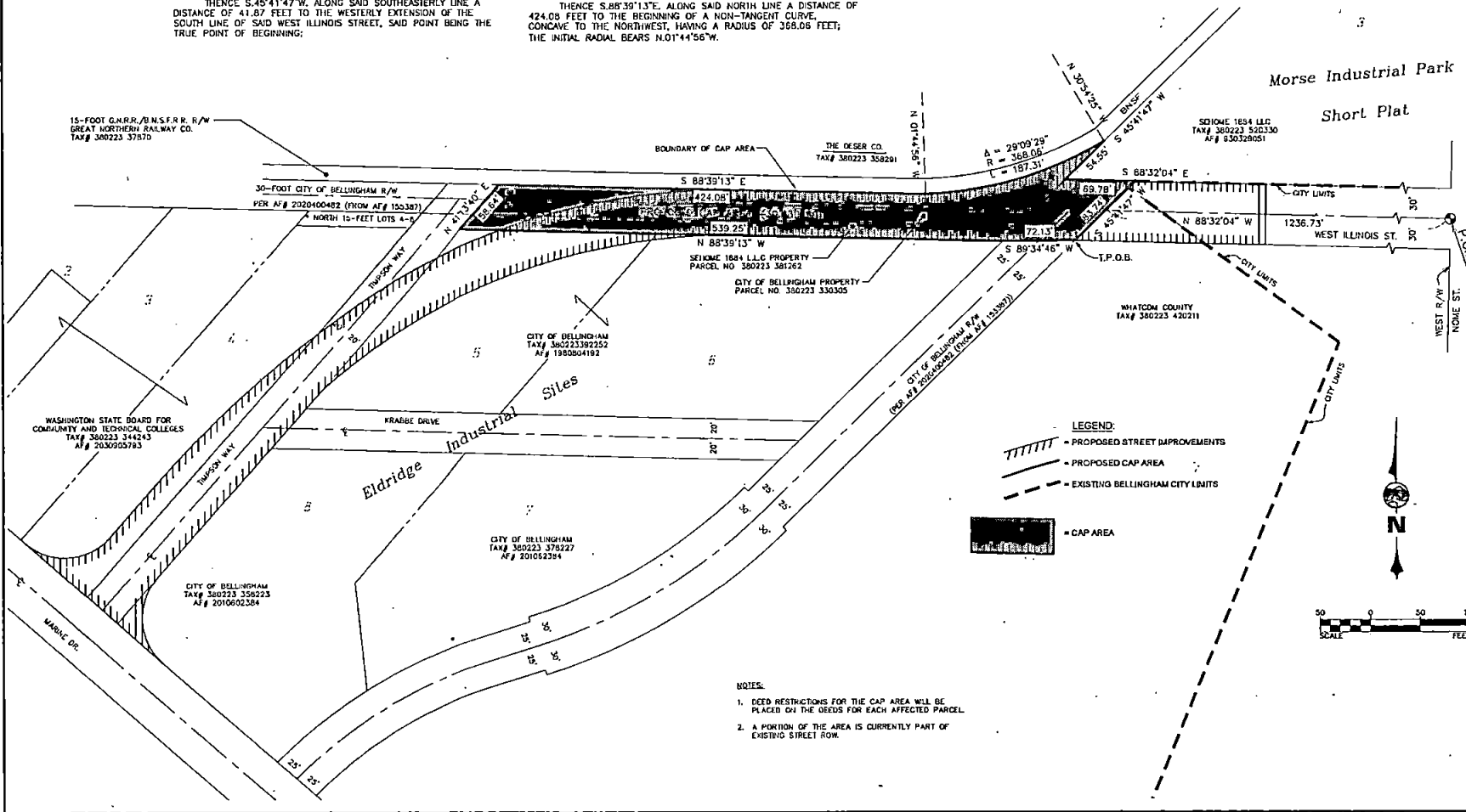
THENCE S.88°39'13"E, ALONG SAID NORTH LINE A DISTANCE OF 424.08 FEET TO THE BEGINNING OF A NON-TANGENT CURVE, CONCAVE TO THE NORTHWEST, HAVING A RADIUS OF 368.06 FEET; THE INITIAL RADIAL BEARS N.01°44'56"W.

THENCE NORTHEASTERLY, ALONG SAID NON-TANGENT CURVE, THROUGH A CENTRAL ANGLE OF 29°09'29", AN ARC LENGTH OF 187.31 FEET TO A POINT ON THE NORTHWESTERLY LINE OF A 50 FOOT STRIP OF LAND CONVEYED TO MORSE HARDWARE CO. BY DEED RECORDED UNDER AUDITOR'S FILE NO. 921109228, RECORDS OF SAID COUNTY AND STATE, THE CLOSING RADIAL BEARS N.30°54'25"W.;

THENCE S.45°41'47"W, ALONG SAID NORTHWESTERLY LINE A DISTANCE OF 54.55 FEET TO A POINT ON THE WESTERLY PROLONGATION OF THE NORTH LINE OF SAID WEST ILLINOIS STREET;

THENCE S.88°32'04"E, ALONG SAID PROLONGATION A DISTANCE OF 69.78 FEET TO SAID SOUTHEASTERLY LINE OF A 50 FOOT STRIP OF LAND;

THENCE S.45°41'47"W, ALONG SAID SOUTHEASTERLY LINE A DISTANCE OF 83.74 FEET TO THE TRUE POINT OF BEGINNING.



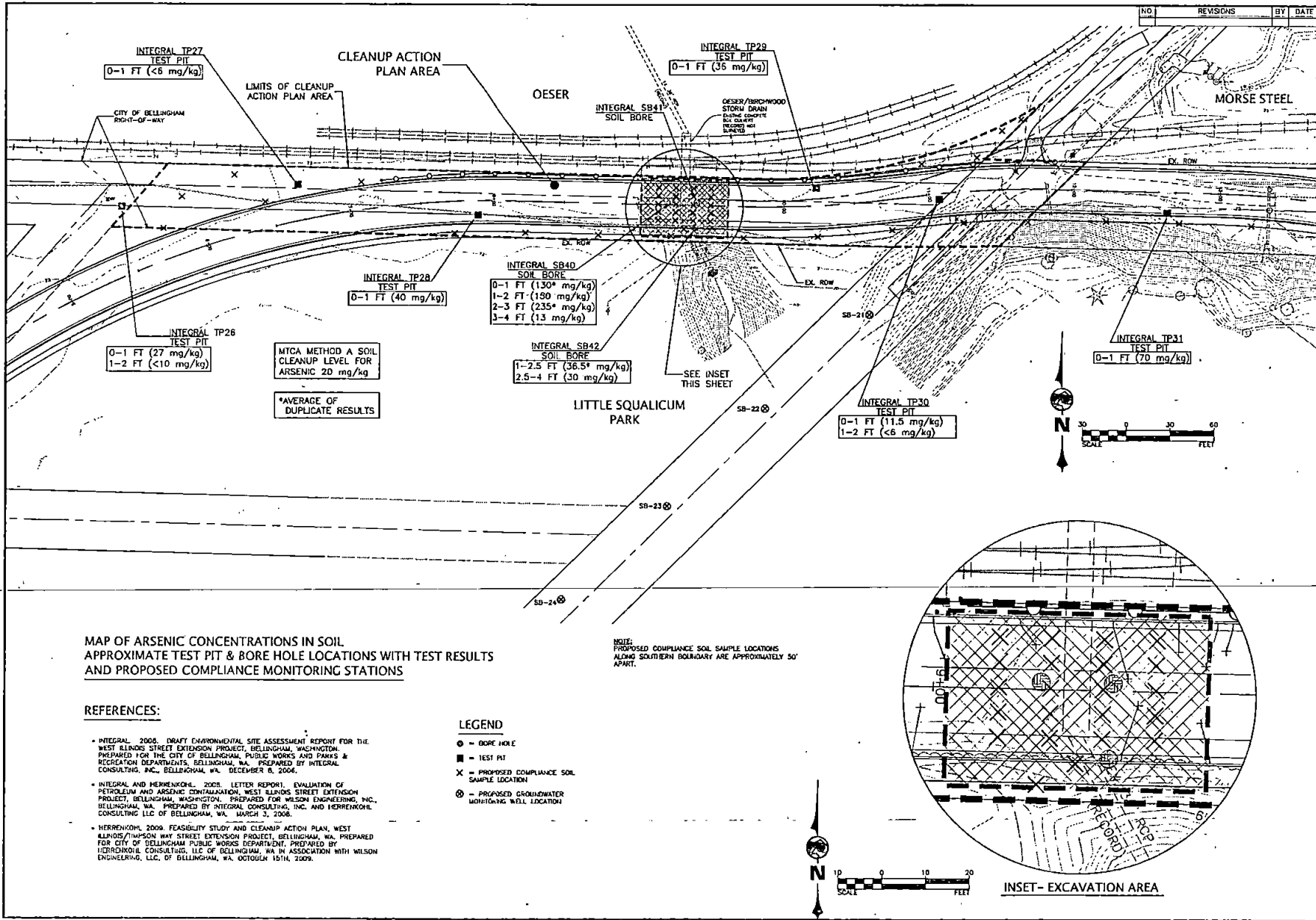
WILSON ENGINEERING, LLC
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 www.wilsonengineering.com

Wilson
 SURVEY/ENGINEERING

CITY OF BELLINGHAM
 WASHINGTON
 WEST ILLINOIS/TIMPSON WAY STREET EXTENSION
 CAP AREA MONITORING PLAN
 FIG. 2. LEGAL DESCRIPTION OF THE PROPERTY

DATE	OCT. 2009
SCALE	AS SHOWN
PER NO.	2007-019A
SHEET	3
FIG 2	

W:\2007\2007-019A COB West Illinois\DWG\CAP EXHIBITS\CAP-Final 9-09\Compliance Monitoring Plan\CMP FIG 03.dwg, 11/5/2009 2:18:12 PM, JEFF S



MAP OF ARSENIC CONCENTRATIONS IN SOIL
APPROXIMATE TEST PIT & BORE HOLE LOCATIONS WITH TEST RESULTS
AND PROPOSED COMPLIANCE MONITORING STATIONS

REFERENCES:

- INTEGRAL, 2006. DRAFT ENVIRONMENTAL SITE ASSESSMENT REPORT FOR THE WEST ILLINOIS STREET EXTENSION PROJECT, BELLINGHAM, WASHINGTON. PREPARED FOR THE CITY OF BELLINGHAM, PUBLIC WORKS AND PARKS & RECREATION DEPARTMENTS, BELLINGHAM, WA. PREPARED BY INTEGRAL CONSULTING, INC., BELLINGHAM, WA. DECEMBER 8, 2006.
- INTEGRAL AND HERRENKOH, 2006. LETTER REPORT, EVALUATION OF PETROLEUM AND ARSENIC CONTAMINATION, WEST ILLINOIS STREET EXTENSION PROJECT, BELLINGHAM, WASHINGTON. PREPARED FOR WILSON ENGINEERING, INC., BELLINGHAM, WA. PREPARED BY INTEGRAL CONSULTING, INC. AND HERRENKOH CONSULTING LLC OF BELLINGHAM, WA. MARCH 3, 2006.
- HERRENKOH, 2009. FEASIBILITY STUDY AND CLEANUP ACTION PLAN, WEST ILLINOIS/TIMPSON WAY STREET EXTENSION PROJECT, BELLINGHAM, WA. PREPARED FOR CITY OF BELLINGHAM PUBLIC WORKS DEPARTMENT. PREPARED BY HERRENKOH CONSULTING, LLC OF BELLINGHAM, WA IN ASSOCIATION WITH WILSON ENGINEERING, LLC OF BELLINGHAM, WA, OCTOBER 15TH, 2009.

LEGEND

- ⊙ = BORE HOLE
- = TEST PIT
- ✕ = PROPOSED COMPLIANCE SOIL SAMPLE LOCATION
- ⊕ = PROPOSED GROUNDWATER MONITORING WELL LOCATION

NO. _____		REVISIONS		BY		DATE	
WILSON ENGINEERING, LLC 805 DUPONT STREET BELLINGHAM, WA 98223 (360) 738-8197 FAX (360) 658-9669 www.wilsoneng.com							
WILSON SURVEY/ENGINEERING							
DESIGNED BY	EAS	DRAWN BY	DAJ/CS	CHECKED BY			
CITY OF BELLINGHAM WEST ILLINOIS/TIMPSON WAY WASHINGTON STREET EXTENSION - COMPLIANCE MONITORING PLAN FIGURE 3 - PROPOSED SAMPLING LOCATIONS							
SHEET	DATE	SCALE	AS SHOWN	JOB NUMBER			
FIG 3	OCT. 2003	1" = 10'		2007-019A			
OF							
3							

APPENDIX A
STANDARD OPERATING PROCEDURES

STANDARD OPERATING PROCEDURE 1

Hand Auger Sampling

Scope and Application

Soil samples will be collected in support of the West Illinois/Timpson Way Street Extension project property for confirmation purposes. Soils will be collected from 0-1 ft at each location using a stainless steel hand auger, spoon, or equivalent.

/ Equipment and Reagents Required

- Compliance Monitoring Plan
- Site-Specific Health and Safety Plan
- Site logbook and hand auger log
- Hand auger, drive sampler, or equivalent
- Indelible black-ink pens and markers
- Camera
- Stainless steel spoons, bowls
- Sample bottles
- Insulated cooler(s), chain-of-custody seals, Ziploc® bags
- Sample labels and appropriate documentation
- Assorted geology supplies (e.g., hand lens, grain size card, scales, etc.)
- Decontamination equipment (SOP-3)

Procedures

1. Remove vegetation and railroad ballast material in area of station, if necessary.
2. Use hand auger/drive sampler to bore into subsurface soil to a depth of 1 ft below ground surface (bgs).
3. Empty soil from hand-auger/drive sampler cuttings directly into a stainless steel bowl for compositing. Collect enough soil from each location for required analysis – this may require compositing up to 3 replicate samples at each station.
4. Describe soil in accordance with ASTM D2488 on the sample log form.
5. Homogenize soil within bowl/pan with decontaminated stainless steel trowel or spoon. Remove rocks, twigs, leaves and other large debris as appropriate. Fill sample containers for chemical parameters. (Volatiles samples should not be composited but collected from a discrete location within the depth interval from one auger sample.)

6. Label and manage sample containers in accordance with compliance monitoring plan.
7. Backfill sampling hole with remaining hand auger/drive sampler cuttings.
8. Decontaminate sampling equipment in accordance with SOP-3.
9. Document activities in site logbook.

STANDARD OPERATING PROCEDURE 2

Groundwater Sample Collection

Scope and Application

Groundwater samples may be collected from one upgradient well (location to-be-determined) and one or more downgradient wells (SB-21 through SB-24) located within the Little Squalicum Park boundaries. Sampling may be conducted 1, 3, and 5 years after completion of construction.

Equipment and Reagents Required

- Compliance Monitoring Plan
- Site-Specific Health and Safety Plan
- Site logbook
- Indelible black-ink pens and markers
- Sample tags/labels and appropriate documentation
- Appropriate laboratory glassware
- Oil/water interface probe (if necessary)
- Water level meter
- Groundwater parameter multi-meter capable of measuring pH, reduction/oxidation (redox) potential, temperature, specific conductance, turbidity, and dissolved oxygen
- Flow-through cell
- Field alkalinity test kit
- Insulated cooler(s), chain-of-custody seals, Ziploc® bags
- Sample containers, coolers, and blue ice or equivalent
- Sampling equipment (one or more of the following): Peristaltic pump; disposable, dedicated bailers; Grundfos Redi-Flow submersible pump (or equivalent); Reel E-Z® system including control box; portable generator (5,000 watt minimum)
- Water Sampling Log Forms
- Decontamination equipment (SOP-3)

Typical Procedures

Preparation:

1. Record necessary data in site logbook.
2. Prepare sampling equipment including calibration of field meters prior to use.

3. Move equipment and supplies to sampling location.
4. Decontaminate equipment according to SOP 3.

Purging¹:

1. Remove well cap.
2. Measure light nonaqueous phase liquid (LNAPL) thickness (if present), measure static water level and total depth of well.
3. Remove the pump from the pump holder and rinse the pump off with distilled water. After consulting the well log to determine depth to the middle of the well screen, slowly lower the pump into the well. Position the pump at the middle of the well screen.
4. Connect the discharge hose and cable for the control box to the Reel E-Z® system. Start the generator and set it to 120 volts. Make sure the generator is kept down-wind from the sampling system.
5. Place the discharge hose in the flow-through box. Place the probes for the calibrated field meters into the flow-through box. Place a bucket beneath the flow-through box to catch purged water.
6. Turn on the pump and adjust flow rate to approximately 2 liters per minute.
7. After approximately 4 liters of water have been purged from the well, adjust the flow rate to 1 liter per minute.
8. Start recording field parameters every 4 liters of water purged. Purging should continue at a constant rate until the selected parameters shown below have stabilized for three consecutive measurements.

Field Parameter	Stabilization Criteria
Temperature	± 1°C
pH	± 0.1 pH units
Specific Conductance	± 5 percent
Dissolved Oxygen	± 10 percent
Redox Potential (Eh)	± 50 mV
Turbidity	± 10 nephelometric turbidity units (NTUs)

Sampling:

1. After specified parameters have stabilized, turn down flow rate on control box so pressure is maintained in the system to stop water from entering well and minimize or stop water from exiting the well.
2. Disconnect discharge hose from Reel E-Z® system.

¹ Alternatively, a dedicated disposable bailer may be used for purging and sampling if the depth of the monitoring wells precludes the use of a sampling pump.

3. Connect Teflon® sampling tube to Reel E-Z® system. Place bucket beneath sampling tube to catch unsampled water.
4. Turn up flow rate slightly and fill necessary sample bottles. If sampling for volatile organic compounds (VOCs), flow rate should be just enough to create a trickle of water. If sampling for other analytes, adjust flow rate to 1 liter per minute.
5. Samples collected for dissolved metals shall be field filtered by connecting a 0.45 micron in-line filter to the sampling tube. Dispose of filter after each sample.
6. Label and manage sample containers in accordance with monitoring plan for shipping and handling of samples.

Documentation:

1. Fill out one Water Sampling Log Form for each sample collected with all necessary information recorded in the site logbook.

STANDARD OPERATING PROCEDURE SOP-3

Equipment Decontamination

Scope and Application

This SOP describes procedures for decontamination of sampling equipment, drilling equipment and other tools that could come in contact with contaminated media (Ecology 2008, PSEP 1997). Personnel performing the decontamination procedures will wear protective clothing as specified in the site-specific Health and Safety Plan.

Equipment and Reagents Required

- Plastic sheeting
- Steam cleaner and collection basin (if required)
- 55-gallon drums (if required)
- Non-phosphate detergent (e.g., Alconox® or Liquinox®).
- Acid Rinses (inorganic constituents) shall be reagent grade diluted nitric or hydrochloric acid (if required)
- Solvent Rinses (organic constituents) shall be pesticide grade methanol, hexane, isopropanol or acetone (if required)
- Deionized or distilled water rinse available from retail stores. Note that distilled water generally contains low levels of organic contaminants and can not be used for field blanks (must receive reagent-grade from laboratory).
- Tap water rinse from local tap water.
- 5-gallon buckets, or other appropriate containers
- Scrub brushes
- Teflon squirt bottles
- Gloves (e.g., nitrile or polyethylene)
- Personal protective clothing

Procedures

Decontamination of Sampling Implements and Processing Materials

1. Decontaminate sampling implements (e.g., spoons and knives) and other processing materials such as mixing bowls and pans, before use, between samples, and upon completion of sampling operations.
2. To decontaminate sampling spoons, mixing bowls and other hand-held tools, wash using a laboratory-grade detergent/water solution, rinse with tap water, followed by distilled water

- or ASTM Type II Reagent-grade water. If the soil is visibly contaminated (e.g., petroleum sheen), a hexane rinse may be necessary following a methanol rinse to remove water. To the extent possible, allow to air dry. Once decontaminated, this equipment will be wrapped in aluminum foil to prevent contamination by airborne contaminants during transportation to the sampling site.
3. To decontaminate sampling spoons used to collect volatile organics, wash the spoon using a laboratory-grade detergent/water solution, and rinse with distilled water. Wrap the spoon in aluminum foil. The solvent rinses are eliminated in order to avoid interference with the analysis.
 4. If necessary, to decontaminate wash buckets, pressure wash with a steam cleaner using a laboratory-grade detergent/water solution and potable water rinse upon mobilization, between station locations, upon demobilization, or as needed during sampling operations.

References

- Ecology 2008. Sediment Sampling and Analysis Plan Appendix. Guidance on the Development of Sediment Sampling and Analysis Plans Meeting the Requirements of the Sediment Management Standards (Chapter 173-204 WAC). Prepared by Washington State Department of Ecology, Olympia, Washington.
- PSEP. 1997. Recommended Guidelines for Sampling Marine Sediment, Water Columns, and Tissue in Puget Sound. Final Report. Prepared for the Puget Sound Estuary Program, U.S. Environmental Protection Agency, Region 10, Office of Puget Sound, Seattle, WA, and Puget Sound Water Quality Authority, Olympia, WA.

**APPENDIX B
FIELD FORMS**

GROUNDWATER SAMPLE COLLECTION FORM

Well Number _____
 Sample No. _____
 Date _____

Project Name: West Illinois/Timpson Way Street Project
 Project Number: _____
 Collector: _____

Well Information

Monument Condition Good Needs Repair _____
 Well Cap Condition Good Locked Replaced Needs Replacement
 Elevation Mark Yes Added Other
 Well Diameter 2-inch 4-inch 6-inch Other
 Odor Comments _____

Purge Data

Total Well Depth _____ ft Clean Bottom Muddy Bottom Not Measured
 Depth to Water _____ ft
 Casing Volume _____ ft (H2O) X _____ gpf = _____ X 3 = _____ gallons
 3/4" = 0.02 gpf 1" = 0.04 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf

Purge Method

Pump Type: Peristaltic Tubing: Disposable, dedicated LDPE Total volume purged _____
 Sample Intake Depth _____ Purge Rate _____
 Purge Start Time _____ Purge Stop Time _____ Sample Rate _____

Field Parameters

Time	Gallons	pH	Temperature	Conductivity	D.O.	Comments

Sampling Device

Filter Type: _____ Size: _____

Sample Containers

Collection Time _____

Tag No.	Type	Preservative	Analytical Method	QA Remarks
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			
	<input type="checkbox"/> Amber <input type="checkbox"/> Poly			

Samplers' Signature _____

Date _____

EQUIPMENT CALIBRATION AND MAINTENANCE FORM (TYPICAL)

INSTRUMENT (NAME / MODEL NO. / SERIAL NO.): _____

MANUFACTURER: _____ DATE PURCHASED or LEASED: _____

CALIBRATION LOGSHEET

Calibration Date	Initial Settings	Standard(s) Used	Procedure	Adjustments Made	Final Settings	Signature of Operator	Comments

MAINTENANCE LOGSHEET

Maintenance Date	Reason for Maintenance	Maintenance Performed	Signature of Operator	Comments

FIELD CHANGE REQUEST (FCR) FORM (TYPICAL)

Project Name: _____ Project No.: _____
Client: _____ Request No.: FCR- _____

To: _____ Date: _____

Field Change Request Title: _____

Description:

Reason for Change:

Recommended Disposition:

Field Operations Lead (or designee) Signature Date

Disposition:

Project Manager Signature Date

Approval:

Project Manager Signature Date

Distribution:

City of Bellingham Project Manager
Consultant Project Manager
Field Operations Lead

Other:

(Additional Field Forms will be provided before sampling begins)