4621 South Custer Court • Spokane, WA 99223
(509) 448-3187 • fax (509) 448-9238

December 28, 2011

Ms. Marni Solheim
Senior Regulatory & Facilities Specialist
Waste 2 Resources Program
Washington State Department of Ecology
4601 North Monroe Street
Spokane, Washington 99205-1295

RE: RESPONSES TO ECOLOGY LETTER DATED NOVEMBER 30, 2011 REGARDING: SUDBURY ROAD LANDFILL - OCTOBER 2011 DRAFT DATA SUMMARY AND RI WORK PLAN (INCLUDING SAP/QAPP AND HSP) AND INDEPENDENT REMEDIAL INVESTIGATION FIELD METHODS

Dear Ms. Solheim:

Schwyn Environmental Services, LLC (Schwyn), on behalf of the City of Walla Walla (City) prepared this letter to respond to the comments in your letter dated November 30, 2011[i], regarding the Sudbury Road Landfill Remedial Investigation (RI) Work Plan[ii] including the Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP). Each of your comments is addressed below by restating the comment in italics, followed by the response. Two modifications to the RI Work Plan are also described at the end of the letter. The attached revised RI Work Plan, SAP/QAPP, and HASP incorporate the corresponding actions described herein.

RESPONSES TO ECOLOGY COMMENTS

RI Work Plan

COMMENT 1

Section 1.3.3.1 states that Well #2 is located south of Area 5 and east of Area 6. Well #2 is west of Area 6.

RESPONSE

Correction made.

COMMENT 2

Section 1.4.2.4: The last sentence states that the health department and Ecology approved the final cover system for Area 6. Only the health department has approval authority. Ecology provides comments on landfill design, but has no authority to approve or deny.

RESPONSE

The sentence was revised to state that "The final cover system design was incorporated into the Area 6 Specifications and Plans (JUB 2010), which was reviewed by Ecology and approved by the WWCHD."

COMMENT 3

Section 1.6 lists redesign and construction of a composite liner and leachate collection system for Area 7 as an interim action. This was not an interim action as defined under MTCA. Please remove it from this section to avoid confusion. Likewise, place Section 1.6.1 somewhere other than in the Interim Actions section.

RESPONSE

The Area 7 information has been removed Section 1.6 and incorporated into the Area 7 history described in Section 1.4.2.5.

COMMENT 4

Section 3.4.2 states that contaminants in the Camp and Small domestic wells are from area wide groundwater contamination and not the site. The remedial investigation will help resolve if site contaminants are affecting the domestic wells. Until then, the City cannot exclude the site as a potential source. The report needs to clarify this.

RESPONSE

The statement has been eliminated and the following sentence has been added: "However, the source has not been fully determined and will be further evaluated in the RI".

COMMENT 5

Section 3.6 states that landfill gas poses a possible, but low, likelihood of direct risk of vapor intrusion. Is there data to support this statement? The RI work includes gas monitoring to assess the risk of vapor intrusion to on-site structures. Until the City completes this work, risks are not known.

RESPONSE

The paragraph has restructured to eliminate the sentence discussing the relative level of risks.

The statement was based on the fact that there are few structures in landfill area, and meter testing in and around those structures has not indicated the presence of gas intrusion.

COMMENT 6

Section 3.6.1 explains the rationale for a terrestrial ecological evaluation exclusion. In addition to the reasons stated, any contaminated soil would be more than 15 feet below ground surface, which is the standard point of compliance.

RESPONSE

True. A sentence was added to strengthen the exclusion.

COMMENT 7

1. Section 4.2 outlines specific work proposed in table format. Ecology offers the following comments, most of which we discussed during our meeting last week:

COMMENT 7a

a. Instead of drilling two co-located soil borings and gas wells in Area 1, consider only one. Along with the proposed gas well near the east edge of Area 1, one placed nearer the expected point of compliance (west edge of Area 1) may be enough to show whether Area 1 is contributing to contamination at the site.

RESPONSE

Based on information collected to date, Area 1 is considered to pose a lower risk of impacting the Site media by the City and Schwyn. During the November 22, 2011 meeting, Frank Nicholson also indicated that additional material from the northeastern end of Area 1 was recently removed and placed in Area 7. Therefore, we agree with your suggestion and have eliminated the eastern-most boring (SB-21/GW-11). However, an additional test pit was added in the borings place to assess the soil cover thickness in the former boring location.

GW-13 located on the western property line was relabeled GW-12.

COMMENT 7b

b. Two groundwater monitoring wells (MW-17 and -24) are proposed at the Area 5/Area 6 boundary. We discussed moving MW-24 farther north, in the proximity of MW-4, to better gauge off-site contaminant impacts to the site. We encourage you to explore placement of MW-24 in different locations that may better help characterize the site.

We also discussed whether MW-17 would be able to distinguish contaminants from Area 5 or Area 6. To establish if Area 6 is a possible source, Ecology recommends the City place a groundwater monitoring well at the west edge of Area 6, far enough south of Area 5 to isolate any Area 6 impacts.

RESPONSE

Proposed groundwater monitoring wells MW-17 and MW-24 were positioned to gather specific information relating to contribution from Area 6 to groundwater contamination, and more specifically to allow us to determine the area within Area 5 that is causing the greatest impact to groundwater. Preliminary data gathered during the Independent Remedial Investigation leads us to believe that the source location may be along the northern boundary of Area 5. These two monitoring wells, along with other proposed downgradient wells, will allow us to verify or discredit the hypothesis. Therefore, we believe MW-17 and MW-24 are properly located for the intended purposes and we do not recommend any modification to their placement.

We agree that a groundwater monitoring well placed south of Area 5 and west of Area 6 would provide valuable information. An additional monitoring well (MW-26) has been added to the proposed RI scope of work.

COMMENT 7c

c. The City proposes work on MW-5, -7 and -9 to assess off-site impacts. MW-7 is screened in much deeper groundwater than other wells. As such, monitoring data from it may not be useful. Ecology encourages the City to consider whether or not work on this well and subsequent monitoring will help characterize the site.

During our meeting, we speculated also that MW-9 may be a deep well, but have since found that though it is deep, the screen is much shallower.

RESPONSE

Upon review of the MW-7 construction we agree that the well screen depth is too great to optimally monitor the area-wide groundwater contamination. The construction and placement of monitoring wells MW-9 and MW-10 provide adequate upgradient coverage of the upgradient area-wide groundwater contamination. Groundwater sample collection from MW-7 has therefore been removed from the sampling plan. However, the calculated groundwater table elevation in MW-7 corresponds with the regional elevations, and therefore the depth to groundwater will be measured during each monitoring event.

MW-9 was drilled to 210 feet; however, the screen is set near the water table surface from 63 to 83 feet below ground level. On March 18, 2011 the depth to water in MW-9 was 61.00 feet below the top of casing. Therefore the well construction provides for adequate monitoring of the shallow aquifer. Based on the groundwater flow paths shown on Figure 9, it appears that groundwater passing MW-9 would travel by the northern portion of the landfill. This information suggests that monitoring MW-9 will provide valuable information concerning the area-wide contamination that may be impacting the landfill and off-site domestic water supply users. For this reason no changes to the MW-9 work plan are proposed.

COMMENT 7d

d. The City proposed MW-19 to see if contaminants are migrating north/northwest and a possible source for contaminants in the Camp domestic well. Because MW-19 is quite close to the landfill, Ecology is not confident the well is outside of likely groundwater flow to the southwest, or outside areas of landfill gas influence. We recommend the City place MW-19 farther from the site to ensure contaminants found are truly due to migration to the north/northwest.

RESPONSE

The City has agreed to pursue an off-site access agreement with the Camp's and place the well approximately 100 feet further northwest from the proposed position. The new MW-19 position will be approximately 250 feet northwest of MW-15 and the northwest corner of Area 5. See Figure 13 for the well placement.

COMMENT 7e

e. The City proposes a landfill gas monitoring well at the household hazardous waste facility (HHWF) to assess vapor intrusion. We discussed the possibility of using an existing flammable gas monitor inside the HHWF to assess these impacts. After further discussion, Ecology recommends the installation of the gas monitoring well as proposed. The flammable gas monitor would not be capable of measuring volatile organic compounds (VOCs) needed to gauge vapor intrusion.

Response

The vapor intrusion investigation will proceed as proposed.

Comment 7f

f. Regarding measurement of VOCs in gas wells, the City proposes to test several wells for VOCs only if it observes methane above a certain percentage. Methane is not an indicator of the presence of VOCs. Ecology recommends monitoring for VOCs in all gas wells that are planned for assessing the site. The frequency of VOC monitoring should also be included.

Response

Landfill gas (LFG) samples will be collected from each gas monitoring well, adding four VOC samples to the proposed monitoring plan. The additional VOC data will be valuable in assessing the landfill gas impact on groundwater quality.

It was implied that VOCs would be collected during one sampling event. The SAP was modified to indicate that VOC sampling of LFG will be performed during a single sampling event.

Comment 7g

g. The City proposes to test groundwater for VOCs and conventional chemistry parameters. To help ensure contaminants of concern are the same as they were when identified years ago, Ecology recommends testing for parameters found in Appendix III of Chapter 173-351 WAC prior to finalizing the list of groundwater parameters.

Federal regulations (40 CFR, Part 258) require testing for Appendix III parameters annually during assessment monitoring. Though Ecology's landfill regulations (Chapter 173-351 WAC) do not reflect this, we have advised staff at landfills in assessment monitoring about the federal requirement. Ecology is not aware of the City having annually tested Appendix III parameters.

Response

Groundwater samples will be collected and analyzed for Appendix III assessment monitoring parameters from the downgradient compliance groundwater monitoring wells (MW-11, MW-14, and MW-15) during the first groundwater monitoring event of the RI. Upon receipt of the analytical results, the RI groundwater sampling program will be reviewed to assure that any significant Appendix III analytical detections exceeding MTCA screening levels are included during the remaining sampling events. If no new constituents are reported then the RI monitoring would revert to the groundwater sample plan as proposed in the SAP.

Comment 8

The City must continue to monitor compliance wells on a quarterly basis and for parameters identified in monitoring plans, including inorganic constituents, as part of the landfill's routine groundwater monitoring program. Though not part of the Remedial Investigation, it might be helpful to include such a statement in the Work Plan.

Response

It is understood that the Compliance Groundwater Monitoring Program conducted as a requirement of chapter 173-351 WAC and the RI groundwater sampling program are two separate entities. The wells that are/will be sampled, analytical requirements and monitoring frequency is different between the two programs. Overlapping data from the RI may be used for the compliance reporting if the opportunity arises; however, compliance monitoring will proceed in accordance with the Solid Waste Permit.

The RI Work Plan and SAP was revised to indicate that the Compliance Groundwater Monitoring Data will be incorporated into the RI database of information. This was intended, but not specifically stated in the draft documents.

COMMENT 9

Be sure to update both the Work Plan and the Sampling and Analysis Plan to reflect any changes to proposed work.

RESPONSE

Acknowledged

Sampling and Analysis Plan and Quality Assurance Project Plan

COMMENT 1

Section 2.11.2: Please describe methods for storing and movement of development, purge and decontamination water for downgradient wells.

RESPONSE

The SAP was modified as follows:

> The following waters generated during the project will be stored in 55-gallon drums stationed at each well head pending a review of the laboratory analytical results:
>
> - New downgradient or off site well development, purge, and decontamination water.
> - Purge water from site, downgradient or off –site wells that have constituent concentrations greater than the MTCA Method A or B screening levels.

Waters that have constituent concentrations greater than the MTCA Method A or B screening levels will be disposed of in the landfill’s leachate evaporation pond. Based on at least two sets of laboratory analytical results, waters that have constituent concentrations less than the MTCA screening levels may be discharged to the ground surface and the drums may be removed from the well head area. The City may also opt to discharge the waters directly into the leachate evaporation pond prior to the receipt and evaluation of the analytical results. The water will be transported by the City using available equipment from the landfill, or by a contractor employed by the City.

COMMENT 2

Section 2.12 needs to include the frequency of testing for VOCs in gas wells.

RESPONSE

Section 2.12 addresses the Site Surveying, so no changes to that section have been made.

Testing for VOCs in the landfill gas will be performed during a single monitoring event. The frequency is now clearly stated in the SAP, Section 2.5.3.

COMMENT 3

Section 2.8 states "Laboratory analyses will be performed by an Ecology-accredited laboratory in accordance with Chapter 173-50 WAC (Ecology 2002)." Please change it to read "Laboratory analyses will be performed by an Ecology-accredited laboratory accredited for appropriate parameters and media…"

RESPONSE

The text was modified as requested.

COMMENT 4

Section 2.8.2 states that total organic carbon (TOC) will be analyzed using USEPA Method 420.1. This method is for measuring phenolic compounds. Please clarify if this is correct and if not, correct the method proposed for TOC here and in tables where also referenced.

RESPONSE

Total organic carbon will be analyzed by USEPA Method 415.1. The text in the SAP and accompanying tables have been changed to reflect the correct procedure.

COMMENT 5

Section 3.1 lists information a lab must include with test results. Please include "test method" on this list. Likewise, in Section 3.4.2 include review of test methods among the items Schwyn Environmental will verify upon receipt of test results.

RESPONSE

No change has been made to Section 3.1 Data Quality Objectives, because the review of the test methods is part of the data validation procedure.

Verification of the test method was added to Section 3.4.2 Data Validation.

COMMENT 6

In Section 3.4.3, please add that the City will submit lab data to Ecology's Site Manager in an electronic format suitable for entry into Sanitas Statistical Software.

RESPONSE

All data will be entered into Ecology's EIM system from which the data can be downloaded into Sanitas. Schwyn may enter and evaluate specific data sets (such as VOCs in groundwater) using Sanitas for Groundwater. Those files will be provided to Ecology as used for internal evaluations; however, the Sanitas files may not include all data.

The following sentence was added to Section 3.4.3: "Data sets entered in Sanitas For Groundwater format that are used in the RI evaluation process will also be provided to Ecology."

Health and Safety Plan

COMMENT 1

Section 5.1 lists potential toxic effects from exposure to individual contaminants. Some contaminants are carcinogenic, though cancer is not listed anywhere. Please list cancer by those contaminants that are known or suspected carcinogens.

RESPONSE

Carcinogenic parameters are now identified in Table 5.1.

COMMENT 2

Movement of downgradient well development, purge and decontamination water to leachate lagoons could pose a hazard. Please describe how workers will move and transfer materials to lagoons.

RESPONSE

Safe handling practices for the storage, movement, and discharge of well development, purge and decontamination water to leachate lagoons were added to the HASP.

Independent Remedial Investigation Field Methods

COMMENT 1

Referenced figures were not included in the report. Please submit the figures for our records.

RESPONSE

Appendix C figures were emailed to you on December 5, 2011.

ADDITIONAL WORK PLAN MODIFICATIONS

MW-14 Replacement

During a recent meeting with the City, Dennis Rakestraw indicated that MW-14 is very temperamental and difficult to sample during the compliance groundwater monitoring required each quarter. The water level in the well has dropped considerably over the years, and the well many times goes dry before the samples are collected. Sometimes the water level is below the top of the pump and the level cannot be measured.

MW-14 is an important monitoring point proposed for use in the RI. A replacement well will therefore be installed so that consistent depth to water measurements and groundwater quality can be obtained during the RI. The new well (MW-14b) will be constructed consistent with the methods described in the SAP for shallow groundwater wells, and MW-14 will be decommissioned consistent with applicable state regulation.

GW-12 Depth (formerly labeled as GW-13)

The screened interval of GW-12 was proposed to be constructed 15 to 20 feet below surface; however, the former medical waste and asbestos trenches were cut approximately 10 feet deep in the vicinity of the proposed gas well. It is preferred that the screen section be set below the trench bottom to best monitor gas migration potential on the western boundary. Therefore, the screened interval of GW-13 will be constructed from 25 to 30 feet below surface.

Attached is the Revised Sudbury Road Landfill Remedial Investigation Work Plan incorporating the modifications described in this letter. If you have any questions please call Frank Nicholson at (509) 524-4510.

Sincerely,

SCHWYN ENVIRONMENTAL SERVICES, LLC

Craig C. Schwyn

Craig C. Schwyn, L.Hg.
Principal

Cc: Frank Nicholson, City Engineering
Bill Joyce, Salter Joyce Ziker, PLLC

Attachments: Sudbury Road Landfill Remedial Investigation Work Plan

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[i] Marni Solheim, Washington State Department of Ecology letter to Frank Nicholson, City of Walla Walla Public Works. *Sudbury Road Landfill – October 2011 Draft Data Summary and RI Work Plan (including SAP/QAPP and HSP) and independent Remedial Investigation Field Methods.* November 30, 2011.

[ii] Schwyn Environmental Services, LLC. *Data Summary and Remedial Investigation Work Plan, Sudbury Road Landfill, Walla Walla, Washington.* Review Draft for Washington State Department of Ecology. October 2011.

Data Summary and Remedial Investigation Work Plan
Sudbury Road Landfill
Walla Walla, Washington

December 28, 2011

Prepared for:

City of Walla Walla

Prepared by:

Schwyn Environmental Services

4621 South Custer
Spokane, WA 99223
(509) 448-3187

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TABLES

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APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

AO	Agreed Order No. 8456
ARARs	Applicable or relevant and appropriate requirements
bgl	Below ground level
BNSF	The Burlington Northern Santa Fe Railway Company
BPA	Bonneville Power Association
City	City of Walla Walla, Washington
CLARC	Cleanup Levels and Risk Calculation
cm/sec	Centimeters per second
CSI/A	Contaminant Source Identification/Assessment
Ecology	Washington State Department of Ecology
EDR	Environmental Data Resources, Inc.
ET	Evapotranspiration
FEMA	Federal Emergency Management Agency
Freon 11	Trichlorofluoromethane
Freon 12	Dichlorodifluoromethane
FS	Feasibility Study
Ft	Feet
Ft/ft	Feet per foot
HASP	Health and Safety Plan
HHWF	Household Hazardous Waste Facility
JUB	J-U-B Engineers, Inc.
LCRS	Leachate collection and removal system
LFG	Landfill gas
mg/L	Milligram per liter
mm	Millimeter
MRL	Method reporting level
MSL	Mean sea level
MSW	Municipal solid waste
MTCA	Washington State Model Toxics Control Act
PCB	Polychlorinated biphenyl’s
PCE	Tetrachloroethene
PCOC	Preliminary Contaminant of Concern
PLP	Potentially liable party

PP&L	Pacific Power and Light
QAPP	Quality Assurance Project Plan
RCW	Revised Code of Washington
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
Site	Sudbury Road Landfill
Schwyn	Schwyn Environmental Services, LLC
S&W	Shannon & Wilson, Inc.
TCE	Trichloroethene
TDS	Total dissolved solids
TOC	Total Organic Carbon
TWL	Tausick Way Landfill
µg/L	Micrograms per liter
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound
Work Plan	Remedial Investigation Work Plan
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
WSP	Washington State Penitentiary
WWCHD	Walla Walla County Health Department

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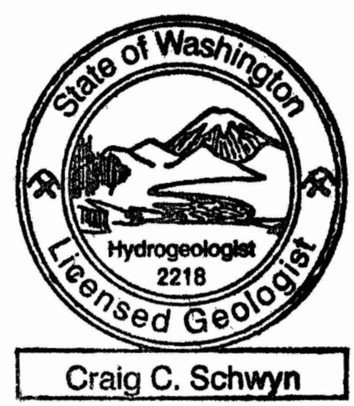
SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

The technical material and data contained in this document were prepared by Schwyn Environmental Services, LLC with assistance from Floyd|Snider, Inc., Herrera Environmental Consultants, Inc., and J-U-B Engineers, Inc., under the supervision and direction of the undersigned Washington Licensed Hydrogeologist.



Craig C. Schwyn

December 28, 2011

Craig C. Schwyn, L.HG.
Principal Hydrogeologist

Date

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1.0 INTRODUCTION

On behalf of the City of Walla Walla, Washington (City), Schwyn Environmental Services, LLC (Schwyn) prepared this Remedial Investigation (RI) Work Plan (Work Plan) for the Sudbury Road Landfill (Site) pursuant to Agreed Order No. 8456 (AO). This Work Plan presents the approach to complete an RI of the Site that will close data gaps, present a conceptual site model, and provide the site characterization necessary to conduct a Feasibility Study (FS). This Work Plan was prepared in accordance with the AO and the Washington State Model Toxics Control Act (MTCA) Chapter 173-340 of the Washington Administrative Code (WAC) regulations (Ecology 2007).

1.1 PURPOSE AND OBJECTIVES

In March 2010, the Washington State Department of Ecology (Ecology) submitted a Notice of Potential Liability Letter to the City (Ecology 2010). The City and Ecology subsequently initiated Agreed Order No. 8456, effective May 26, 2011. The AO stipulated the scope of work and schedule for the preparation of the Remedial Investigation and Feasibility Study (RI/FS). The first task of the AO is to prepare a Work Plan to supplement existing data and determine the nature and extent of contamination at the Site. This Work Plan, with the accompanying Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP), were prepared to fulfill Task I of the required Scope of Work presented in Exhibit D of the AO.

1.2 REPORT ORGANIZATION

The document is organized as follows:

- Section 1 summarizes existing data and information from the Site;
- Section 2 presents the basis of information from which the RI scope was derived;
- Section 3 presents a conceptual site model; and
- Section 4 identifies data gaps and a work plan to fill the data gaps.

1.3 SITE DESCRIPTION AND SETTING

According to the AO, the Site is referred to as the Sudbury Road Landfill and is generally located at 414 Sudbury Road, Walla Walla, Washington 99362, about 4 miles west of the City of Walla Walla and one-quarter mile north of Highway 12, in the southwest quarter of Section 14, southeast quarter of Section 15, northeast quarter of Section 22, and northwest quarter of Section 23, Township 7 North, Range 35 East, Willamette Meridian (Figure 1). The landfill area itself is approximately 125 acres in size and is located within the western portion of an 828.86-acre City-owned parcel of land zoned and used for various waste management purposes (Figure 2 and Figure 3). The Site is designated by Ecology as Facility No. 4446540. The AO defines the Site as the extent of contamination caused by the release of hazardous substances at the Site. The Site constitutes a Facility under Revised Code of Washington (RCW) 70.105D.020(5).

1.3.1 Surrounding Land Use

The landfill is located in rural southeastern Washington and entirely surrounded by large expanses of rolling land used for dry-land wheat farming. The northern border of the landfill is defined by the 100-foot wide Burlington Northern Santa Fe (BNSF) railroad right-of-way, which was abandoned in 1988. The Washington State Penitentiary is located immediately east of the City property, about 6,400 feet east of the landfill. The new State Highway 12 right-of-way lies approximately 300 feet south of the landfill entrance station and approximately 1,200 feet south of the landfill disposal areas. No significant changes to these land uses in the vicinity of the Site are expected in the near future.

1.3.2 Surrounding Residential Populations

Rural housing is located south of State Highway 12, approximately 500 feet south of the landfill scale house and more than 1,400 feet from the southern boundary of the landfill disposal area. Three residences are located to the west of the landfill, between 4,500 feet and more than 8,000 feet from the western landfill boundary. One additional residence lies approximately 9,000 feet southwest of the landfill. The nearest residence north of the landfill is over 7,500 feet away. The Washington State Penitentiary and its inmate population are located immediately east of the site property boundary and more than 1.2 miles east of the landfill itself.

1.3.3 Beneficial Use

Under WAC 173-200 (Ecology 1990), beneficial uses for waters of the state are defined as the "*uses of waters of the state which include but are not limited to use for domestic, stock watering, industrial, commercial, agricultural, irrigation, mining, fish and wildlife maintenance and enhancement, recreation, generation of electric power and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state*".

The land use, ecological resources, and cultural resources also were considered herein because surface water and groundwater quality may influence other resources and their beneficial uses. In order to evaluate the potential beneficial uses in the vicinity of the landfill a search was conducted by Environmental Data Resources, Inc. (EDR), of state, federal, and local databases as well as independent searches of State of Washington Water Resources and Water Well information databases. Beneficial use information and reports are provided in Appendix A. Surrounding land uses and wells are shown on Figure 4.

The following list describes the potential beneficial uses that may be affected by activities at the landfill if a completed pathway to exposure of site contaminants is present.

- Water Uses and Water Rights:
  - Groundwater wells (domestic, municipal, industrial, stock watering, or irrigation)
  - Surface water rights (irrigation, stock watering)
- Ecological Uses:
  - Wetland areas
  - Threatened and endangered species habitat areas
  - Flood plain
- Cultural Resources:
  - Historic sites
  - U.S. Indian reservations

1.3.3.1 Water Uses and Water Rights

Groundwater Use

One active supply well, Well #2 (also termed MW-2), is used for landfill operations. Well #2 is located south of Area 5 and west of Area 6. The deep well water is used for dust control and the compost facility. The well is used for non-potable uses only. Bottled drinking water is provided at the Site for potable purposes.

Searches for groundwater use in the vicinity of the landfill focused on wells and water rights within 1.5 miles in the hydraulically downgradient directions (northwest, west, and southwest), and 2,000 feet in the upgradient and side gradient directions (north, east, and south) of the landfill. The search distances conservatively encompass a region around the landfill that could possibly be affected by site releases. Well information for surrounding properties was collected from several sources: EDR searches; Ecology’s water rights informational database (Water Resources Explorer), which provided copies of water right certificates and other documents detailing location, quantities of water allowed, and original water right holder; Ecology’s Well Log Database, which provided available well logs maintained by Ecology detailing depth of well and information on the screened aquifer; in some cases property owners provided various well information and allowed sampling. The water well reports obtained during this study are provided in Appendix A.

No residences or water use was evident within the 2,000-foot search area to the north or east of the landfill. As mentioned above, the nearest wells to the northwest, west, and southwest are approximately 1 to 1.5 miles from the landfill boundary. The Washington State Penitentiary is located approximately 1.2 miles east of the landfill. The resident populations of the State Penitentiary are provided City water for potable purposes. Penitentiary grounds are irrigated with well water. The Penitentiary property is hydraulically upgradient of the Site and is not impacted by landfill activities.

The area south of the landfill is generally rural residential housing. Two water districts provide water to most of the rural housing developments located south of State Highway 12. Several properties maintain water rights related to domestic or irrigation wells that are listed as active. Only two of these properties are within the search area of 2,000 feet.

- The Smith Well property, located approximately 1,800 feet south of the landfill, has a certified water right on file with Ecology (January 1995) that allotted up to 11 acre-feet per year to be withdrawn from the old gravel and clay aquifer for irrigation and domestic purposes (Ecology Water Resources Explorer Record #G3-24731CWRIS).
- The Bonneville Power Association (BPA) property and substation is located 2,000 feet south of the landfill (3072 Heritage Road) and maintains an active water right (Water Resources Explorer). Several test wells are located on the property (Well logs available in Hydrogeologic Report), but one well is listed for domestic use. Originally the domestic use well was installed in 1941 to a depth of 515 feet into the bedrock and then reconditioned in 1976. No water right information is available for this well in the Ecology Water Resources Explorer.

Four residential properties located northwest, west, and southwest of the landfill maintain their own domestic wells for water supply. No water rights were available in Ecology's Water Resources Explorer for any of these well users. The locations of these wells are shown on Figure 4.

- The Camp Well is located approximately ¾-mile northwest of the landfill and owned by Camp Properties. A well log is not available for the well.
- The Small Well is located approximately ¾-mile west of the landfill on a parcel owned by Mark and Kathleen Small. The well was installed in 1998 to a depth of 100 feet and is screened within gravels.
- The Kinman Well is located approximately 1.5 miles west of the landfill and designated for domestic use. The well was installed in 2002 to a depth of 180 feet. The well is screened within a water-bearing gravel layer (Kinman Well Log).
- Two wells are located on the Schmidt property, which is located approximately 1.5-miles southwest of the landfill. One well is 122 feet deep and designated for domestic purposes. The second is 780 feet deep, constructed in basalt, and is designated for irrigation purposes. No water rights are available for the irrigation well at this time.

Surface Water Use

No perennial creeks or waterways are located within 2,000 feet of the landfill. Three creeks or intermittent streams are identified within one mile of the landfill. Mill Creek is the largest and approximately 1 mile south of the landfill in the Walla Walla Valley. Mud Creek is an intermittent stream and lies more than ½ mile northwest of the landfill at its closest point. A tributary of Mud Creek extends along the northern boundary of the landfill (the north drainage ditch). Several surface water rights are listed on Mud Creek and its tributaries. Very little information is available regarding whether these surface water rights are actively used.

1.3.3.2 Ecological Resources

No officially designated wilderness areas, or wildlife preserves are located within a mile of the landfill. No state designated critical habitat areas are located within one mile of the landfill. Bald eagles, steelhead and bull trout are endangered species listed for Walla Walla County; however, it is unlikely these species will be impacted by work at the landfill. Endangered salmon and steelhead species are also listed for Walla Walla County, but limited to the Walla Walla River, Mill Creek, Snake and Columbia Rivers, so no impacts from the landfill would be expected (refer to relevant material from EDR Report in Appendix).

The National Wetland Inventory identifies wetland areas within the Mill Creek basin, just over a mile from the landfill site (Appendix A). No wetlands are identified within 2,000 feet of the landfill.

The nearest Federal Emergency Management Agency (FEMA) mapped 100-year floodplain is on Mill Creek and does not impact the Site.

1.3.3.3 Cultural Resources

No state or federal historic sites or U.S. Indian Reservations are located within the 1 mile search radius.

1.3.4 GEOMORPHOLOGY AND DRAINAGE

The Sudbury Road Landfill is located on Pleistocene terrace deposits on the northern flank of the Walla Walla Valley. The terrace surface has been dissected by intermittent drainages formed entirely in unconsolidated soils of the Palouse Formation and the Touchet Beds. The southern property boundary of the site generally coincides with the edge of the terrace where it drops steeply (approximately 50 feet) down to the Mill Creek and Walla Walla River flood plain (EMCON 1995).

The site topography ranges in elevation from 900 feet above mean sea level (MSL) at the top of Area 6 to 780 feet above MSL in the southern drainage area. Natural slopes in the area are 20 percent or lower (EMCON 1995). The site topography is shown on Figure 2.

The landfill area consists of a central plateau with elevations dropping to the north, east, and south. The central plateau elevation lies at approximately 840 feet MSL in the vicinity of Well #2. Drainage bottoms located to the south and north lie at approximately 780 and 800 feet MSL, respectively. The landfill disposal cells have historically been cut into the central plateau or built up on the side slopes of the plateau.

Intermittent drainages flow to the west and southwest around the landfill disposal areas. One intermittent drainage originates in the terrace upland to the east of the landfill and wraps around the east and south edges of Area 1 and Area 7. A second drainage borders the north side of Areas 5 and 6, originating near a minor drainage divide approximately 1,000 feet northeast of Area 7. The drainage extends west to southwest along the northwest property boundary. The draw is commonly called the "north stormwater drainage." Site drainages are shown on Figure 2.

Historically, stormwater passed through the north stormwater drainage ditch and flowed off-site, westward toward Mud Creek. During the last 100 years the “natural channel” was altered significantly by the Northern Pacific Railroad and by agricultural activities that follow the channel to Mud Creek. More recently, stormwater drainage from portions of MSW disposal Areas 5, 6, and 7, and farmland located north of the landfill, was diverted to the valley bottom. Excavations were constructed adjacent to Area 5, where the stormwater either infiltrated into the soils and/or evaporated, rather than flowing off-site.

1.3.5 SITE GEOLOGY

The Site lies on the northern flank of the Walla Walla Valley. The valley is bounded on the east by the Blue Mountains, which consist of a northeast-trending uplifted arch of the Columbia River basalt; to the south by Horse Heaven Ridge, which is an extension of the Yakima Fold Belt; and to the north by the Touchet slope, which is an undulating surface of the Columbia Plateau that slopes gently southeast into the Walla Walla Valley. The Walla Walla Valley ends at the Columbia River at Wallula, approximately 27 miles west of the Site.

The subsurface geology beneath the landfill consists of (from upper to lower) the Palouse silt; reworked lacustrine silt and clay of the Touchet beds; interbedded alluvial gravels in a clayey, silty, or sandy matrix, underlain by a basal clay comprising a unit informally termed the "old gravel and clay" by R.C. Newcomb (Newcomb 1965); and Columbia River basalt. The unconsolidated to semi-consolidated deposits overlying the Columbia River basalts may be 600 feet or more in thickness.

Vadose zone soils in the landfill area consist of silt, clayey silt, and fine sandy silt, which are interpreted to be soils of the Palouse Formation and the Touchet Beds. These silty soils exhibit laboratory permeabilities in the range of 10^{-6} to 10^{-5} centimeters per second (cm/sec, EMCON 1995 and Schwyn 2010a). Underlying the silty soils is a unit consisting of consolidated to semi-consolidated, poorly-graded gravel, silty gravel, and silt, which are interpreted to correlate with the “old gravel and clay” unit. Remolded samples of the gravelly silt unit indicated a permeability in the order of 10^{-7} cm/sec (EMCON 1995). Geologic cross-sections of the region and site are presented on Figures 5, 6, 7, and 8.

1.3.6 HYDROGEOLOGY

Groundwater is first encountered beneath the Site at depths from approximately 30 to 80 feet below surface in the lower silt horizon of the Touchet beds and/or the underlying alluvial gravel termed the “old gravel and clay” aquifer. This aquifer is locally utilized for domestic water supply purposes. A groundwater elevation contour map constructed with depth-to-groundwater measurements collected on May 18, 2011 is provided on Figure 9.

The groundwater levels in the vicinity of the landfill have been declining since 1997. During this period, the water level has declined as much as 10 feet in MW-12 (resulting in the deepening of the well in 2008). The water level trends in the landfill monitoring wells are shown on Figure 10.

The inferred groundwater flow direction is to the west and southwest with an approximate horizontal gradient of 0.004 feet per foot (ft/ft) beneath the landfill. A vertical downward gradient has been observed between the water levels in MW-3 and MW-15 (749.58 and 753.73 feet MSL respectively on May 18, 2011). The vertical gradient between MW-3 and MW-15 was calculated to be 0.054 ft/ft.

The horizontal hydraulic conductivity (geometric mean) of the uppermost aquifer beneath the Site is 1.52×10^{-3} cm/sec, based on rising head slug tests conducted in monitoring wells MW-1, MW-3, MW-11, and MW-12 (EMCON 1995). Using this information and an effective porosity of 0.3, the average groundwater flow velocity beneath the Site has been reported to be approximately 2.03×10^{-5} cm/sec (21 feet per year). These parameters will be confirmed in the RI.

A second, more regional, aquifer is present in the underlying Columbia River basalts. Information from the driller's water well reports, within the vicinity of the Site, indicate that the basalt aquifer had a potentiometric surface in the range of 150 to 200 feet below ground surface and a positive upward gradient (EMCON 1995).

1.4 LANDFILL HISTORY AND DESCRIPTION

The Site is developed within a much larger city-owned parcel of land that was established for various waste management purposes before the development of the Site. The earliest references to the City property date back to 1970 when the City proposed to purchase land to develop a spray irrigation farm for disposal of industrial wastewater from the canning plants that were operating within the City, provide land on which to dispose of future domestic waste, and to make needed improvements to the existing sewage treatment facilities. In 1970 and 1973, the City purchased a total of 967.17 acres of farmland and had it designated for waste management purposes. The westernmost 125 acres of the City property were set aside for landfill development. Approximately 600 acres of the remaining property were utilized for the agronomic application of non-hazardous food processing wastewater from 1971 to 2004. In April 2004, Seneca Foods, Inc. canceled the sprayfarm lease with the City and terminated the State Waste Discharge Permit with Ecology due to the declining cannery industry. Since 2004, the sprayfarm portion of the property has been dry land wheat farmed under leases to another party. Additionally, portions of the former sprayfarm and the northwestern 200 acres of the City property are used for the agronomic application of biosolids, and the City has built an emergency sewer lagoon for the City wastewater/reuse water plant on 10 acres in the south east corner of the property.

Currently, the City property is split by several linear parcels owned by Pacific Power and Light (PP&L), BNSF, and the Washington State Department of Transportation (WSDOT). PP&L owns a north-south trending strip of land that cuts across the eastern side of the City property (approximately 6,000 feet east of the landfill area). Large transmission lines extend over the PP&L land. The City property is further dissected by a BNSF railroad right-of-way that roughly cuts the property into north and south halves. The 100-foot wide right-of-way was part of BNSF's former Attalia to Walla Walla rail line and forms the northern boundary of the landfill. The railroad tracks were removed circa 1988 and the right-of-way functions as a road across the property.

In 2007, 57.79 acres of the original 967.17-acre parcel was acquired by WSDOT for the development of new State Highway 12. This resulted in approximately 80.5 acres of City land becoming orphaned from the original City property on the south side of the highway. As of 2011, the parcel that is located on the north side of the highway and contiguous with the landfill is 828.86 acres as shown on Figure 2.

1.4.1 LANDFILL DEVELOPMENT

The City used the Tausick Way Landfill (TWL), located within the eastern Walla Walla City limits, for solid waste disposal from the late 1930s until 1978. By the mid-1970s the TWL was nearing capacity and in March 1976 the Walla Walla County Health Department (WWCHD) would not issue a "Conforming Permit" for the TWL due to the limited remaining area.

Records indicate that planning for the Site began in earnest during the middle of 1976 and continued through 1977. In 1976, the City Engineering Department prepared preliminary design plans for the Site. The plans called for a road into the property extending north from Sudbury Road and construction of a scale house and equipment building in the low valley of the intermittent drainage on the south side of the existing landfill site. Three monitoring wells, now known as MW-1a, MW-2, and MW-3a were installed in late 1976, and background groundwater samples were collected on a monthly program from August 1977 through June 1978. On February 28, 1977, the Walla Walla Regional Planning Board of Adjustment granted a Conditional Use Permit to operate the Site on the property which was formerly zoned for agriculture use. In March 1977 the City submitted an Engineers Report with an Environmental Impact Statement, Department of Ecology Application for Disposal Site Permit, and General Plan of Operation to the WWCHD. The Conforming Permit for the Site was issued on June 27, 1977. News publications announced that the "New City Landfill on Sudbury Road" was opened to the public on July 10, 1978 (Walla Walla Union 1978).

1.4.2 WASTE DISPOSAL PROCESS

Municipal solid waste (MSW), asbestos waste, and medical waste have been placed on the landfill site. Hazardous wastes have never been accepted at the landfill. MSW has been placed in five separate areas, commonly referred to as Areas 1, 2, 5, 6, and 7. The disposal area numbers are based on location, rather than sequence of disposal. Asbestos waste has been disposed of in two separate cells. A single medical waste cell has been used. The approximate limits of the refuse disposal areas are shown on Figure 3. Descriptions of the waste filling practices are fully described in the Historical Report (Schwyn 2006) and are summarized below.

1.4.2.1 Area 1

Area 1 is located on the southeast arc of the landfill property. The Engineers Report, dated March 1977, states that "disposal of the refuse would start at the toe of the south slope of the landfill site then proceed up the slope to the edge of the plateau. After the south slope has been utilized, refuse would be disposed at the north slope in a similar sequence. Trenches would be excavated as needed perpendicular to the side slopes, generally following the final contour lines." Records indicate that this process was followed for the most part.

Waste was first placed in Area 1, located on the southeast face of the landfill area, starting in 1978 and continued off and on until about 1980 (City 1988 and Schwyn 2006). Review of photographs and preliminary design plans indicate that up to three trenches were excavated parallel with the curvature of the hillside. The design plans called for the trenches to be excavated 10 feet deep and 30 feet wide, with a bottom slope of 0.01 and side slope of 0.15. The 1988 Operation Plan states that "the waste was placed with no compaction equipment on hand."

1.4.2.2 Area 2

Area 2 is located west of the equipment building on the south-central slope of the landfill property. Reports of Area 2 disposal practices are limited. According to Mr. Al Prouty, the landfill supervisor from 1985 into 1997, waste in Area 2 was placed for temporary disposal while the first trench in Area 5 was excavated. Mr. Prouty thought the waste was placed in a shallow gully and on the native surface without trenching. An aerial photograph taken in July 1979 indicates that minor trenching may have occurred west of the equipment building; however, deliberate trenches do not appear to have been excavated for Area 2. The limits of Area 2 were vague until a test pit program was conducted on May 24, 2005 by Schwyn. Based on the findings of the test pit program, the approximate limits of Area 2 are shown on Figure 3. MSW observed in the test pits ranged from several inches to 4 feet thick, and was covered with 2 to 4 feet of silty soil.

1.4.2.3 Area 5

Areas 5 is located at the northwest corner of the landfill parcel and was one of the first areas used for MSW disposal. The waste in Area 5 exists approximately 50 to 300 feet east of the western property line, extends north to the base of a draw that separates the landfill from the BNSF right-of-way (commonly referred to as the north drainage ditch), and is bounded on the east by Area 6 and on the south by the central plateau. The north drainage ditch routes stormwater west around the landfill and was part of the original natural drainage. Based on an early topographic map for the landfill area (dated June 2, 1979), the natural surface elevation of the north drainage ditch was about 790 feet above MSL and sloped upward to the south to an elevation of approximately 830 feet MSL on the central plateau.

Based on available information, Area 5 was active from as early as 1978 through 1990. Historical maps and records suggest that Area 5 consists of four refuse-filled trenches (Trenches 5a, 5b, 5c, and 5d). Recent information indicates that the MSW disposal area is larger than the maps describe. The historical maps and records suggest that each trench extends approximately 950 to 1100 feet east to west. The four trenches were excavated side by side and extend about 450 feet south of the draw. Waste was first placed at the northern base of the hill along the draw. Trench profile drawings prepared for the 1980 Sanitary Landfill Permit indicate Trench 5a may have started as an excavation parallel and within the draw and that the depth of the trench was planned to be about 17 feet. As the trench was filled, another trench would be excavated on the adjacent hillside (south side of trench) and the soils from the second trench would be used for cover of the active cell. By this method the trenches would stair-step up the hillside to the south.

Mr. Prouty stated that when he became the landfill supervisor in May 1985 that Trench 5b was approximately two-thirds full. Reports indicate that Trenches 5c and 5d were operated from 1986 through 1989; however, minor discrepancies in the actual duration of disposal are apparent in the records.

A dual-purpose lysimeter/gas vent was installed against the northern wall of Trench 5d. Mr. Prouty installed the gas vent and lysimeter and stated that the pipe was set on the trench bottom and provided an accurate measure of the bottom elevation of the trench. Historic literature, hand notes, and verification measurements collected by Mr. Dennis Rakestraw (landfill supervisor from 1997 to present) in 2005 indicate that the bottom elevation of the gas vent and presumably the corresponding bottom elevation of these two trenches is about 777 feet MSL.

Mr. Prouty stated that in 1985 minimal soil cover (less than 1 foot) had been placed over the waste in Trenches 5a and 5b, so he placed a 5- to 8-foot soil cover over the waste during 1985 and 1986. Temporary soil cover was placed over Trenches 5c and 5d during 1988 and 1989 (1988 Operating Plan). Final cover material was placed over Trenches 5c and 5d during 1994 consistent with the WAC 173-304-

407 general closure and post-closure requirements. Recent information indicates that the cover thickness may range from 3- to 20-feet thick.

Mr. Prouty set stakes at the corners of each trench in March 1986. The trench corners and boundaries were presented in the 1988 Sudbury Road Landfill Utilization Plan (Dahl et al. 1987); however, the boundaries do not correspond with the surface morphology of the fill area today and MSW has been verified outside the drawn trench boundaries. A test pit program was conducted by the City and Schwyn in 2005 to determine where the edges of the trenches were located and the findings did not correspond with previous documents either.

Verbal reports by Mr. Prouty and several written reports suggest that sections of Trench 5a and possibly Trench 5b may have been excavated near to or below the water table. Based on the planned profile, the northern Area 5 trenches were to be excavated 17 feet below the level of the draw. If excavated as designed, the bottom of Trench 5a would be about 773 feet MSL or approximately 16 feet above the high water table elevation recorded in March 2008; however, Mr. Prouty recollected that Trenches 5a and 5b were being excavated 25 to 30 feet below the surface level of the draw and were being filled with uncompacted waste. He stated that when he took over, Trench 5b was approximately two-thirds full and that he placed soil fill back into the trench to bring the bottom up approximately level with the draw. Based on Mr. Prouty’s estimate that the trenches were excavated 25 to 30 feet below the level of the draw, the bottom of these trenches could be as low as 760 feet MSL. The groundwater elevation in MW-15, located at the northwest corner of the landfill site has measured as high as 757 feet MSL (March 2008 measurement). Based on this information, there is potential that the bottom of these trenches and waste placement could have been within 3 feet of the water table.

1.4.2.4 Area 6

Area 6 is north-centrally located on the landfill parcel, adjacent to the eastern side of Area 5. Excavation of Area 6 began in late 1987 and deposition of MSW into the waste cell began as early as 1988. Area 6 was initially permitted and operated consistent with Chapter 173-304 WAC regulations. In September 1993, a WAC 173-351 Transition Permit was issued for Area 6 operation. In July 1997 use of Area 6 was granted a Full Permit for operation as an arid landfill in accordance with WAC 173-351. Closure of Area 6 was completed in 2010 in accordance with the WAC 173-351 Operating Permit and the Revised Interim Action Plan (Schwyn 2010b).

Area 6 consists of three trenches extending roughly 1,400 feet north to south and 450 to 600 feet east to west. The northwestern half of the area abuts, and in some areas overlaps, Area 5, and the southeast corner touches Area 1. Area 7 abuts the eastern side of Area 6. The northern edge of Area 6 is bounded by the north drainage ditch and BNSF right-of-way.

The Area 6 trenches are designated from west to east; Trench 6a, 6, and 6b. The trench floor has a bottom elevation of 792 to 806 feet MSL at the north end and is graded with an upward slope of 1 or 2 percent toward the south (Schwyn 2006). The Area 6 cell bottom is composed of compacted native silt without leachate collection. Six lysimeters were installed during the cell construction. Fluids were not detected in the lysimeters until 2005, during which time a small volume (several gallons) of fluid was discharged and sampled from one of the six lysimeter ports. Leachate has not been observed in the lysimeter sampling ports since that time.

In 2001 the City submitted a vertical expansion permit application to the WWCHD for Area 6. The application proposed upward expansion over the three trenches to a projected top elevation of 884 feet MSL. The expansion permit was approved, and Area 6 reached its permitted maximum elevation in 2005. Waste disposal was transitioned into Area 7 during 2006. Limited additional waste was placed in Area 6 until 2008.

Full closure of Area 6 occurred in 2010 in accordance with the Operating Permit and Interim Action Plan. The closure consisted of an evapotranspiration (ET) cover that meets the requirements of WAC 173-351-500(1)(b) for arid areas, a gas collection and treatment system, and surface water controls. The final cover system design was incorporated into the Area 6 Specifications and Plans (JUB 2010), which was reviewed by Ecology and approved by the WWCHD.

1.4.2.5 Area 7

In 1995 Area 6 and the initial design of the proposed lateral expansion into Area 7 was permitted as an arid design landfill consistent with WAC 173-351-300(2)(b). Chapter 173-351 does not specifically require landfill designs to incorporate liners or leachate collection systems in arid locations and Area 7 was designed without these systems.

Initially, Area 6 was expected to reach capacity in 2002, at which time operations would have transferred into Area 7. In September 2001, the City submitted a Solid Waste Permit renewal for the Site that included the lateral expansion into Area 7. In 2002, the agencies approved a vertical expansion of Area 6, which resulted in additional waste capacity and life of the cell. In 2004, Ecology submitted a letter to the WWCHD that indicated the department could no longer support expansion into Area 7 without a liner system. The decision was based upon the groundwater contamination detected in MW-15, which suggested that the existing unlined cell design without leachate collection may not be protective of groundwater. The November 2004 Permit Application for the Area 7 Lateral Expansion was subsequently not approved.

In 2005, Shaw/EMCON/OWT, on behalf of the City, submitted a revised permit modification for the lateral expansion into Area 7. The revised Area 7 landfill design included significant modifications to the original design including a composite liner, a leachate collection and removal system (LCRS), and an

LFG collection and control system. The Area 7 composite liner consisted of a 12-inch layer of soil with permeability less than 1 x 10^{-5} cm/sec, geosynthetic clay liner, 60-mil HDPE geomembrane, and a 250-mil bi-planer geocomposite LCRS with collection piping as needed to maintain a leachate head below 1 foot. An LFG and collection system was not required by Federal New Source Performance Standards, but was proposed as a proactive and appropriate means to control potential VOC impacts to groundwater.

The City started excavating soil from the proposed area in 1996, using the excavated material for daily cover in Area 6. Waste disposal into the Area 7 began in 2006. Area 7 is 17.3 acres and authorized to accept approximately 1,592,000 cubic yards of waste (Schwyn 2006). The bottom elevation of Area 7 is designed to range from 789 to 797 feet MSL (Shaw et al. 2005). The active leachate evaporation ponds are located on the north side of the BNSF right-of-way.

1.4.2.6 Asbestos Waste Area (Area 4)

WWCHD correspondence to the City dated July 24, 1985 (Schwyn 2006), indicated that the City had “been allowing the disposal of asbestos in the landfill under certain specific conditions for the past several years.” The correspondence goes on to state that WWCHD recommends that the City adopt the new U.S. Environmental Protection Agency (USEPA) Asbestos Waste Management Guidance (USEPA 1985) before accepting more asbestos for disposal in the landfill.

In accordance with the WWCHD recommendation, the City adopted the asbestos management guidance and two asbestos waste cells were subsequently excavated at the Site. The oldest cell (Area 4a) is located between the western property line and Area 5, at the northwest corner of the landfill property (Figure 3). Mr. Prouty stated in 2005 (Schwyn 2006) that the first asbestos disposal cell consisted of several trenches excavated approximately 12 feet deep (bottom approximately level with the north drainage ditch at 790 feet MSL). The west edge of the cell was cut 8 to 10 feet east of the fence so that a vehicle could get by. Area 4a was small and filled very quickly due to the amount of asbestos projects being conducted at that time. Mr. Prouty recalled that the cell was filled and covered by the end of 1985. Area 4a was closed along with Area 5 consistent with the Chapter 173-304 WAC closure and post-closure requirements for limited purpose landfills.

The second asbestos trench (Area 4) located at the southwest corner of the landfill area was cut much bigger to accommodate the quantity of material coming in. The “Asbestos Waste Area” was operated from 1985 into 2004 in accordance with the Solid Waste Landfill General Facility Permit.

The asbestos waste trench extended approximately 860 feet north to south, and was cut approximately 40 feet from the western property line. The trench was about 40 feet wide at its base, with nearly vertical sidewalls about 40 feet high. The trench was sloped to the south and records indicate that the deepest point of the trench was 787.27 feet MSL. Mr. Rakestraw indicated that approximately 3 lifts of asbestos were placed in the trench before its closure. Standard operating procedure was to cover the waste within 24 hours of disposal. "Extreme care was taken to not rupture any of the protective coating of the asbestos wrappings" (1988 Operations Plan). The Asbestos Waste Area was closed in 2004, consistent with the WAC 173-304 closure and post-closure criteria for limited purpose landfills. Asbestos wastes are now placed directly into Area 7.

1.4.2.7 Medical Waste Cell (Area 3)

Records indicate that before 1992 medical wastes generated by local medical facilities were either incinerated by the generator or transported out of the Walla Walla area for disposal. City Council documents indicate that the Site began accepting medical wastes on a three-month trial basis on December 31, 1991 (City file). In March 1992 the City Council approved the continued collection and handling of medical waste at the Site. Medical wastes were accepted at the Site until 2004 when the trench was closed in accordance with the WAC 173-304 closure and post-closure requirements for limited purpose landfills.

During operation, the medical wastes were placed in a trench that ran parallel to the east side of the Asbestos Waste Area and was separated by a high soil berm. The trench measured approximately 880 feet long by 80 feet wide at its base. The deepest point of the trench was 785 feet MSL (Schwyn 2006).

Several site maps show an area labeled "Existing Covered Medical Waste" located to the east of the Medical Waste Trench. During closure of the asbestos and medical waste areas in 2004, soil was removed from the area and medical waste was not encountered. Based on these soil excavations, file documents, and aerial photographs reviewed during this study, it is believed that the maps were labeled improperly.

1.4.2.8 Compositing Area

In 2006, a temporary compositing facility was constructed above the former asbestos and medical waste cells. A design for a WAC 173-350 compliant facility was designed in 2007 and 2008. The composting facility was constructed and opened in 2009. The facility has an asphalt surface for working the compost. Stormwater is collected and diverted into a lined evaporation pond located on the southeast side of the compositing area.

1.4.3 REGULATORY CRITERIA

The operation of the Site has been and continues to be conducted in accordance with the applicable regulations of the time. Development and permitting of the Site began in 1976 in accordance with Ecology's Regulation Relating to Minimum Functional Standards for Solid Waste Handling, Chapter 173-301 WAC (Ecology 1972). Conforming Permits were issued by the WWCHD annually under WAC

173-301 until the regulation was superseded by Chapter 173-304 WAC in 1985. All of Areas 1 and 2, and Area 5 Trenches 5a and 5b were operated during the effective period of Chapter 173-301 WAC.

The Minimum Functional Standards For Solid Waste Handling, Chapter 173-304 WAC was filed on October 28, 1985 (Ecology 1988), and the City conducted operational changes and prepared documents to comply with the new regulation. Area 5 Trenches 5c and 5d, and Area 6 operated from 1985 into 1993 consistent with Chapter 173-304 WAC regulatory criteria. Area 5 was also closed consistent with Chapter 173-304 WAC closure and post closure requirements.

Operation of Area 6 was transitioned into the new operating standards of Chapter 173-351 WAC Criteria For Municipal Solid Waste landfills, which became effective on November 27, 1993 (Ecology 1993). A Solid Waste Transition Permit for the facility was issued on September 27, 1993, and on July 14, 1997, the WWCHD issued a WAC 173-351 Full Permit for Municipal Solid Waste Landfilling in Area 6. The closure of Area 6 in 2011 was also conducted in accordance with the requirements of WAC 173-351-500(1)(b) for arid areas.

All design and operations of Area 7 have been conducted consistent with WAC 173-351 and the Municipal Solid Waste Landfilling Permit.

The Asbestos and Medical Waste disposal trenches were operated as limited purpose landfills in accordance with Chapter 173-304 WAC into 2004. The Solid Waste Handling Standards, chapter 173-350 WAC replaced Chapter 173-304 WAC and became effective on February 10, 2003. The City determined that it would not be economical to upgrade the Asbestos and Medical Waste Areas to meet the new standards, and, therefore, these two areas were closed in 2004 consistent with Chapter 173-304 WAC closure standards.

The composting facility was designed, constructed, and permitted in accordance with the Chapter 173-350 WAC standards.

1.4.4 WASTE COMPOSITION

Most of the waste disposed at the Site is mixed MSW transported to the Site by commercial and public garbage disposal service contractors from the City, and Walla Walla and Columbia Counties, which are predominantly rural counties with an agricultural economic base and little manufacturing or heavy industry. Permitted waste disposal at the Site has been limited to MSW, asbestos, and medical wastes. The Site has also provided special areas for animal carcass disposal. Hazardous materials have never been allowed into the landfill.

Appliances (“white goods”) have historically been set aside for salvage and recycling. The appliances are stored (normally in the vicinity of Area 2) and retrieved by a salvage operation. When market conditions were not economical for recycling, or the appliances were not retrieved by the salvage operation within a reasonable time period, the appliances were disposed of in the active disposal area in use at that time, according to verbal reports (Schwyn 2006).

Extensive City records indicate that measures to prevent disposal of hazardous materials in the landfill were initiated during the early years of operation. Correspondence from Ecology and WWCHD, as early as February 8, 1979, recommended that landfill operators screen loads to keep hazardous waste out of the landfill. Shortly thereafter, the City requested information about hazardous waste disposal practices from the WWCHD for incorporation into the landfill policy and procedure manual. The City posted notice at the scale house in 1980 regarding disposal of dangerous wastes.

Landfill records report several patron attempts to dispose of small quantities of hazardous waste in the landfill suggesting that the landfill operators diligently tried to keep the materials out of the landfill. Mr. Prouty stated in 2005 that he was not aware of any large quantities of non-permitted materials being disposed of in the landfill, but did remove unacceptable materials from the disposal area occasionally. Mr. Prouty also stated that he never allowed or observed disposal of large quantities of hazardous waste, such as 55-gallon drums. He indicated that the established practice was to only allow disposal of empty rinsed drums.

On June 3, 1986 the Dangerous Waste Regulation (Chapter 173-303 WAC) formerly prohibited the disposal of certain hazardous wastes in MSW landfills. In 1993, the City constructed a Household Hazardous Waste Facility (HHWF) at the landfill to accept, recycle, and/or appropriately dispose of hazardous waste from non-commercial persons. The HHWF facility remains in operation and continues to divert disposal of hazardous materials from the landfill.

1.5 GROUNDWATER MONITORING

1.5.1 MONITORING WELL INSTALLATIONS

The City installed the first monitoring wells (MW-1a, Well #2 (also referred to as MW-2), and MW-3a) in November and December 1976 to monitor shallow groundwater downgradient of the landfill and provide background groundwater quality information. Well #2 was installed to greater depth for additional use as the landfill potable water supply well; however, in 1984 or 1985 landfill staff quit using Well #2 as a potable water source and began using bottled water.

Since 1976, numerous additional wells have been installed to monitor upgradient and downgradient water quality beneath the landfill, sprayfarm, and sludge application areas. A summary of installation dates, well uses, casing sizes, screen intervals, and other information are summarized on Table 1. Site Well Logs and Drillers Well Reports are provided in Appendix B.

Some of the wells have been decommissioned or are no longer in use. MW-1a and MW-3a either went dry or had poor surface seals. These two wells were abandoned in 1986 and replaced with MW-1 and MW-3. Monitoring wells MW-1 and MW-3 had screens installed deep into the underlying aquifer and were replaced with MW-14 and MW-15 in 1999 and 2001 to better monitor the top of the first encountered water bearing zone. Monitoring Well MW-1 is currently unusable due to a pump stuck in the casing. Monitoring Well MW-3 is still in usable condition. Monitoring Well MW-6 is no longer usable. The parking area of the landfill office was apparently constructed on top of MW-6, and its location is unknown.

Monitoring wells MW-4, MW-5, MW-7, MW-9, and MW-10 were originally installed to monitor the sprayfield and biosolids application areas; however, these wells have also been used to monitor upgradient groundwater quality for the landfill. Monitoring wells MW-11 and MW-12 were installed in 1995 as part of the chapter 173-351 hydrogeologic study and were incorporated into the approved monitoring program in 1995. MW-12 historically produced low quantities of water and eventually the water table dropped below the screen section and water samples could not be obtained. In August 2008, MW-12b was drilled to a deeper depth in the close vicinity of MW-12, which was decommissioned in accordance with state regulation. Monitoring Well MW-16 was installed in 2005 as part of the Independent RI to evaluate groundwater quality south of MW-15, downgradient of Area 5, and at the western property boundary. The locations of the wells are shown on Figure 2.

The permitted groundwater monitoring system in 2011 consists of three downgradient monitoring wells (MW-11, MW-14, and MW-15) and one upgradient monitoring well (MW-12b). Upgradient Well MW-5 may be included in the quarterly evaluations, primarily as a method of monitoring volatile organic compounds (VOCs) in the upgradient groundwater; however, the pump in MW-5 is not operating and the well has not been sampled since June 2004.

Other wells located on the City property include MW-4 and the Garver Well. MW-4 was installed to monitor the biosolids application area, though the well has historically had very poor groundwater production and has not been used in years. The Garver Well was the original irrigation well installed on the property and is still used for irrigation, dust control, construction and the compost facility.

1.5.2 GROUNDWATER MONITORING PROGRAM

Monitoring began in 1976 after the installation of MW-1a, Well #2, and MW-3a. Initially, only groundwater elevations were measured so that the landfill cell bottom elevation could be designed to be above the water table. Collection of groundwater samples began the following year in August 1977 and continued on a monthly sampling frequency through July 1978. The sampling program was conducted at the request of Ecology to establish “baseline” groundwater quality before the landfill began operation. The groundwater samples were analyzed for pH, biological oxygen demand, chemical oxygen demand, chlorides, iron, total dissolved solids (TDS), total alkalinity, and total coliform.

Groundwater monitoring has been conducted on a quarterly schedule since the landfill was opened in July 1978. The analytical parameters have been modified through time to address changes in the groundwater monitoring regulatory requirements. Since September 1994 the landfill monitoring well samples have been analyzed for Appendix I and II detection monitoring constituents, per WAC 173-351-990. Numerous additional analyses were performed in 2002 and 2003 as part of an assessment monitoring program conducted to evaluate statistically significant detections of VOCs at levels greater than background levels in downgradient Well MW-15. Dichlorodifluoromethane (Freon 12) was added to the analytical suite as a result of the assessment monitoring program.

Currently, in accordance with the 2011 Operating Permit, monitoring Wells MW-11, MW-12b, MW-14, and MW-15 are sampled quarterly. The groundwater samples are analyzed for Appendix I and II detection monitoring constituents, per WAC 173-351-990, plus Freon 12, by an accredited laboratory in accordance with Chapter 173-50 WAC.

1.5.3 SUMMARY OF GROUNDWATER CONTAMINATION

Groundwater monitoring data collected since 1993 indicate the presence of groundwater contamination (primarily VOCs) in samples collected from monitoring wells located upgradient and downgradient of the sprayfarm and landfill areas. Since 2001, when MW-15 was installed, groundwater contamination with slightly different characteristics (VOCs with inorganic constituents) has been detected in downgradient Monitoring Well MW-15.

The maximum detected VOC concentrations in each monitoring well are summarized as follows:

Well	1,1-Dichloroethane (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	cis-1,2-Dichloroethene (µg/L)	Dichlorodifluoromethane (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl Chloride (µg/L)
MW-1	ND	ND	1.1	ND	ND	0.90	ND	ND	ND	ND
MW-3	ND	ND	1.0	ND	ND	0.75	2.2	ND	ND	ND
MW-5	ND	ND	1.3	ND	ND	7.10	1.0	4.0	0.6	ND
MW-11	ND	ND	1.5	ND	0.94	2.3	1.1	2.8	1.0	ND
MW-12/12b	ND	ND	2.2	ND	ND	0.9	0.97	ND	ND	ND
MW-14	ND	ND	0.9	ND	1.9	ND	0.61	ND	ND	ND
MW-15	7.6	1.9	ND	12.0	13.0	11	0.68	3.8	1.6	3.8
MW-16	ND	ND	0.57	ND	0.74	0.64	ND	ND	1.8	ND
MW-7	ND	ND	0.6	ND	ND	1.26	ND	ND	ND	ND
MW-9	ND	ND	1.5	ND	ND	4.10	ND	8.3	ND	ND
MW-10	ND	ND	2.0	ND	ND	0.52	ND	ND	ND	ND
Small	ND	ND	0.62	ND	ND	1.5	ND	ND	ND	ND
Camp	ND	ND	ND	ND	ND	0.76	ND	ND	ND	ND
Kinman	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Note:
Values indicate the maximum concentration reported in well sample, based on data collected from 1991 through March 24, 2011.

Abbreviation:
ND Not detected at or at levels greater than the laboratory method reporting level

1.5.3.1 Area-Wide Contamination

Groundwater monitoring data indicate that a number of VOCs (including chloroform, trichloroethene [TCE], and tetrachloroethene [PCE]) are present in upgradient wells on the eastern property boundary (over 1.4 miles east, and upgradient, of the landfill). The VOCs in groundwater have been present since at least 1993 when the City began monitoring for VOCs, and persist in samples collected as recently as 2011. Similarly, slightly lower VOC concentrations have regularly been detected in the downgradient landfill monitoring wells (MW-1, MW-3, MW-11, and MW-14) and two domestic water supply wells (Small and Camp Wells). The Small and Camp residences are located approximately ¾-mile west and northwest of the landfill, respectively.

In 1999 Ecology, under cooperative agreement with the USEPA, published a Contaminant Source Identification/Assessment Report (CSI/A, Ecology 1999). The CSI/A indicated that the relatively high contaminant concentrations observed both up- and downgradient of the landfill, and the persistence of the concentrations with time, implied that a large continuous source is present. Ecology identified the Washington State Penitentiary (WSP), which lies just east (and upgradient) of the Site to be a potential source for the VOC contamination at the landfill, because similar VOCs have been used and potentially disposed of on the penitentiary property.

1.5.3.2 Localized Landfill Contamination

In July 2001, Monitoring Well MW-15 was installed in the northwest corner of the landfill to monitor the downgradient groundwater quality of the uppermost aquifer immediately downgradient from Area 5. VOCs (including TCE, PCE, trichlorofluoromethane (Freon 11), Freon 12, vinyl chloride, chloroethane, 1,1-dichloroethane, and cis-1,2-dichloroethane) and inorganic constituents (including calcium, sodium, bicarbonate/alkalinity, chloride, and TDS) have been detected at higher levels in this well as compared to other site wells and background conditions. All of these constituents except chloride and TDS have exceeded the site-specific WAC 173-351 compliance levels (prediction intervals) on at least two consecutive occasions.

1.5.4 PRIOR GROUNDWATER STUDIES

Various initial groundwater studies of the landfill were conducted in the 1970s and 1980s to comply with the landfill Operating Permit requirements, but shed little light on the nature of the area-wide or localized VOC contamination. Three later studies are more significant.

The first was a 1993 hydrogeologic investigation (EMCON 1995) prepared to meet the requirements of WAC 173-351-490. The resulting Hydrogeologic Report provided the first extensive report of the geology, hydrogeology, and groundwater quality of the landfill.

The second was an assessment monitoring program that was initiated in September 2002 in accordance with WAC 173-351-440. The extensive testing requirements of the assessment monitoring program did not indicate the presence of other constituents in the landfill's groundwater monitoring wells at concentrations greater than background levels, with exception of Freon 12. Freon 12was subsequently added to the landfill's compliance monitoring program.

The third was a recent study to characterize the MW-15 contamination and fulfill the requirements of WAC 173-351-440(6). A work plan was prepared to guide the RI process (LAI 2004), and is referred to from here-on as the 2004 RI Work Plan. An Independent RI was initiated in 2005 in general accordance with the 2004 RI Work Plan; however, a number of factors including available funding and off-site access stalled the program in 2006 before all tasks were completed. Relevant information from these previous studies is described in Section 2 of this report.

1.6 INTERIM ACTIONS

The detection of VOC and inorganic constituents in the MW-15 groundwater samples at concentrations greater than statistical background/upgradient levels in 2001 prompted the following interim actions:

- Redesign and construction of an alternate Area 6 closure; and
- Design and construction of stormwater controls on the north side of Area 5 and Area 6.

Each of these interim actions is described below.

1.6.1 AREA 6 CLOSURE

The closure of Area 6 was performed as an interim action in 2010. Area 6 does not have a geosynthetic bottom liner or leachate collection system, and prior to 2010 Area 6 did not have an engineered or permitted top cover, LFG extraction and treatment system, or adequate surface water collection and control facilities. Therefore, on March 31, 2010, a Revised Interim Action Plan (Schwyn 2010b) was submitted to the agencies to address these landfill design features. The closure/interim action was approved by Ecology and constructed in 2010.

The interim action for the Area 6 closure consisted of the design and construction of 1) an ET cover that meets the requirements of WAC 173-351-500(1)(b) for arid areas, 2) an LFG collection and control system and 3) a stormwater collection and conveyance system to divert water away from the active refuse disposal areas and the northern stormwater drainage area where percolating waters could potentially migrate into the Area 5 refuse. Details on the northern stormwater drainage system are provided in the section below.

1.6.2 NORTH DRAINAGE STORMWATER CONTROLS

Construction of stormwater drainage controls in the drainage located on the north side of Area 5 was determined to be an important engineering control to minimize a possible contaminant transport mechanism for waste constituents to migrate to groundwater. The drainage features of the north drainage ditch valley bottom have historically been modified to trap sediments and stormwater. This was accomplished by excavating depressions in the natural drainage channel along the northern boundary of Area 5. Stormwater formerly pooled in the depressions, where it either infiltrated and/or evaporated. Preliminary studies of Area 5 indicated that a possible source of leachate generation could be from the infiltration of the pooled surface water in the north drainage area migrating south in the underlying soils into the Area 5 refuse.

The interim action that was constructed in 2010 was designed to promote stormwater flow through the valley adjacent to Area 5 and minimize pooling, thereby reducing the quantity of surface water available for infiltration through the refuse. The engineering design features of the interim action included 1) a sedimentation basin, 2) filling of depressions excavated in the valley bottom and surface grading to slope the valley to the west along the natural drainage channel, 3) installation of a culvert under the western perimeter roadway to allow the stormwater to flow off-site, and 4) installation of erosion control mats in the stormwater channel.

2.0 BASIS FOR RI SCOPE

2.1 PREVIOUS INVESTIGATIONS AND EXISTING DATA

2.1.1 HYDROGEOLOGIC REPORT

In 1993, landfill operations began the transition into the new operating standards of Chapter 173-351 WAC Criteria For Municipal Solid Waste landfills (Ecology 1993). A hydrogeologic investigation was performed and a Hydrogeologic Report (EMCON 1995) was prepared to meet the requirements of WAC 173-351-490. The report was prepared to transition the Area 6 operations into the new operating standards and for the Area 7 Lateral Expansion Permit application.

The hydrogeologic investigation included the installation of 10 borings (8 soil borings and 2 monitoring wells). Data from the new borings and monitoring wells were supplement by data obtained from 11 existing monitoring wells, 2 abandoned wells, and numerous test pits.

Among other regulatory requirements of the WAC, the Hydrogeologic Report provides a summary of:

- the regional and local geology and hydrogeology including a summary of the hydrostatigraphy and geologic cross-sections of the site;
- soils testing data including moisture content, grain size analyses, and laboratory permeability of the vadose zone soils;
- geologic logs for site and regional borings and wells; and
- a groundwater characterization summary including laboratory analytical data, depth to groundwater, groundwater flow; and in-situ hydraulic testing using rising head slug test methods.

The Hydrogeologic Report provides valuable baseline information for the Site, and much of the reported data remain valid today, especially as they concern site geology and hydrogeology.

2.1.2 ASSESSMENT MONITORING PROGRAM

On June 14, 2002, a memorandum was submitted to the Site operating record, the WWCHD, and Ecology, to provide notice that several constituents had shown statistically significant concentrations greater than background levels in downgradient Monitoring Well MW-15 groundwater samples. An assessment monitoring program was initiated in September 2002 and analysis of the WAC 173-351-990 Appendix III suite of constituents was conducted during two sampling events. The Appendix III suite of constituents includes an extensive list of VOCs, metals, semi-volatile organic constituents, polyaromatic hydrocarbons, pesticides, herbicides, and polychlorinated biphenyls (PCBs). The results of the assessment monitoring program did not reveal any additional Appendix III constituents in the downgradient groundwater samples, with exception of Freon 12 reported in the MW-14 and MW-15 samples, and cyanide in one MW-14 sample. On May, 14 2003 a letter was submitted to the WWCHD requesting modifications to the assessment monitoring program. The WWCHD responded on June 9, 2003 and indicated that the Appendix III constituents could be limited to Freon 12 and cyanide, with background data for these two parameters to be collected during the regular quarterly sampling events. Background levels were established at less than the method reporting level (MRL) for cyanide, and with approval by the WWCHD and Ecology the cyanide has not been sampled since December 2004. Freon 12 was reported at levels greater than the MRL and continues to be analyzed during the regular quarterly monitoring events.

2.1.3 INDEPENDENT REMEDIAL INVESTIGATION

2.1.3.1 Summary of Work

In 2004, the City initiated an Independent RI to characterize the MW-15 contamination and fulfill the requirements of WAC 173-351-440(6). The 2004 RI Work Plan was prepared to guide the RI process.

The following tasks of the 2004 RI Work Plan were accomplished:

- A Historical Study Report of the landfilling operations was completed (Schwyn 2006). The Historical Study Report describes the site history, waste disposal processes, and groundwater monitoring history.

- RI field studies were conducted in 2005 and 2006 by Schwyn with additional work conducted in 2009 during the interim action. The Independent RI field work included the following activities:
  - Assessed the extent and thickness of the MSW in Areas 2 and 5;
  - Conducted a Geoprobe investigation and installed borings in the vicinity of Area 5, Area 6, and Area 7, as well as along the north drainage ditch;
  - Installed one monitoring well (MW-16) on the western property boundary, south of MW-15;
  - Installed LFG Wells GW-5 and GW-6; and
  - Conducted LFG monitoring in MW-14, MW-15, MW-16, GW-5, and GW-6.

The field methods for the Independent RI work are documented in Appendix C. The findings are summarized in the following sections.

2.1.3.2 Findings

Waste Screening

Information reviewed during the historical study did not suggest that any significant hazardous substances (other than standard MSW) were placed in the landfill. In fact, the reviewed information establishes that the City responsibly tried to prevent hazardous or dangerous wastes and chemicals from being placed in the disposal areas.

Area 5 MSW Thickness

The MSW thickness observed in the Independent RI borings ranged from 12.5 to 38 feet. The approximate bottom elevations of the MSW observed in the borings ranged from 776 to 819 feet above MSL. The MSW lowest elevation (observed at GP-6), provided approximately 19 feet of separation from groundwater, based on the measured high in MW-15 of 757 feet MSL (March 2008 measurement).

Verbal reports indicated that the northern trench of Area 5 may have been excavated near, or into, the groundwater table, implying that MSW may have been placed in close contact with groundwater; however, due to access difficulties, borings were not drilled through the northern most trench of Area 5 during the Independent RI to verify or discount the verbal reports.

Source Evaluation

Eight Geoprobe explorations (GP-1 through GP-8) and ten TUBEX borings (B-9RI through B-12RI, B-14RI through B-18RI, and MW-16) were drilled to provide preliminary information about the possible source area, waste extent and thickness, subsurface lithology, depth to groundwater, and soil and groundwater quality in the vicinity of Area 5. The boring logs are provided in Appendix C. The boring locations are shown on Figure 3. The soil sample analytical results are summarized in Table 2. The groundwater sample analytical results are summarized in Table 3. The findings of the investigation are summarized below.

Geoprobe Borings GP-1(a, b, and c) and GP-2:

GP-1(a, b, and c) and GP-2 were drilled to assess groundwater quality on the south central side of Area 5. Maps of the Area 5 waste disposal area indicated that these locations would be outside of the disposal area. Interception of MSW at approximately 3 feet below ground level (bgl) in GP-1 indicated that many of the maps of the Area 5 waste disposal area were not correct. The explorations accurately located the disposal area boundary between GP-1c and GP-2.

Geoprobe Borings GP-3 through GP-6:

GP-3 through GP-6 were drilled to assess the lithology and groundwater quality on the north side of Area 5. The lithology in the upper 20 to 25 feet in these borings was composed primarily of silt with some layers of clay and sand. Whitish brown clayey silt with nodules or thin layers (2 millimeters [mm] or less) of calcite cementation (caliche) was encountered below approximately 20 feet bgl. Wet soil zones were observed above the less permeable caliche layers, creating alternating wet and dryer soils within the deeper vadose zone. Landfill gas odors were observed in the vadose zone in several of the borings.

Soil samples were collected from GP-3 at 21.5–22 feet, GP-4 at 18–18.5 feet, and GP-6 at 15–15.5 feet and analyzed for VOCs. The soil analytical results are summarized in Table 2. The analytical results did not detect VOCs at concentrations at or greater than the MRLs in any of the soil samples.

Groundwater samples were collected from well points set in GP-3 GP-4, GP-5, and GP-6. The sample point locations represent a general hydraulically upgradient (GP-6) to downgradient (GP-3) profile along the northern boundary of Area 5.

The groundwater results indicated the presence of Freon 12 (all samples), 1,1, dichloroethane (all samples except GP-5), 1,2-dichloroethane (GP-4 only), 1,2-dichloropropane (GP-4 only), chloroethane (GP-3 and GP-4 only), cis-1,2-dichloroethene (GP-3 and GP-4 only), PCE (GP-4 only), TCE (GP-3 and GP-4), Freon 11 (GP-3 only), and vinyl chloride (GP-3 and GP-4 only). The VOC results show a general increasing concentration trend from GP-5 westward, with the highest levels reported in downgradient probe GP-3. These data suggest that a possible VOC source area may exist between GP-5 and GP-4 near the northern side of Area 5. The groundwater analytical results are summarized in Table 3.

Geoprobe Boring GP-7

GP-7 was drilled to assess the thickness of the MSW in the northernmost trench area, and the separation between the MSW and groundwater. Refusal was encountered approximately 11 feet into the MSW at 17 feet bgl so the full thickness could not be determined. The boring did indicate the presence of approximately 6 feet of soil cover over the MSW at that point.

Geoprobe Boring GP-8

GP-8 was drilled in Area 7 to assess the lithology and water quality immediately upgradient of Areas 5 and 6. The lithology in the upper 10 feet was generally composed of low plasticity silt with some layers of clay and sand. Whitish brown clayey silt with nodules or thin layers (2 mm or less) of caliche was encountered below 11 feet bgl. Alternating wet and dryer zones were encountered below approximately 24.5 feet bgl. The wet soil zones were observed above the less permeable clay and cemented zones. A sand layer (1.5 feet thick) was encountered 27 feet bgl and basaltic gravels were encountered in a sandy silt matrix at 34 feet bgl. Landfill gas odors were not observed in the vadose zone.

A water quality sample was collected from a temporary well point set 32 to 34 feet bgl. The sample was submitted for VOC analysis. No VOCs were reported in the sample at or greater than the MRL suggesting that a significant source of the VOCs detected in MW-15 does not lie upgradient of Area 6.

Borings B-9RI through B-18RI

Soil borings B-9RI through B-18RI were drilled in Area 5 by the TUBEX method to assess the MSW cover thickness, limits, and depositional depth, as well as the lithology, and soil and groundwater quality. The soil cover over the MSW was composed of loose silt and the cover thickness ranged from 3 feet in B-9RI and B-16RI to 20.5 feet in B-11RI. The limits of the waste were not found in accordance with the maps, and the eastern extent of Area 5 appeared to extend beneath Area 6. The MSW thickness observed in the borings ranged from 12.5 feet in B-11RI to 38 feet in B-14RI.

Soil samples were collected from beneath the MSW in B-10RI, B-11RI, and B-12RI to assess the possible impact of leachate on the sub-soils. No VOC concentrations were reported at or greater than the MRL in any sample. The soil sample results are summarized in Table 2.

Groundwater samples were collected from temporary wells constructed in borings B-9RI and B-17RI. The laboratory results did not indicate the presence of VOCs at concentrations at or greater than the MRLs in either sample. These borings are located south of GP-3 where the highest VOC concentrations were recorded. The data suggest that the contamination source located upgradient of MW-15 may be confined to a very narrow band along the northern edge of Area 5.

<u>Groundwater Monitoring of MW-16</u>

Groundwater monitoring of MW-16, the single well installed to comply with the requirements of WAC 173-351-440(6)(b), was conducted during September 2005, June and September 2006, and March 2011. Laboratory analysis included VOCs during each monitoring event, and assorted conventional parameters and metals during several of the other events.

The VOC results indicated the presence of Freon 12 (three of four events) up to 0.74 µg/L, Freon 11 (three of four events) up to 1.8 µg/L, chloroform (two of four events) up to 0.57 µg/L, and p-isopropyltoluene at 1.6 micrograms per liter (µg/L, single analysis). The reported concentrations of conventional chemistry parameters appear in the normal background ranges for the Site.

The specific VOCs observed in MW-16 are more representative of the landfill and area-wide wells than the VOCs observed in MW-15. These data, along with the borings B-9RI and B-17RI groundwater data, further suggest that the contamination source located upgradient of MW-15 may be confined to a very narrow band along the northern edge of Area 5.

Landfill Gas Evaluation

In 2006, monitoring for LFG constituents and collection of samples for laboratory analysis was conducted within the casings of monitoring wells MW-14, MW-15, and MW-16 to assess the potential for VOCs from LFG to impact groundwater. Real-time measurements of methane, carbon dioxide, and oxygen levels, along with the meter pumping period (measured in seconds) were recorded using a hand-held multi-gas meter. Gas samples were also collected in 1-liter Tedlar bags for laboratory analysis from monitoring Wells MW-15 and MW-16. The gas samples were analyzed for VOCs using USEPA method TO-15. The field measurements and analytical results are presented in Table 4.

The field measurements did not indicate the presence of methane, elevated carbon dioxide, or reduced oxygen in MW-14 or MW-16. Low level methane (0.9%), elevated carbon dioxide (13.9%), and low oxygen (2.7%) were reported in MW-15. The laboratory analytical results indicated the presence of 16 VOCs in the MW-15 sample and 11 VOCs in the MW-16 sample. With exception of Freon 11 and ethylbenzene, the reported VOC concentrations in MW-15 were significantly higher than the reported concentrations in the MW-16 sample. The MW-15 sample also indicated the presence of constituents such as 1,1-dichloroethane, chloroethane, PCE, and vinyl chloride, which are commonly detected in the MW-15 groundwater samples. These data indicate the potential for VOCs in the LFG to partition into the groundwater at the well.

In July 2009, J-U-B Engineers (JUB) was contracted by the City to design the closure for Area 6; including LFG extraction and cover systems. JUB teamed with Shannon & Wilson, Inc. (S&W) for LFG extraction system design, and Schwyn for hydrogeologic and remedial investigation coordination activities. JUB's design took into consideration that LFG extraction and stormwater designs for the Area 6 closure could potentially impact the remedial activities. Therefore, JUB requested that the Area 5 LFG monitoring wells that were described in the 2004 RI Work Plan, but never installed, be installed to complement JUB's closure design. A scope of work was submitted to Ecology in July 2009 (Schwyn 2009) and the installation and monitoring of gas wells GW-5 and GW-6 in Area 5 was conducted in August 2009. A report of the gas well installation and monitoring with S&W's complementary report (S&W 2010) of the LFG studies that included three other gas wells located in Area 6 is provided in Appendix C.

The LFG studies indicated the presence of LFG in Area 5 and Area 6 under positive pressure containing VOCs, methane, carbon dioxide, and low oxygen. The laboratory analytical results indicated the presence of 23 VOCs in the GW-5 sample and 39 VOCs in the GW-6 sample. Methane concentrations up to 61% and 53% were reported in the GW-5 and GW-6 samples, respectively. The recorded field measurements and laboratory analytical results are presented on Table 4.

2.2 DETAILED EVALUATION OF GROUNDWATER QUALITY

Groundwater monitoring data collected from January 1991 through March 24, 2011 from monitoring wells are summarized in Appendix D. Based on this data, statistical data including mean, standard deviation, standard error, median, lower and upper quartile, maximum and minimum concentrations, and percent of detects are provided in Table 5.

Statistical evaluation of the historical groundwater quality data collected from the monitoring wells indicates three well-constituent groupings. The three groupings include:

- VOC and inorganic constituents specific to MW-15;
- Landfill specific Freon compounds; and
- Area-wide presence of PCE, TCE, and chloroform.

2.2.1 MW-15 GROUNDWATER QUALITY

Reported MW-15 constituents that have been reported at levels greater than the site-specific WAC 173-351 compliance levels (also referred to as prediction intervals) on at least two consecutive occasions are summarized as follows:

Analyte	**Maximum Concentration**
1,1-Dichloroethane (µg/L)	7.6
Chloroethane (µg/L)	1.9
cis-1,2-Dichloroethene (µg/L)	12.0
Dichlorodifluoromethane (µg/L)	13.0
Tetrachloroethene (µg/L)	11.0
Trichloroethene (µg/L)	3.8
Trichlorofluoromethane (µg/L)	1.6
Vinyl Chloride (µg/L)	3.8
Calcium (mg/L)	176
Sodium (mg/L)	118
Alkalinity (mg/L)	658

VOCs that are unique to the MW-15 samples include 1,1-dichloroethane, chloroethane, cis-1,2-dichloroethene, and vinyl chloride. Freon 12 and Freon 11 , which are commonly reported in the Site monitoring wells, are also commonly reported in MW-15 sample results. Regionally (area-wide) reported constituents that are also found in MW-15 include PCE and TCE. Chloroform, which is found regionally, has never been reported in MW-15.

Inorganic constituents, including calcium, sodium, and alkalinity, measured in milligrams per liter (mg/L), in the MW-15 samples have been reported at levels greater than the site-specific WAC 173-351 compliance levels. TDS concentrations in MW-15 are also commonly reported at levels greater than those observed in the other site wells, but have not exceeded the prediction interval on consecutive events.

2.2.2 LANDFILL SPECIFIC FREON COMPOUNDS

Review of the historical groundwater quality data collected from the downgradient site monitoring wells indicates the common presence of Freon compounds, Freon 12 and Freon 11, in the MW-11, MW-14, MW-15, and MW-16 samples. These two constituents do not appear to be associated with the area-wide VOC contamination and were not reported in any of the samples collected from MW-1 or MW-3, which are screened deeper in the aquifer.

Freon 12 and Freon 11 have been reported in the samples at levels greater than the site-specific WAC 173-351 compliance levels (prediction intervals) on at least two consecutive occasions. .

2.2.3 AREA-WIDE GROUNDWATER QUALITY

2.2.3.1 Regional Groundwater Quality

Regionally, the groundwater in the vicinity of the landfill contains low-level concentrations of chloroform, PCE, and TCE. Each of these constituents, except TCE, has been detected in all upgradient wells. The upgradient concentrations of PCE (up to 7.1 µg/L) and TCE (up to 4.0 µg/L) have routinely exceeded the MTCA Method A and/or B cleanup levels for groundwater and Washington State Groundwater Standards. Similarly, slightly lower VOC concentrations have regularly been detected in the downgradient landfill monitoring wells (MW-1, MW-3, MW-11, MW-14, and MW-16) and two domestic water supply wells (Small and Camp Wells). The maximum historical VOC detections are illustrated on Figure 11. Figure 12 illustrates the most recent VOC concentrations reported in each well.

Toluene has also been reported in samples collected from upgradient and site monitoring Wells MW-3, MW-5, MW-11, MW-12, MW-14, and MW-15; however, since 1991 toluene has only been reported once in each well, except for MW-11 which has had two detections. The reported concentrations are far less than the applicable regulatory criteria. Based on the sporadic detections of toluene, a groundwater trend was not apparent, and at this time is not considered an indicator parameter or a constituent of significant concern.

2.2.3.2 Domestic Well Groundwater Quality

The groundwater sample results from three domestic supply wells have indicated the presence of chloroform (up to 0.62 µg/L) and PCE (up to 1.5 µg/L) in the Small Well samples, and PCE (up to 0.74 µg/L) in the Camp Well. VOCs have not been detected in the two samples collected from the Kinman Well.

The fingerprint of the VOCs detected in the Small and Camp groundwater samples (chloroform and PCE) appear to correspond with the fingerprint of the area-wide contamination (chloroform, PCE, and TCE). VOCs that are unique to the Site have not been detected in the domestic well samples. Furthermore, the groundwater flow path from the Site (flow to the southwest) does not extend within the reach of the Camp Well (located ¾-mile northwest of the landfill). The VOC fingerprints and direction of groundwater flow suggest that the contamination in the domestic wells is the result of area-wide contamination and not the Site. This preliminary conclusion will be reassessed or confirmed as part of the RI.

3.0 PRELIMINARY CONCEPTUAL SITE MODEL

The following section describes the preliminary conceptual site model derived from the available information on the landfill as described in the preceding sections. According to the MTCA, the goal of the conceptual site model is to identify the potential or suspected sources of hazardous substances, the types and concentrations of hazardous substances, the potentially contaminated media, and the potential exposure pathways and receptors. The conceptual site model is typically developed during the scoping of the RI and further refined as additional information is collected at the Site. The conceptual site model provides the essential foundation for conducting the feasibility study.

3.1 SUSPECTED SOURCES OF HAZARDOUS SUBSTANCES

Most of the waste disposed at the Site is mixed MSW transported to the Site by commercial and public garbage disposal service contractors from the City, as well as Walla Walla and Columbia Counties, which are predominantly rural counties with an agricultural economic base and little manufacturing or heavy industry. Permitted waste disposal at the Site has been limited to MSW, asbestos, and medical wastes. The Site has also provided special areas for animal carcass disposal. Hazardous materials have never been allowed into the landfill.

Based on the Independent RI data, the suspected sources of hazardous substances found in groundwater at the landfill are the MSW placed in Areas 5, and possibly Area 6. While it is possible that the MSW in Area 1 and Area 2 have potential to impact the groundwater, sufficient investigation has not been conducted to verify a source of contamination from these areas.

The most likely source of the chlorinated and Freon-based VOCs detected in landfill groundwater is from small quantities of legally disposed household wastes and spent aerosols cans or white goods containing Freon gas. Historical records do not indicate that large quantities of industrial or hazardous wastes have been disposed of at the landfill.

3.2 PRELIMINARY CONTAMINANTS OF CONCERN FOR GROUNDWATER

There is a large amount of existing data for site groundwater showing frequent detections of multiple VOCs and inorganic constituents. A preliminary screening process was undertaken in order to identify which of the detected compounds pose the most concern to human health and the environment. (Note: this screening process is preliminary only and will be reevaluated during the RI, at which time the final contaminants of concern will be established). Compounds that are not screened out are called Preliminary Contaminants of Concern (PCOCs). They are identified by evaluating the site data against the following criteria:

- **Data must be of acceptable quality.** Only data that were collected and analyzed under standard field and laboratory methodologies are used. Data that did not meet laboratory Quality Assurance limits are not considered.
- **Background concentration comparisons for metals and inorganics.** Metals or other naturally occurring inorganics with concentrations less than or equal to established site background concentrations are not considered PCOCs.
- **Frequency of detection evaluation.** Chemicals that were not detected with standard USEPA laboratory methods with analytical reporting limits equal to or less than the screening level were eliminated. Also, chemicals detected at a frequency of 5% or less are generally not retained, especially if they are only detected in association with other PCOCs.
- **Risk-based screening.** Maximum concentrations of any detected compound are screened against the following conservative risk-based screening levels:
  - **Groundwater:** Method B and Method A (Residential) cleanup levels from Ecology's Cleanup Levels and Risk Calculation (CLARC) on-line database or Washington State Groundwater Standards (Chapter 173-200 WAC).
  - **Soil Gas:** Ecology's Soil Gas Screening Levels from Table B-1 of the 2009 Draft Guidance for Evaluation Soil Vapor Intrusion in Washington State. The deep soil gas screening levels listed in Table B-1 were used, instead of the sub slab concentrations because the soil gas samples were collected at depths well below ground surface.

Using this process, the PCOCs for VOCs in groundwater are PCE, TCE, and vinyl chloride, as noted in the table below. Other contaminants have been detected at the Site including 1,1-dichloroethane, chloroform, chloroethane, cis-1,2-dichloroethene, Freon-12, Freon-11, and toluene, although not at concentrations that exceed screening levels. These other compounds are considered "fingerprint compounds" in that they imply landfill or upgradient impacts, but are not at concentrations that present environmental risk. The concentrations of metals detected in site wells appear to reflect background levels and were not retained as PCOCs. Other WAC 173-351-990 Appendix III constituent groups, including semi-volatile organic constituents, polyaromatic hydrocarbons, organo-chlorine and organo-phosphorus pesticides, chlorophenoxy herbicides, and PCBs that were not detected at levels greater than MRLs during the assessment monitoring program were also eliminated as PCOCs.

The PCOCs for soil gas are PCE, TCE, and cis-1,2-dichloroethene, whose maximum concentrations detected in the sample from GW-6 exceed Ecology MTCA Method B and C screening levels for deep soil gas.

Maximum Concentrations vs. Screening Levels for VOCs

Well	1,1-Dichloroethane (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	cis-1,2-Dichloroethene (µg/L)	Dichlorodifluoromethane (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl Chloride (µg/L)
MW-1	ND	ND	1.1	ND	ND	**0.90**	ND	ND	ND	ND
MW-3	ND	ND	1.0	ND	ND	0.75	2.2	ND	ND	ND
MW-5	ND	ND	1.3	ND	ND	**7.10**	1.0	**4.0**	0.6	ND
MW-11	ND	ND	1.5	ND	0.94	**2.3**	1.1	**2.8**	1.0	ND
MW-12/12b	ND	ND	2.2	ND	ND	**0.9**	0.97	ND	ND	ND
MW-14	ND	ND	0.9	ND	1.9	ND	0.61	ND	ND	ND
MW-15	7.6	1.9	ND	12.0	13.0	**11**	0.68	**3.8**	1.6	**3.8**
MW-16	ND	ND	0.57	ND	0.74	0.64	ND	ND	1.8	ND
MW-7	ND	ND	0.6	ND	ND	**1.26**	ND	ND	ND	ND
MW-9	ND	ND	1.5	ND	ND	**4.10**	ND	**8.3**	ND	ND
MW-10	ND	ND	2.0	ND	ND	0.52	ND	ND	ND	ND
Small	ND	ND	0.62	ND	ND	**1.5**	ND	ND	ND	ND
Camp	ND	ND	ND	ND	ND	0.76	ND	ND	ND	ND
Kinman	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Screening Level (a)	1600	NR	80	16	1600	0.8(b)	640	2.4(b)	2400	0.029

Notes:

(a) Screening level based on MTCA Chapter 173-340 WAC Method B standard groundwater cleanup levels. CLARC formula values based on 10^{-6} cancer risk.

(b) Current CLARC cleanup level recommended for protection of groundwater.

Values indicate the maximum concentration reported in well sample, based on data collected from 1991 through March 24, 2011.

Single or sporadic constituent detections may not be included in screening.

Bold Indicates exceedance of screening level.

Abbreviation:

CLARC Cleanup Levels and Risk Calculation
MTCA Model Toxics Control Act
NR Not researched
VOC Volatile organic compound
WAC Washington Administrative Code

3.4 POTENTIALLY CONTAMINATED MEDIA

3.4.1 SOIL

While preliminary soil testing data from beneath Area 5 has not indicated the presence of any VOCs in the soil underlying the MSW, soil is retained as a potentially contaminated media at the Site. This conclusion is based on limited data from Area 5, primarily on the north boundary, and no soil data from beneath Area 1 and Area 2.

3.4.2 AREA-WIDE GROUNDWATER

Groundwater monitoring data collected since 1993 have indicated the presence of groundwater contamination in samples collected from monitoring wells located up- and downgradient of the landfill. The area-wide preliminary contaminants of concern include chloroform, TCE, and PCE, and based on the 1999 USEPA/Ecology CSI/A, these contaminants may be originating from the WSP. However, the source has not been fully determined and will be further evaluated in the RI.

3.4.3 LOCALIZED GROUNDWATER NEAR MW-15

Contaminants found in groundwater monitored by MW-15 are distinct from all other site wells and downgradient domestic wells in that they contain a broader list of VOCs than detected area-wide. This list includes PCE, TCE, chloroethane, 1,1-dichloroethane, cis-1,2-dichloroethane, Freon 12, Freon 11, and vinyl chloride, but not chloroform. There are also inorganic substances at elevated levels that include calcium, sodium, bicarbonate, chloride, alkalinity, and TDS that are possible indicators of landfill leachate impacts to groundwater.

3.4.4 LANDFILL AREA GROUNDWATER

Contaminants found in groundwater monitored by MW-11, MW-14, MW-15, and MW-16, which are located downgradient of the disposal areas, indicate the common presence of the Freon compounds Freon 12 and Freon 11. These two constituents do not appear to be associated with the regional VOC contamination and were not reported in any of the samples collected from MW-1 or MW-3, which are screened deeper in the aquifer. The constituent levels are less than the screening levels, but suggest LFG impact to groundwater over a broad area of the landfill.

3.4.5 LANDFILL GAS

Landfill gas is generated by the decomposition of refuse by anaerobic bacteria and is retained as a potentially contaminated media. The LFG studies conducted during the Independent RI and Area 6 closure indicated the presence of LFG in Area 5 and Area 6 under positive pressure containing VOCs, methane, carbon dioxide, and low oxygen. TCE and PCE, and cis-dichloroethene in LFG exceed Ecology screening levels for risk to indoor air and their presence in LFG poses a risk of LFG contaminating underlying groundwater (cross-media pathway). Area 6 has an LFG collection system (active since 2010); Area 5 does not, and therefore the LFG generated by the MSW in Area 5 is a potentially impacted media. The potential impact of LFG generation from Area 1 and Area 2 is also unknown; however, these disposal areas are much smaller and less likely to generate significant volumes of LFG. In addition, the presence of LFG and the VOC concentrations near existing structures in the vicinity of Area 1 and 2 (the HHWF and equipment building) are unknown.

3.4.6 STORMWATER

Stormwater itself is not considered a potentially contaminated media as there are no pathways for stormwater at the Site to encounter hazardous materials before running off-site; however, stormwater infiltration in the north drainage ditch has been identified as a possible cause of groundwater contamination via the infiltration of the stormwater into the Area 5 MSW, and the subsequent generation and downward migration of leachate to groundwater.

3.5 FATE AND TRANSPORT

Chlorinated VOCs are very persistent in the environment and can travel downgradient significant distances before attenuating. Attenuation can occur by direct adsorption of molecules onto soil organic carbon, or via biodegradation, or simple dispersion of the molecules away from the core of the plume into surrounding groundwater as it travels downgradient. Concerning biodegradation, the presence of biodegradation “daughter products” such as cis-1,2-dichloroethene and vinyl chloride (found at elevated concentrations in several of the Geoprobe samples collected adjacent to the Area 5 waste) suggests that biodegradation of the plume is significant and occurring in the source area. This is typical of plumes in anaerobic environments found in groundwater impacted by landfill leachate or LFG, as the bacteria that are capable of biodegrading chlorinated compounds typically live in highly reducing anaerobic environments; however, once the chlorinated plume migrates beyond the limited area of anaerobic activity, little further degradation is expected to occur in the oxidizing environment found in downgradient groundwater. Additionally, the very low relative concentrations of VOCs in downgradient groundwater would typically not support significant bacteriologic growth as there is not enough “food” in the plume to sustain an active bacteriological population.

Therefore, the primary fate and transport mechanism in downgradient groundwater is advective transport and dispersion of the contaminants downgradient until the contaminants eventually attenuate via dispersion or become firmly bound onto soil organic matter in the aquifer. The growth or decay of the plume is dependent on balance between groundwater flow and the amount of contaminant mass being replenished to the aquifer. If the source of the contamination can be controlled, it is expected that the plume will diminish in size as it is transported downgradient via groundwater. Alternatively, if the source mass is increased, the plume will grow in size, as it overwhelms the attenuation ability of the aquifer.

3.6 RECEPTORS/PATHWAYS OF EXPOSURE

Groundwater and LFG are the primary impacted media at this Site. Possible receptors to contaminants found in groundwater are downgradient domestic well users, should it be found that contaminants from the landfill are migrating off-site to any significant degree. There are no current completed exposure pathways from groundwater at the Site itself, because groundwater from site wells is not utilized for potable purposes. The pathways of exposure to possible downgradient domestic users impacted by site groundwater are via drinking of contaminated waters and/or inhalation of vapors that are volatilized from water (e.g., during showering).

The other primary impacted media is LFG. The pathways for exposure are inhalation and cross-media contamination of underlying groundwater. Inhalation risks include accumulation of LFG contaminants from vapor accumulation within habitable structures, or through inhalation of LFG seeping up through the soil cover to the atmosphere. Exposure to VOCs in LFG could occur to landfill employees residing in the HHWF or equipment building. Due to distance and the Site topography, exposure to soil gas vapors in the office/scale-house is not considered an exposure pathway. Additionally, landfill workers and the public may be exposed to LFGs escaping to the atmosphere during periods of work or site visitation.

3.6.1 TERRESTRIAL ECOLOGICAL EVALUATION EXCLUSION

It is expected that a terrestrial ecological evaluation will not be required at this Site in accordance with WAC 173-340-7491. Terrestrial ecological evaluations are required for sites with soil contamination. Based on current data, soil at the Site is not contaminated; MSW in inactive cells is covered by several feet of clean soil and institutional controls are in effect for the landfill. Additionally, any possible soil contamination is expected to be greater than 15 feet below ground level, and would therefore also meet the standard point of compliance described in WAC 173-340-7490(b). These conditions are sufficient to meet the exclusion criteria described in WAC 173-340-7491(1).

4.0 RI WORK TASKS

4.1 DATA GAPS

A substantial amount of investigation work has already been conducted at the Site; however, some aspects of site conditions are inadequately known and need to be addressed to complete the conceptual site model. The data gaps presented below were identified based upon review of existing data as described in the previous sections. Further evaluation is deemed necessary in order to fully characterize the Site and prepare the FS.

4.1.1 LATERAL AND VERTICAL EXTENT OF LANDFILL

The lateral and vertical (subsurface) extents of MSW placed in Areas 1, 2, and 5 have not been fully determined. The lateral extents of the waste are unclear on the north, west, and southern boundaries of Area 5. The vertical extent (thickness) of Area 5 waste along the northern-most trenches is also unknown, and reportedly may extend nearly to groundwater. The extent of MSW in Area 1, either laterally or vertically, has not been determined. The extent of Area 2 has been roughly determined, but needs more accuracy for mapping and waste volume calculation purposes.

4.1.2 LANDFILL COVER

The soil cover thickness over Area 5 is variable, and the Area 1 cover thickness has not been determined. Additional data is required to determine if the cover thicknesses in these two areas are sufficient to prevent infiltration of precipitation.

4.1.3 SOIL

There is partial data indicating the absence of contaminants in the Area 5 subsurface soil, however, additional soil data are needed in the northernmost trench area to assess potential impact from leachate. Additionally, soil data are needed to characterize the presence or absence of PCOCs in soil beneath the MSW in Area 1 and Area 2. Area 6 is constructed over a soil base in accordance with the Solid Waste Permit, with six lysimeters installed to monitor leachate infiltration. Leachate has seldom been detected in the lysimeters, and therefore the soil quality beneath Area 6 is not considered a data gap, and further sampling in this area will not be conducted.

4.1.4 GROUNDWATER

Available hydrogeological information is sufficient to describe most aspects of the shallow aquifer; however, the following data gaps exist:

- The hydrostatigraphy of the shallow aquifer varies considerably due to the fluvial deposition of sediments, and it is expected that a complete understanding of the hydrostatigraphy will never be determined. As additional boring and monitoring wells are installed, however, the understanding of the hydrostatigraphy will be further developed to complete the RI and facilitate the FS.

- It has been determined that the shallow aquifer has been impacted by VOCs and inorganic constituents in MW-15, and Freon compounds in the landfill monitoring wells. With respect to groundwater contamination, the following data gaps are identified:
  - Neither the extent nor the source(s) of the VOC contamination in the MW-15 specific samples have been fully identified. In particular, it has not been established if Area 6 is contributing to the contamination found at MW-15;
  - Neither the extent nor the source(s) of the Freon 11 and 12 contamination in the landfill monitoring wells has been fully identified;
  - The source(s) of inorganic constituent contamination in the MW-15 specific samples has not been fully identified;
  - The downgradient extent(s) of contamination found in MW-15 has not been determined;
  - The vertical extent of contamination and the interaction of the contaminants with deeper zones within the aquifer have not been determined;
  - The impact of the upgradient area-wide contamination on the Site and domestic well groundwater has not been fully characterized; and
  - The current concentration of VOCs in all upgradient and site monitoring wells has not been fully established.
- Analysis of the domestic well VOC fingerprint and groundwater flow path suggest that the chloroform and PCE detections in the Small and Camp Wells are associated with the area-wide contamination and not the Site. The RI will utilize all available groundwater data to assess the source of the impacts to the Small and Camp Wells including data collected from the domestic wells outside of the RI process.

4.1.5 LANDFILL GAS

The following data gaps exist with respect to the LFG collected to date:

- The presence/absence or character of LFG in Areas 1 and 2;
- The potential impact of the LFG on groundwater quality near Area 1 and Area 5;
- The migration extent and pathways—there is lack of data on the presence or absence of LFG extending beyond the waste limits for Areas 1, 2, and 5;
- The stabilized gas quality and flow rate from the gas extraction system, and the radius of influence of the Area 6 LFG extraction wells to determine the effectiveness of the Area 6 interim action; and
- The presence/absence and quality of LFG near to the HHWF has not been characterized for VOCs consistent with vapor intrusion guidelines.

4.2 REMEDIAL INVESTIGATION TASKS

The following tasks provide the general approach that will be used to close the data gaps. The details of the technical approach are described in the SAP, which includes the sampling strategy, locations, methods, and procedures. The SAP is provided in Appendix E. The QAPP and HASP are provided in the SAP. The proposed exploration locations are shown on Figure 13.

Data Gap	Investigation Method
Lateral extents of the wastes in Areas 1, 2, and 5	Conduct geophysical surveys with verification test pit program if needed.
Vertical extent of the waste in Area 1	Drill one boring to 5 feet below the bottom of the MSW.
Vertical extent of the MSW at the northern extent of Area 5	Drill three borings to 5 feet below the bottom of the MSW.
Landfill cover thickness in Areas 1 and 5	Conduct a test pit program and log the soil cover thicknesses.
Soil quality beneath Areas 1, 2, and 5	Collect soil samples for laboratory analysis from each boring that extends through the MSW.
Area 5 and/or Area 6 as source of groundwater contamination at MW-15	1. Install and monitor one monitoring well adjacent to GW-5 to distinguish groundwater quality at Area 5/Area 6 boundary and the interaction of LFG on groundwater. 2. Install and monitor two monitoring wells along the north drainage ditch to verify Geoprobe sampling data and the groundwater quality at Area 5/Area 6 boundary. 3. Install and monitor one monitoring well south of Area 5 and west of Area 6 to distinguish groundwater quality at the Area 6 boundary. 4. Replace monitoring well MW-14 to provide for an adequate sample collection point at the southwest corner of the site.
Impact of area-wide groundwater contamination on the landfill	1. Develop and install dedicated groundwater sampling pumps in MW-5 and MW-9. 2. Install and monitor monitoring well upgradient of Area 1.
Extent of downgradient groundwater contamination from vicinity of MW-15 and Area 5.	1. Install and monitor two downgradient monitoring wells southwest of MW-15 (located approximately 350 feet and 700 feet from property line). 2. Install and monitor one monitoring well in former railroad right-of-way. 3. Install and monitor one monitoring well approximately 250 northwest of MW-15 on the Camp property. 3. Install and monitor one monitoring well between MW-15 and MW-16.

Vertical component of contaminant transport in groundwater	1. Install and monitor two deeper monitoring wells at the two off-site locations. 2. Install and monitor one deeper monitoring well located adjacent to MW-15. The screen section will be constructed between the MW-3 and MW-15 screened sections. 3. Conduct pumping tests to assess hydraulic connection between MW-15 (shallow and deep) and MW-3, and to assess aquifer parameters.
Possible impact of landfill on domestic wells in region	Collect and analyze groundwater samples for VOCs from the Small, Camp, Kinman, and Schmidt (shallow) Wells.
Groundwater quality monitoring	1. Collect groundwater samples for laboratory analysis of Appendix III parameters from site wells MW-11, MW-14, and MW-15 and modify the sampling plan to incorporate detected constituents that exceed MTCA screening levels. 2. Collect groundwater samples for laboratory analysis from site wells (MW-11, MW-12, MW-14, MW-15, MW-16), upgradient wells (MW-5, MW-9, MW-10, MW-12b), domestic wells (Small, Camp, Kinman, Schmidt), and new monitoring wells installed during the RI. 3. Analyze the site well samples and samples from all new monitoring wells for VOCs, and other conventional chemistry parameters that could be indicative of possible leachate impacts to groundwater including calcium, sodium, magnesium, potassium, sulfate, chloride, manganese, iron, ammonia, nitrate, alkalinity, TOC, and TDS. 4. Analyze the upgradient and domestic well samples for VOCs. 5. Incorporate the quarterly compliance groundwater monitoring data (collected as a requirement of the Solid Waste Operating Permit) into the RI data base of information.
Extent and characteristics of LFG and the potential impact of LFG on groundwater	1. Install and monitor LFG monitoring wells at the perimeters of the waste cells and adjacent to structures. 2. Install and monitor one gas well in Area 1 3. Conduct barhole monitoring study at Area 2.
Effectiveness of existing LFG extraction system	1. Monitor existing and new LFG monitoring wells to determine if existing extraction system operation is controlling gas migration. 2. Conduct radius of influence tests if preliminary monitoring results indicate the potential for gas migration.

LFG vapor intrusion	1. Install and monitor one LFG monitoring well adjacent to the HHWF. 2. Conduct additional testing if potential for impacts is observed during the preliminary monitoring program. 3. Conduct vapor intrusion modeling if MTCA screening levels are exceeded.
LFG monitoring	1. Perform field monitoring for the presence of methane, carbon dioxide, oxygen, and gas, and barometric pressure in all LFG monitoring wells. 2. Collect and analyze gas samples for VOCs from LFG monitoring Wells GW-5, GW-6, GW-7S, GW-7D, GW-8, GW-9, GW-10, GW-11, and GW-12 during one monitoring event.

Abbreviations:

HHWF	Household Hazardous Waste Facility
LFG	Landfill gas
MSW	Municipal solid waste
MTCA	Model Toxics Control Act
TDS	Total dissolved solids
TOC	Total organic carbon
VOC	Volatile organic compound

4.2.1 REPORTING

A draft RI report will be prepared after all investigation phases of the RI are complete and the field and laboratory data are compiled and validated. The documentation will consolidate and incorporate data generated during each phase of the investigation. The report will describe general facility information, site history, RI investigation activities, geologic and hydrogeologic conditions, identify site-specific applicable or relevant and appropriate requirements (ARARs), and make a preliminary determination of indicator hazardous substances, the nature and extent of contamination including exposure pathways and identification of preliminary cleanup levels and points of compliance, and contaminant fate and transport.

The RI Report will be presented in draft format to Ecology for review and comment. A Final RI Report will be prepared, pursuant to discussion of comments between Ecology and the City.

4.3 SCHEDULE

The schedule for the RI/FS was established and presented in the AO. Field work is scheduled to begin during the spring of 2012. Groundwater sampling and other field activities are scheduled to extend into February 2013. Laboratory analytical results of samples collected during the RI will be loaded into the Ecology database for environmental monitoring data in the Environmental Information Management

System format within sixty days of receiving the laboratory report. The draft RI Report is scheduled for delivery to Ecology on June 17, 2013. If needed, this schedule will be updated as the project progresses.

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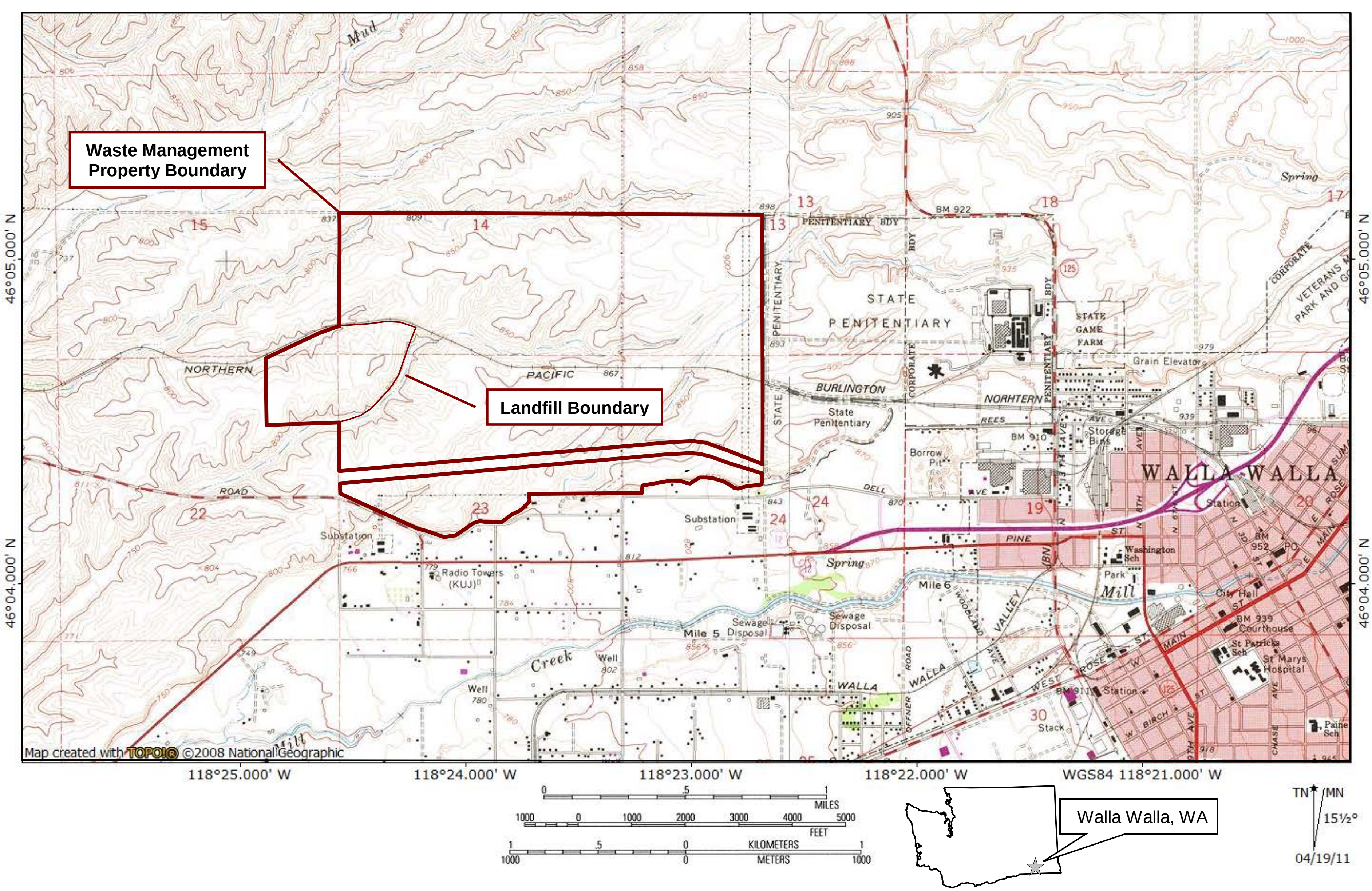
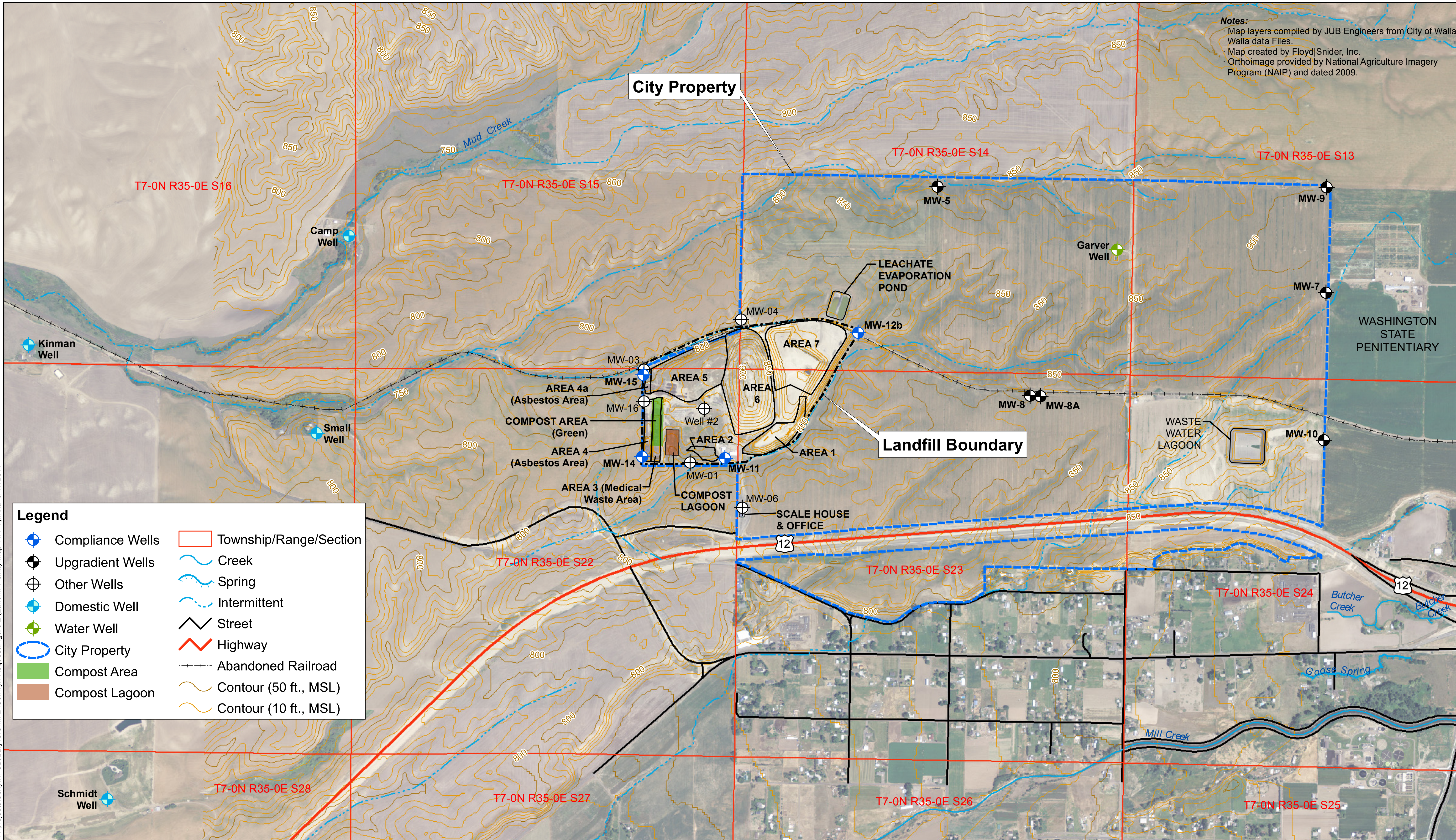


Schwyn Environmental Services

Remedial Investigation Work Plan Sudbury Road Landfill Walla Walla, Washington	**Site Location**	Figure 1



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Schwyn Environmental Services

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Scale in Feet
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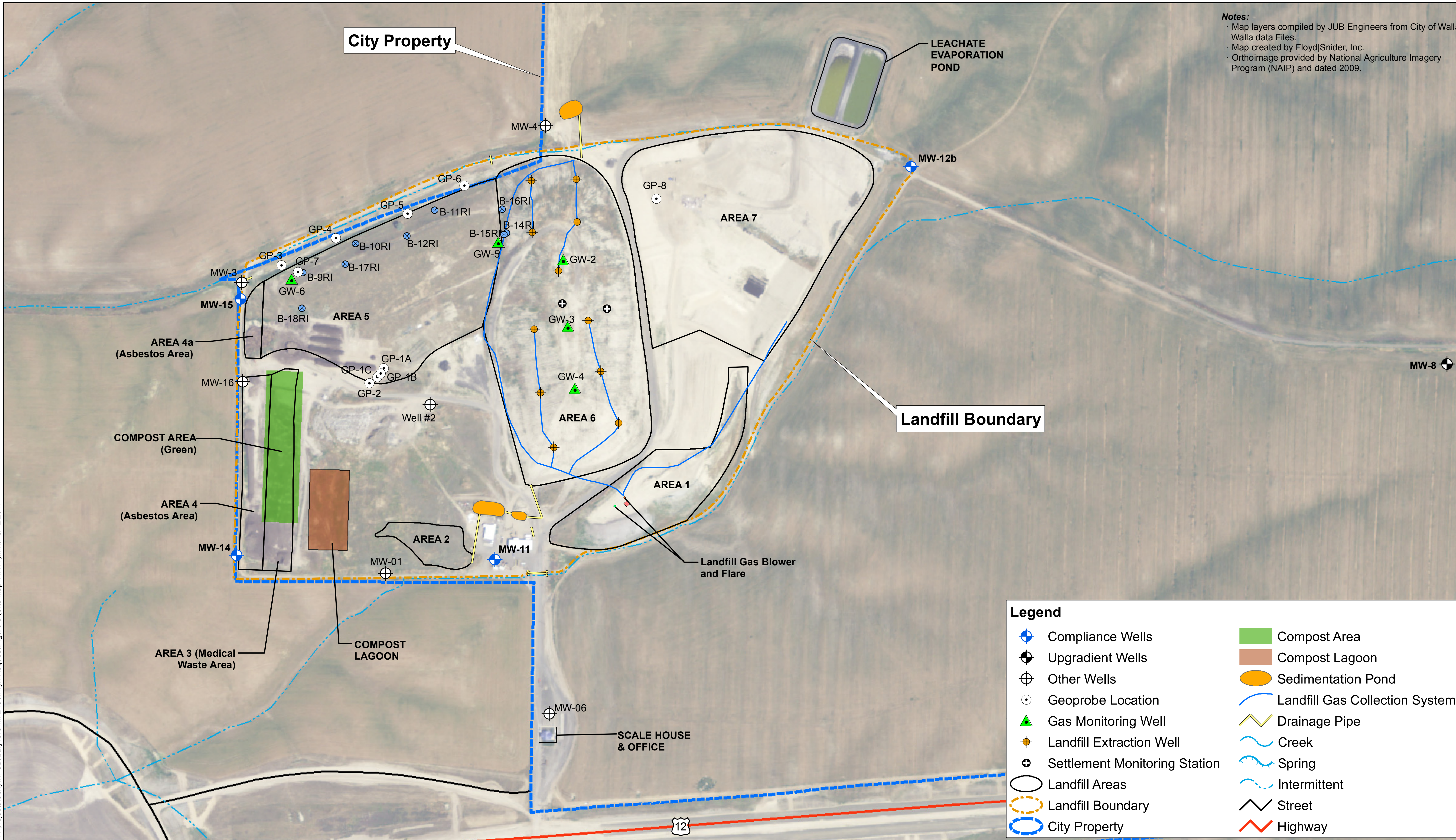
Remedial Investigation Work Plan Sudbury Road Landfill Walla Walla, Washington	**Vicinity Map**	Figure 2



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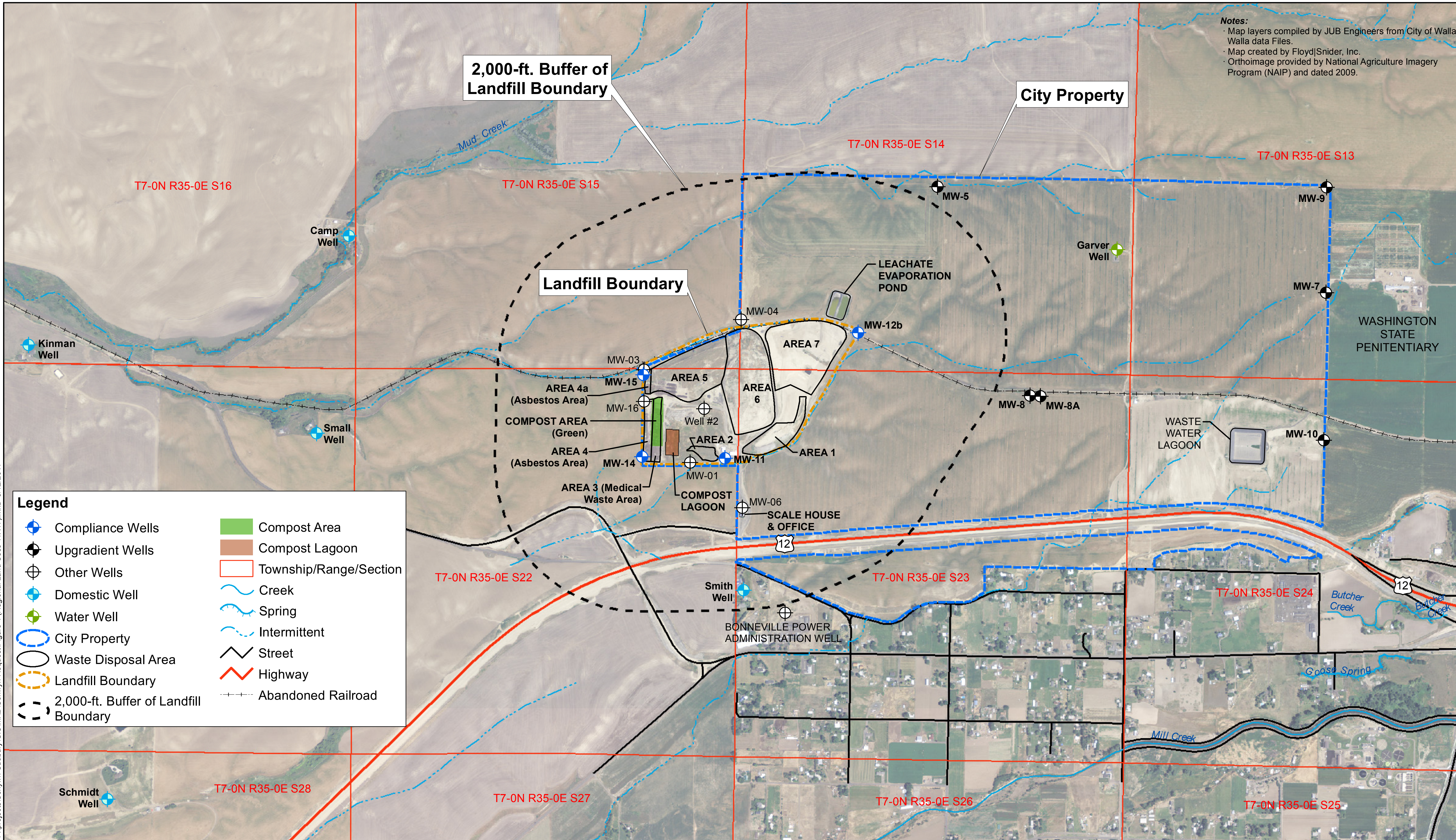
Remedial Investigation Work Plan
Sudbury Road Landfill
Walla Walla, Washington

Site Map

Figure
3



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Remedial Investigation Work Plan
Sudbury Road Landfill
Walla Walla, Washington

Regional Land Uses

Figure 4

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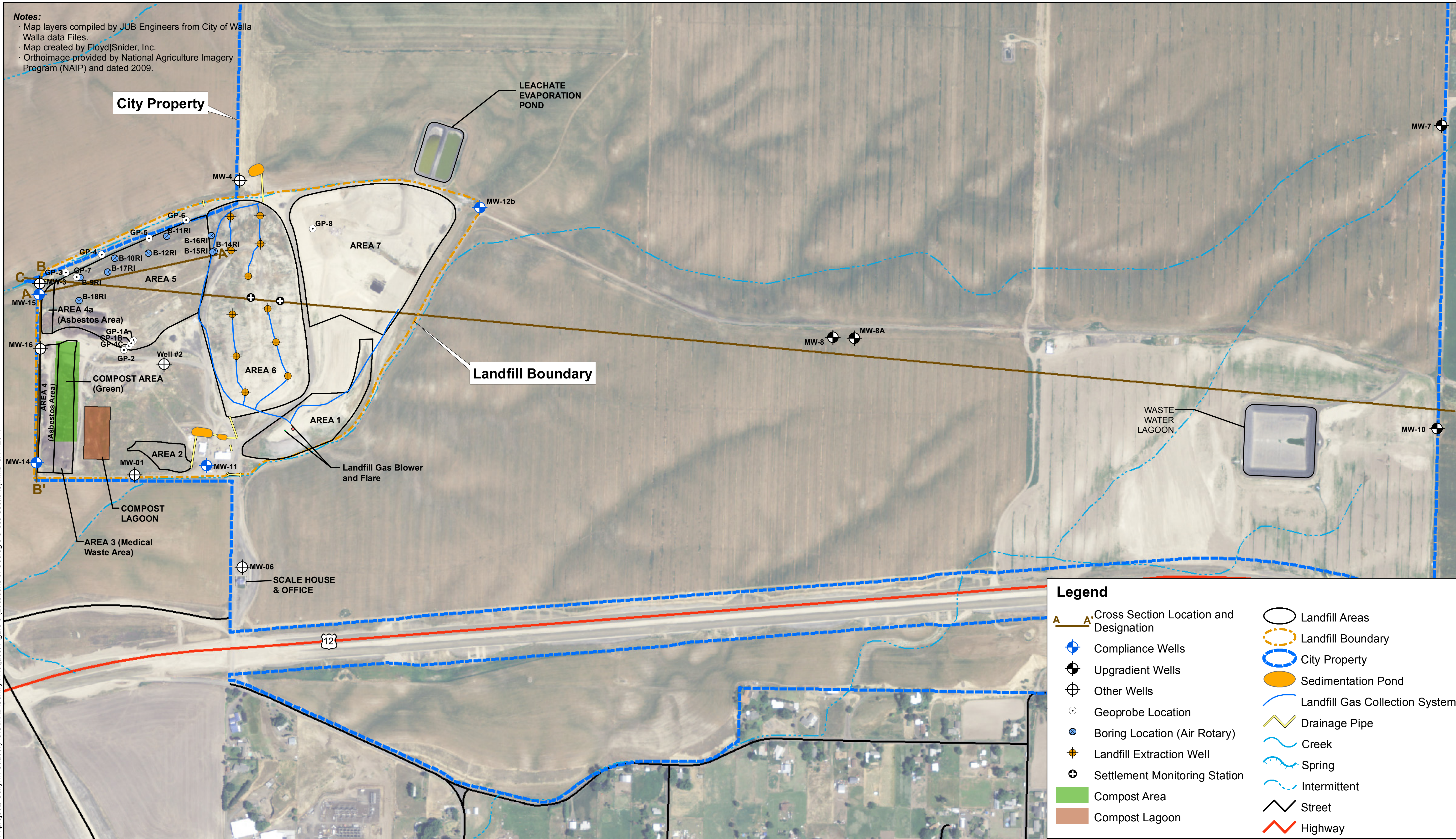

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Sudbury Road Landfill
Walla Walla, Washington

Locations of Geologic Cross Sections

Figure
5

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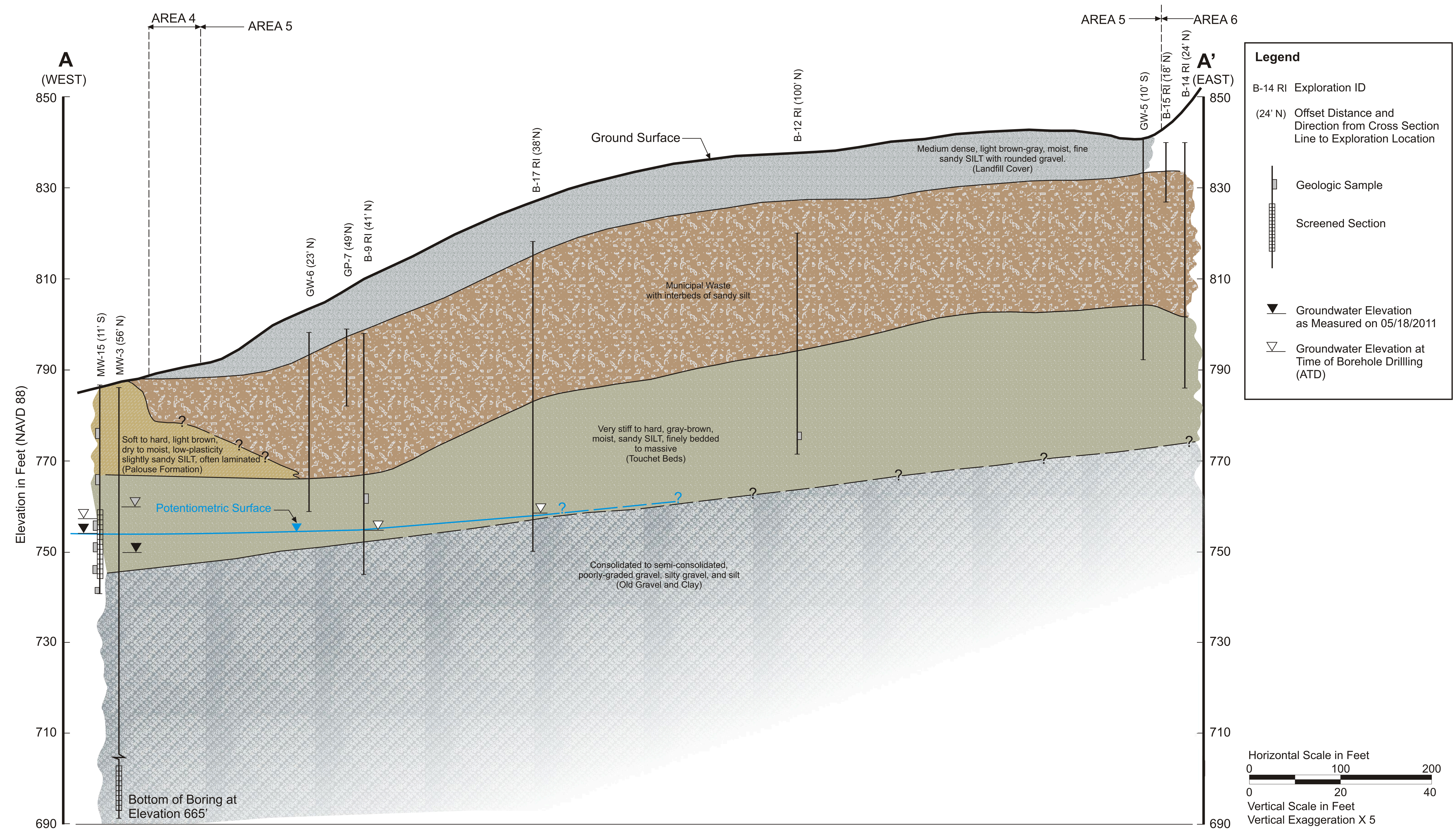

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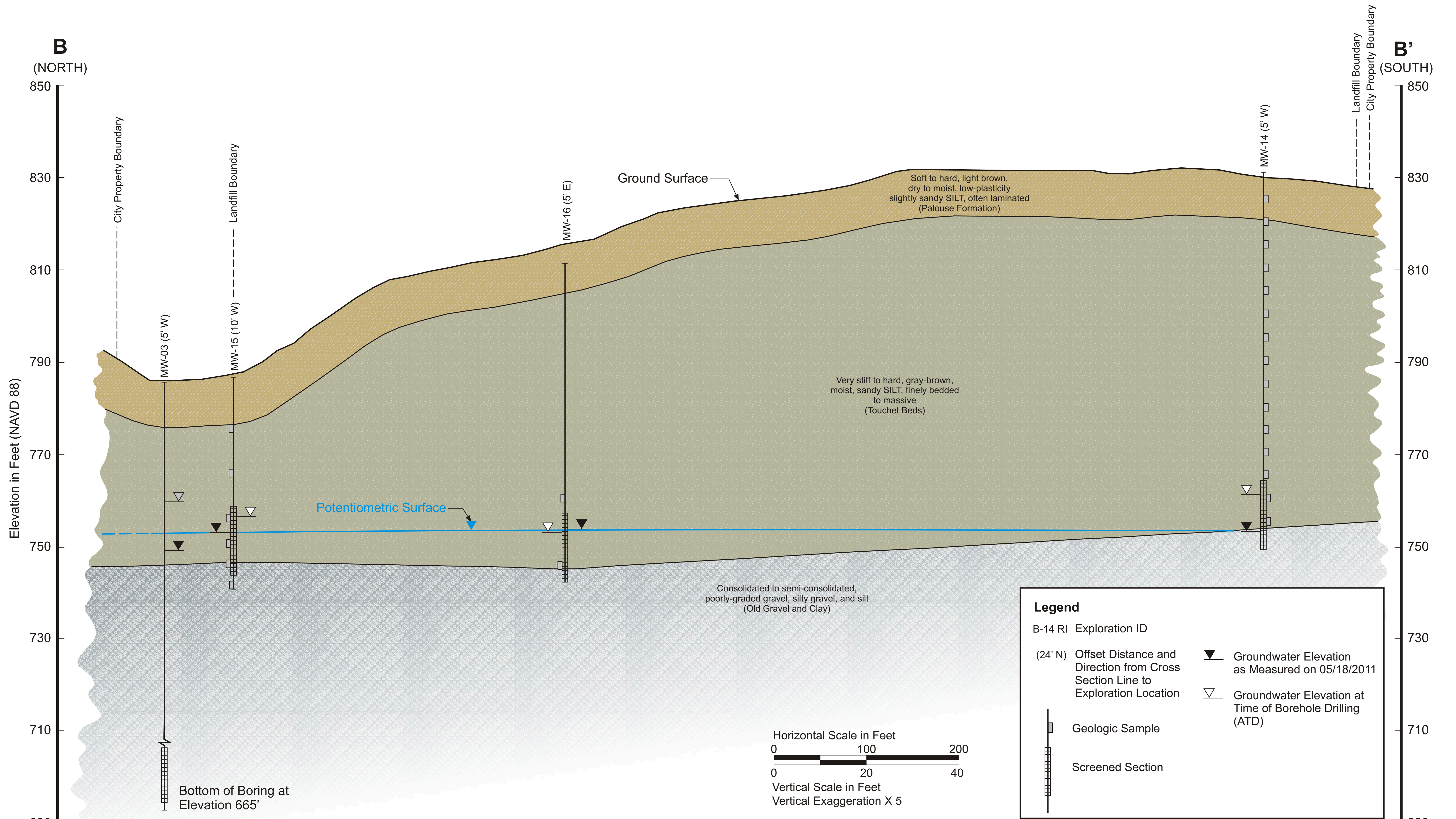
Sudbury Road Landfill Walla Walla, Washington	**Geologic Cross Section A-A'**	Figure 6



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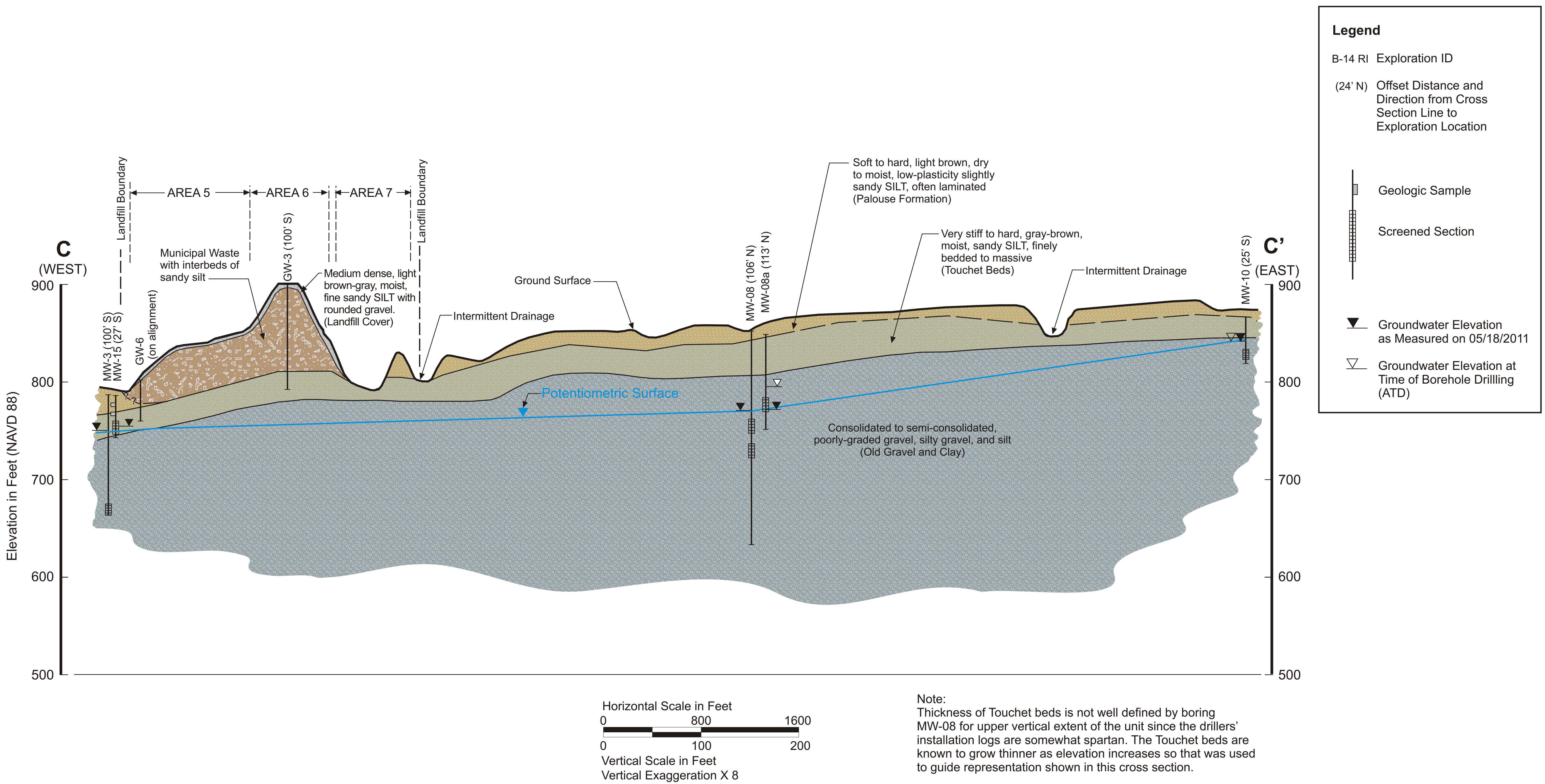
Sudbury Road Landfill
Walla Walla, Washington

Geologic Cross Section B-B'

Figure 7



Note:
Thickness of Touchet beds is not well defined by boring MW-08 for upper vertical extent of the unit since the drillers' installation logs are somewhat spartan. The Touchet beds are known to grow thinner as elevation increases so that was used to guide representation shown in this cross section.

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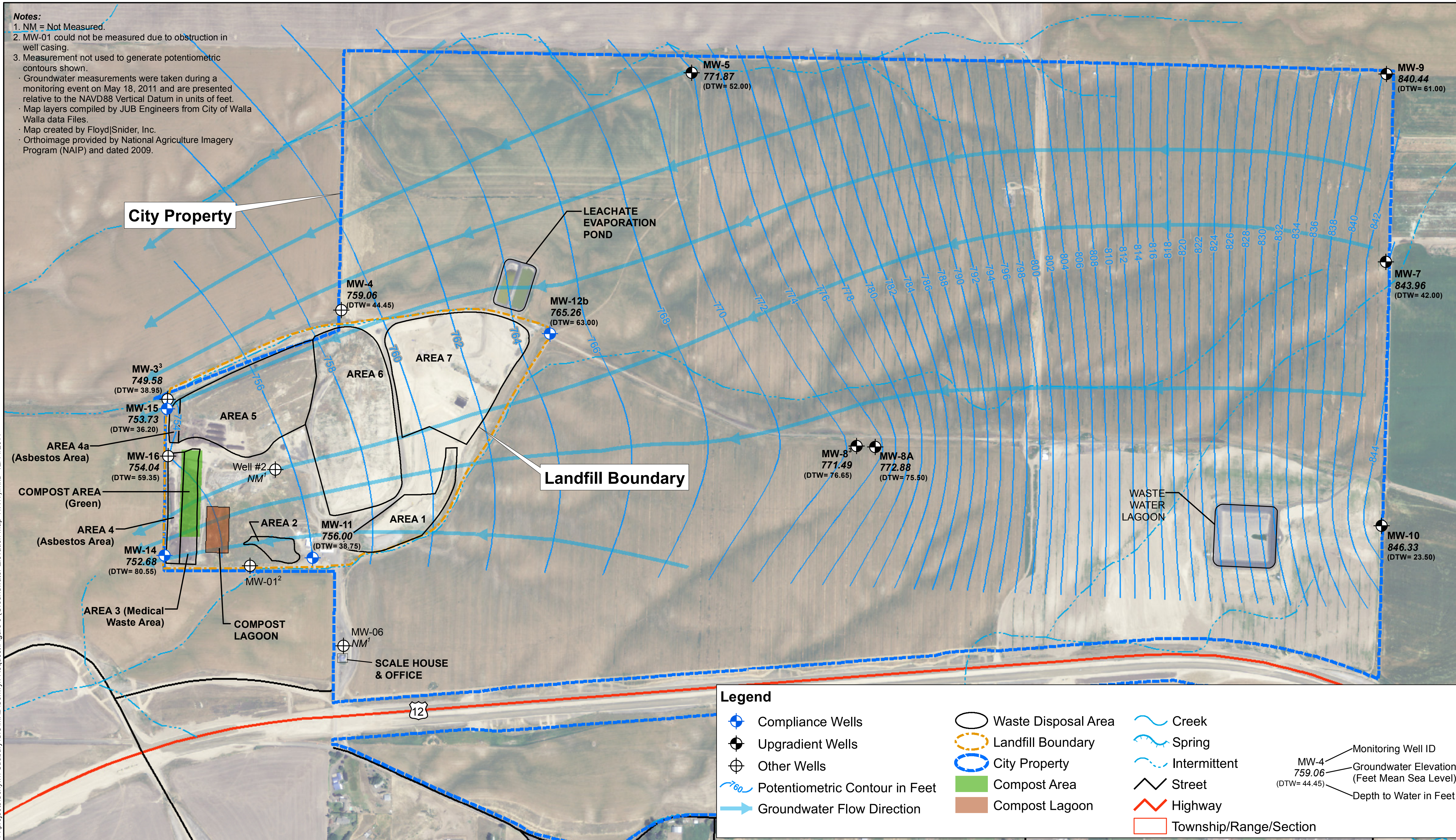
Sudbury Road Landfill Walla Walla, Washington	**Geologic Cross Section C-C'**	Figure 8



0 350 700 1,400
Scale in Feet
1:8,400

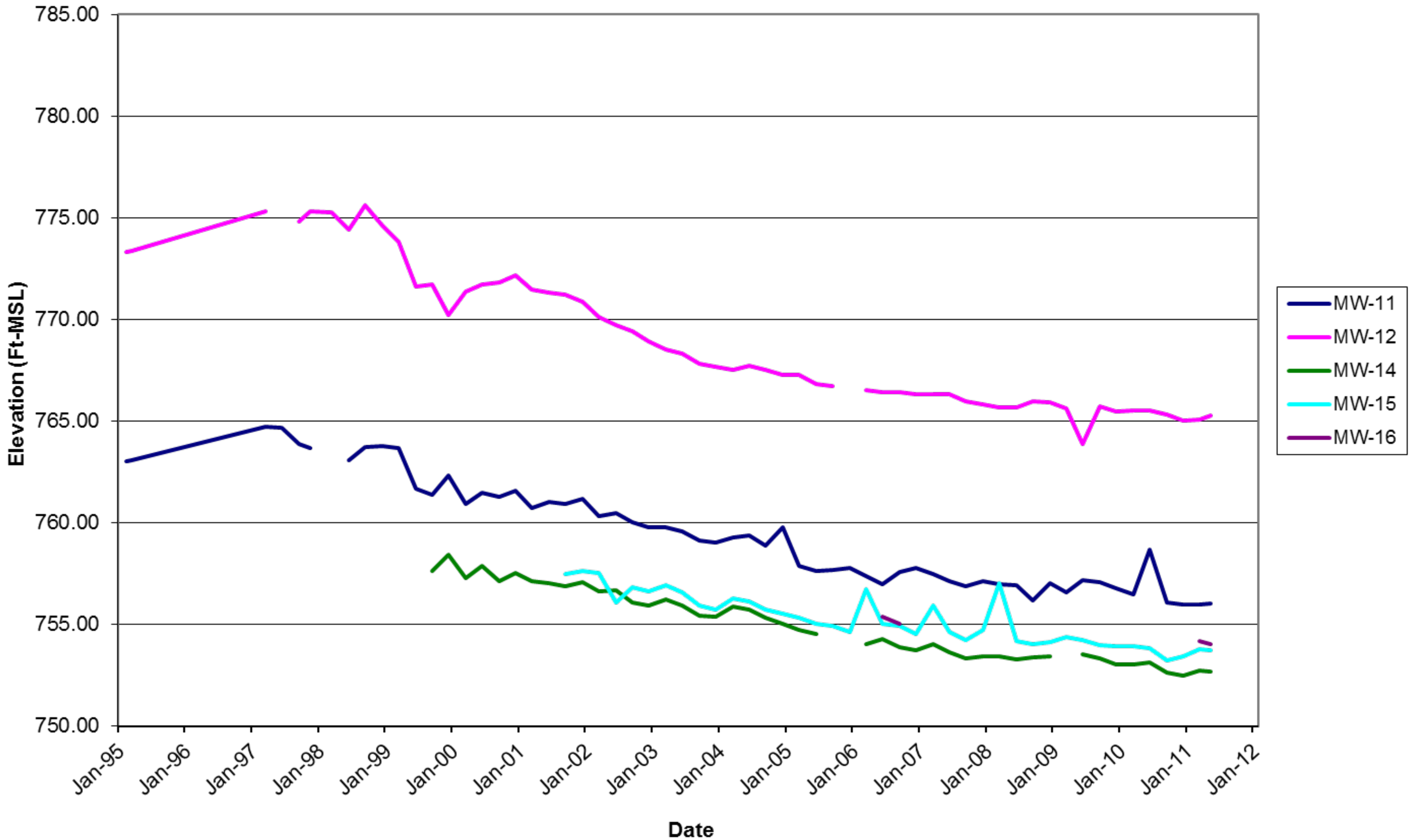
N

Remedial Investigation Work Plan
Sudbury Road Landfill
Walla Walla, Washington

Groundwater Elevation Map

Figure
9

Schwyn Environmental Services



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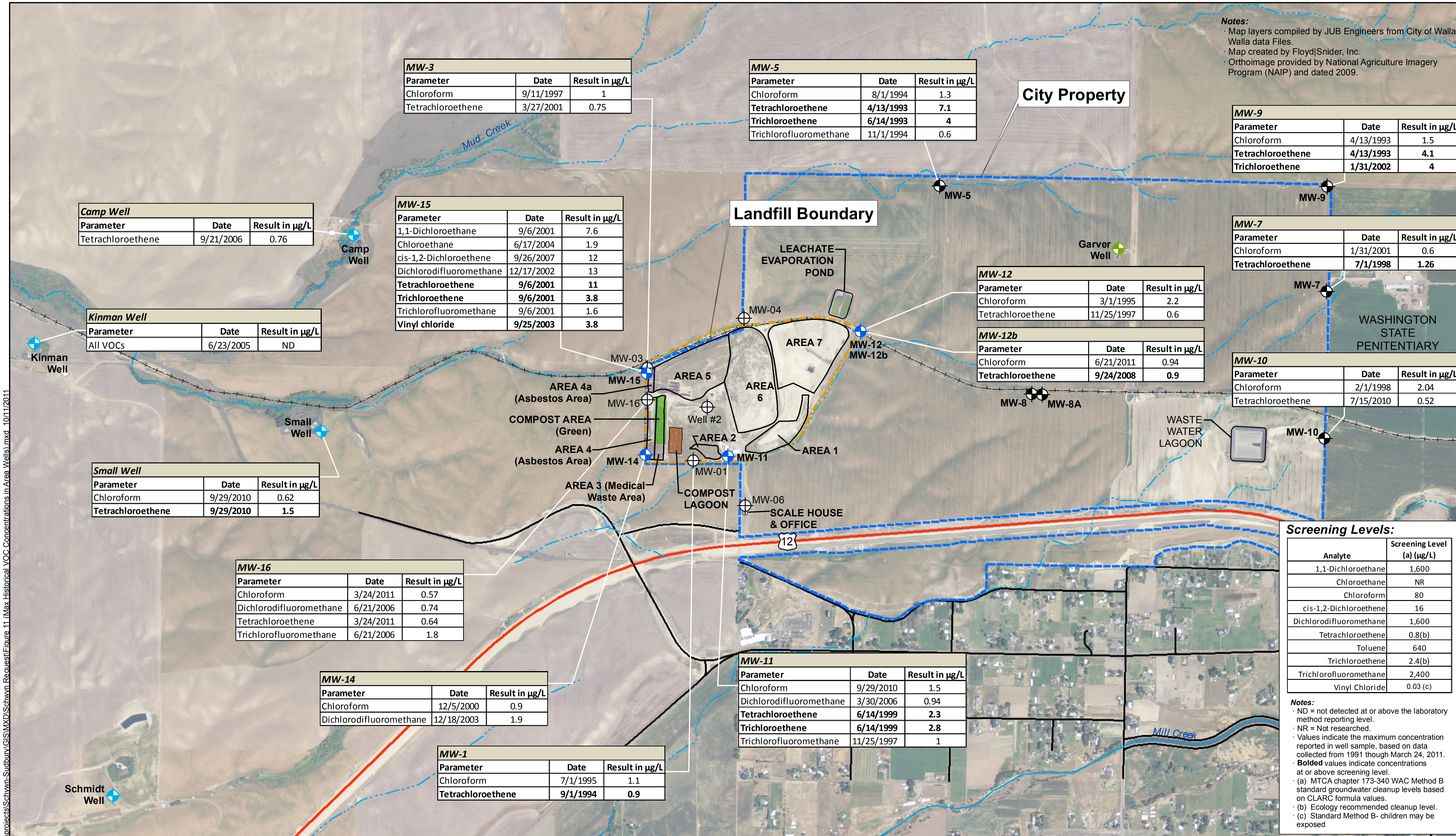
Remedial Investigation Work Plan Sudbury Road Landfill Walla Walla, Washington	**Groundwater Elevation Trend**	Figure 10



MW-3

Parameter	Date	Result in µg/L
Chloroform	9/11/1997	1
Tetrachloroethene	3/27/2001	0.75

MW-5

Parameter	Date	Result in µg/L
Chloroform	8/1/1994	1.3
Tetrachloroethene	**4/13/1993**	**7.1**
Trichloroethene	**6/14/1993**	**4**
Trichlorofluoromethane	11/1/1994	0.6

MW-9

Parameter	Date	Result in µg/L
Chloroform	4/13/1993	1.5
Tetrachloroethene	**4/13/1993**	**4.1**
Trichloroethene	**1/31/2002**	**4**

Camp Well

Parameter	Date	Result in µg/L
Tetrachloroethene	9/21/2006	0.76

MW-15

Parameter	Date	Result in µg/L
1,1-Dichloroethane	9/6/2001	7.6
Chloroethane	6/17/2004	1.9
cis-1,2-Dichloroethene	9/26/2007	12
Dichlorodifluoromethane	12/17/2002	13
Tetrachloroethene	**9/6/2001**	**11**
Trichloroethene	**9/6/2001**	**3.8**
Trichlorofluoromethane	9/6/2001	1.6
Vinyl chloride	**9/25/2003**	**3.8**

MW-7

Parameter	Date	Result in µg/L
Chloroform	1/31/2001	0.6
Tetrachloroethene	**7/1/1998**	**1.26**

MW-12

Parameter	Date	Result in µg/L
Chloroform	3/1/1995	2.2
Tetrachloroethene	11/25/1997	0.6

Kinman Well

Parameter	Date	Result in µg/L
All VOCs	6/23/2005	ND

MW-12b

Parameter	Date	Result in µg/L
Chloroform	6/21/2011	0.94
Tetrachloroethene	**9/24/2008**	**0.9**

MW-10

Parameter	Date	Result in µg/L
Chloroform	2/1/1998	2.04
Tetrachloroethene	7/15/2010	0.52

Small Well

Parameter	Date	Result in µg/L
Chloroform	9/29/2010	0.62
Tetrachloroethene	**9/29/2010**	**1.5**

MW-16

Parameter	Date	Result in µg/L
Chloroform	3/24/2011	0.57
Dichlorodifluoromethane	6/21/2006	0.74
Tetrachloroethene	3/24/2011	0.64
Trichlorofluoromethane	6/21/2006	1.8

MW-11

Parameter	Date	Result in µg/L
Chloroform	9/29/2010	1.5
Dichlorodifluoromethane	3/30/2006	0.94
Tetrachloroethene	**6/14/1999**	**2.3**
Trichloroethene	**6/14/1999**	**2.8**
Trichlorofluoromethane	11/25/1997	1

MW-14

Parameter	Date	Result in µg/L
Chloroform	12/5/2000	0.9
Dichlorodifluoromethane	12/18/2003	1.9

MW-1

Parameter	Date	Result in µg/L
Chloroform	7/1/1995	1.1
Tetrachloroethene	**9/1/1994**	**0.9**

Screening Levels:

Analyte	Screening Level (a) (µg/L)
1,1-Dichloroethane	1,600
Chloroethane	NR
Chloroform	80
cis-1,2-Dichloroethene	16
Dichlorodifluoromethane	1,600
Tetrachloroethene	0.8(b)
Toluene	640
Trichloroethene	2.4(b)
Trichlorofluoromethane	2,400
Vinyl Chloride	0.03 (c)

Notes:
- ND = not detected at or above the laboratory method reporting level.
- NR = Not researched.
- Values indicate the maximum concentration reported in well sample, based on data collected from 1991 though March 24, 2011.
- **Bolded** values indicate concentrations at or above screening level.
- (a) MTCA chapter 173-340 WAC Method B standard groundwater cleanup levels based on CLARC formula values.
- (b) Ecology recommended cleanup level.
- (c) Standard Method B- children may be exposed

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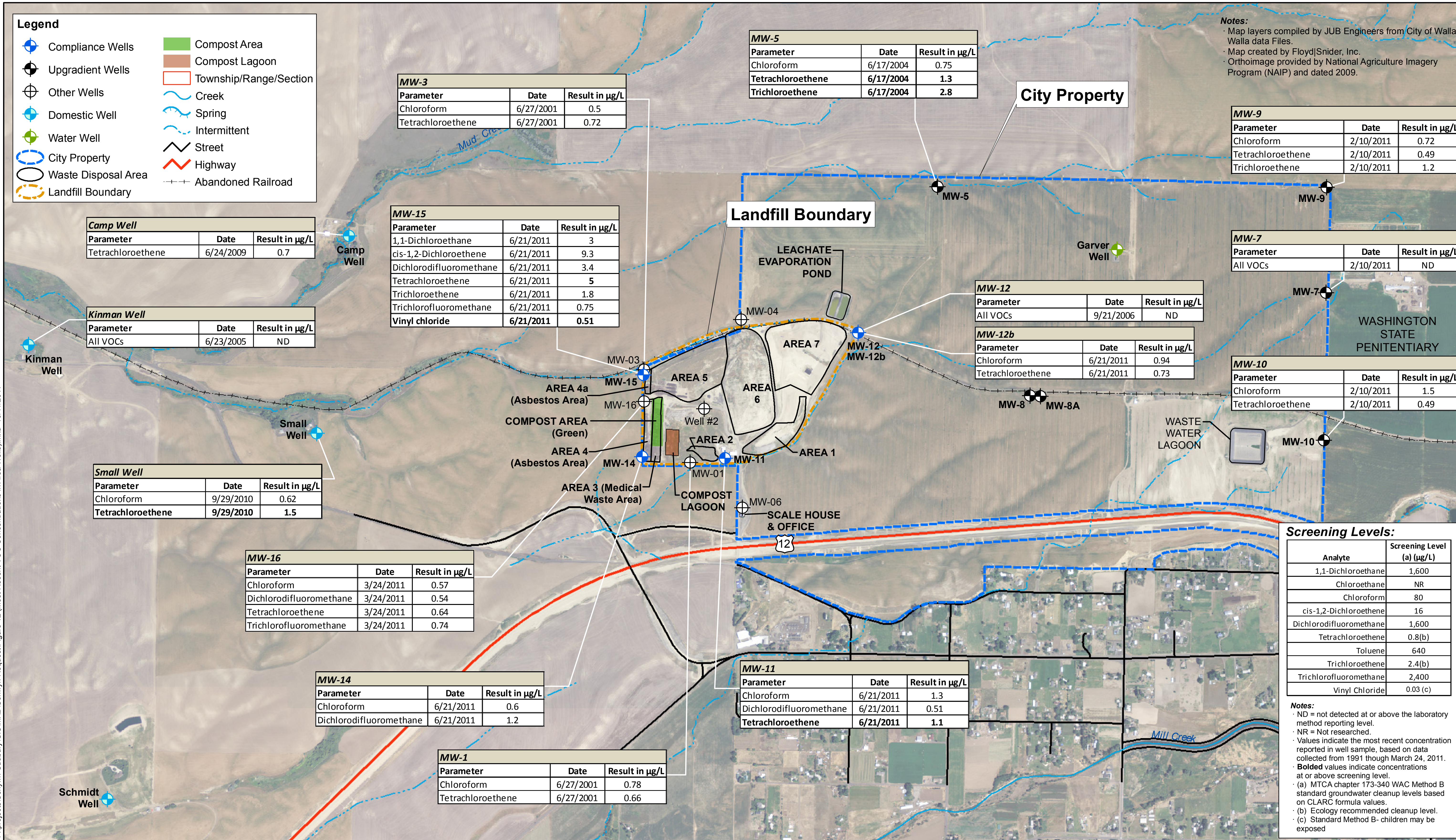
0 500 1,000 2,000
Scale in Feet

N

Remedial Investigation Work Plan
Sudbury Road Landfill
Walla Walla, Washington

Maximum Historical VOC Concentrations in Area Wells

Figure 11



Notes:

- Map layers compiled by JUB Engineers from City of Walla Walla data Files.
- Map created by Floyd|Snider, Inc.
- Orthoimage provided by National Agriculture Imagery Program (NAIP) and dated 2009.

MW-5

Parameter	Date	Result in µg/L
Chloroform	6/17/2004	0.75
Tetrachloroethene	**6/17/2004**	**1.3**
Trichloroethene	**6/17/2004**	**2.8**

MW-3

Parameter	Date	Result in µg/L
Chloroform	6/27/2001	0.5
Tetrachloroethene	6/27/2001	0.72

MW-9

Parameter	Date	Result in µg/L
Chloroform	2/10/2011	0.72
Tetrachloroethene	2/10/2011	0.49
Trichloroethene	2/10/2011	1.2

Camp Well

Parameter	Date	Result in µg/L
Tetrachloroethene	6/24/2009	0.7

MW-15

Parameter	Date	Result in µg/L
1,1-Dichloroethane	6/21/2011	3
cis-1,2-Dichloroethene	6/21/2011	9.3
Dichlorodifluoromethane	6/21/2011	3.4
Tetrachloroethene	**6/21/2011**	**5**
Trichloroethene	6/21/2011	1.8
Trichlorofluoromethane	6/21/2011	0.75
Vinyl chloride	**6/21/2011**	**0.51**

MW-7

Parameter	Date	Result in µg/L
All VOCs	2/10/2011	ND

MW-12

Parameter	Date	Result in µg/L
All VOCs	9/21/2006	ND

Kinman Well

Parameter	Date	Result in µg/L
All VOCs	6/23/2005	ND

MW-12b

Parameter	Date	Result in µg/L
Chloroform	6/21/2011	0.94
Tetrachloroethene	6/21/2011	0.73

MW-10

Parameter	Date	Result in µg/L
Chloroform	2/10/2011	1.5
Tetrachloroethene	2/10/2011	0.49

Small Well

Parameter	Date	Result in µg/L
Chloroform	9/29/2010	0.62
Tetrachloroethene	**9/29/2010**	**1.5**

Screening Levels:

Analyte	Screening Level (a) (µg/L)
1,1-Dichloroethane	1,600
Chloroethane	NR
Chloroform	80
cis-1,2-Dichloroethene	16
Dichlorodifluoromethane	1,600
Tetrachloroethene	0.8(b)
Toluene	640
Trichloroethene	2.4(b)
Trichlorofluoromethane	2,400
Vinyl Chloride	0.03 (c)

MW-16

Parameter	Date	Result in µg/L
Chloroform	3/24/2011	0.57
Dichlorodifluoromethane	3/24/2011	0.54
Tetrachloroethene	3/24/2011	0.64
Trichlorofluoromethane	3/24/2011	0.74

MW-11

Parameter	Date	Result in µg/L
Chloroform	6/21/2011	1.3
Dichlorodifluoromethane	6/21/2011	0.51
Tetrachloroethene	**6/21/2011**	**1.1**

MW-14

Parameter	Date	Result in µg/L
Chloroform	6/21/2011	0.6
Dichlorodifluoromethane	6/21/2011	1.2

MW-1

Parameter	Date	Result in µg/L
Chloroform	6/27/2001	0.78
Tetrachloroethene	6/27/2001	0.66

Notes:

- ND = not detected at or above the laboratory method reporting level.
- NR = Not researched.
- Values indicate the most recent concentration reported in well sample, based on data collected from 1991 though March 24, 2011.
- **Bolded** values indicate concentrations at or above screening level.
- (a) MTCA chapter 173-340 WAC Method B standard groundwater cleanup levels based on CLARC formula values.
- (b) Ecology recommended cleanup level.
- (c) Standard Method B- children may be exposed

F:\projects\Schywn-Sudbury\GIS\MXD\Schwyn Request\Figure 12 (Most-Recent VOC Concentrations in Area Wells).mxd 10/11/2011

Schwyn Environmental Services

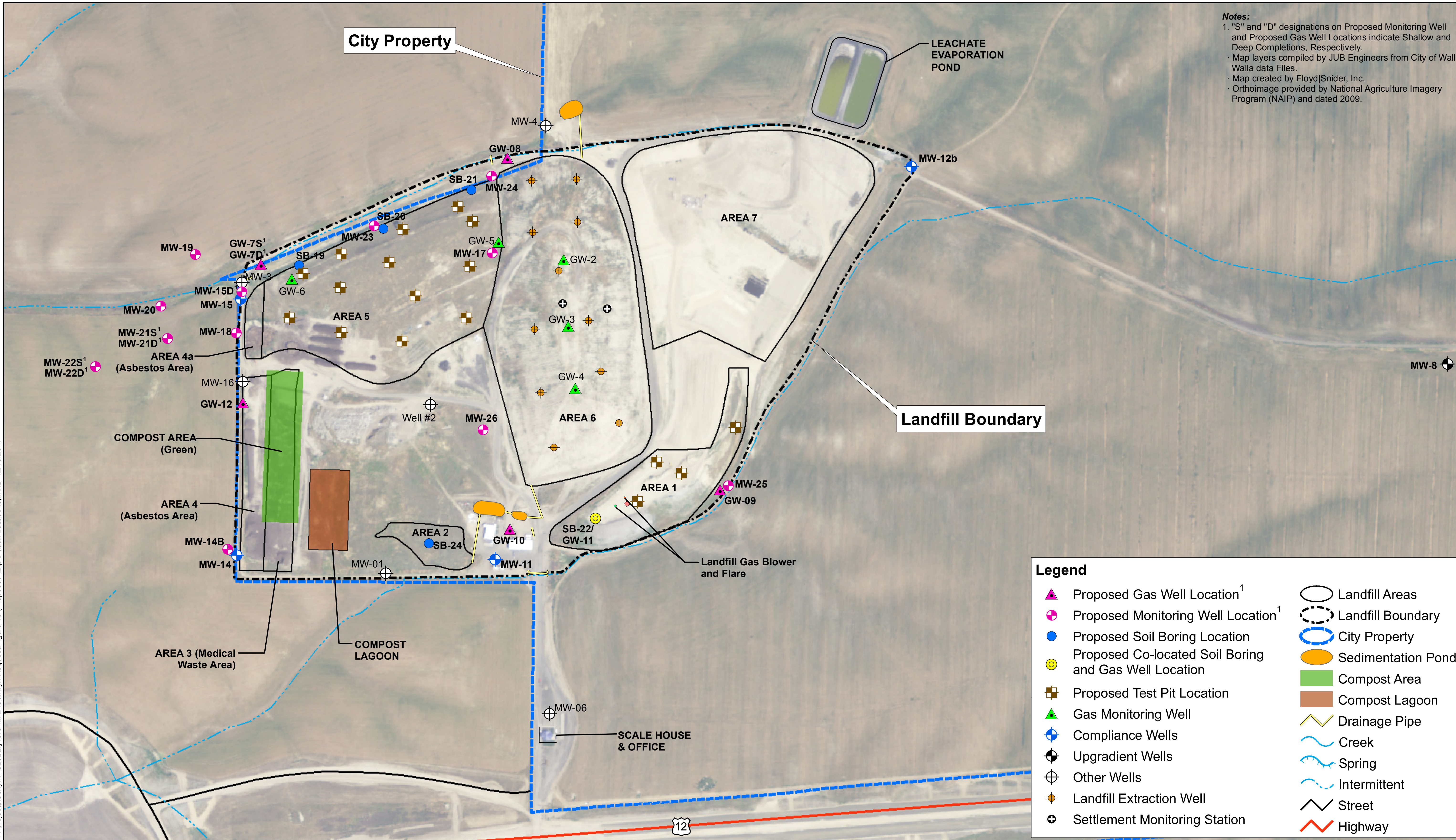
0 500 1,000 2,000
Scale in Feet
1:15,000

N

Remedial Investigation Work Plan
Sudbury Road Landfill
Walla Walla, Washington

Most-recent VOC Concentrations in Area Wells

Figure 12



Schwyn Environmental Services

0 200 400 800
Scale in Feet
1:4,800

N

Remedial Investigation Work Plan
Sudbury Road Landfill
Walla Walla, Washington

Proposed Exploration Locations

Figure 13

F:\projects\Schwyn-Sudbury\GIS\MXD\Schwyn Request\Figure 13 (Proposed Exploration Locations).mxd 12/15/2011

TABLE 1
WELL CONSTRUCTION SUMMARY
City of Walla Walla Sudbury Road Landfill

Well	Date Drilled	Well Elevation Ground (Ft Above MSL)	Well Elevation TOC (Ft Above MSL)	Depth Drilled (Ft-BGL)	Casing Diameter (Inches)	Screen Type	Screen Depth Top (Ft-BGL)	Screen Depth Bottom (Ft-BGL)	Screen Elevation Top (Ft Above MSL)	Screen Elevation Bottom (Ft Above MSL)	Purpose	Comments
MW-1A	11/15/1976	784.0		65	5	Perforated Steel	25	65	759.0	719.0	DG Landfill MW	Abandoned 1986
MW-1	8/26/1986	786.0	788.88	121	2	0.01 slot S.S.	108	118	678.0	668.0	DG Landfill MW	
MW-2	12/1/1976	800.0		155	5	Perforated Steel	80	155	720.0	645.0	Water Supply	
MW-3A	11/14/1976	782.0		80	5	Perforated Steel	25	80	757.0	702.0	DG Landfill MW	Abandoned 1986
MW-3	9/18/1986	785.8	788.53	121	2	0.01 slot S.S.	108	118	677.8	667.8	DG Landfill MW	
MW-4	8/1/1983	800.4	803.91	71	5	Perforated Steel	51	71	749.4	729.4	DG Sprayfarm MW	
MW-5	9/8/1983	820.4	823.87	82	5	Perforated Steel	62	82	758.4	738.4	DG Sprayfarm MW	
MW-6	8/18/1986	830.3	831.70	151	2	0.01 slot S.S.	138	148	692.3	682.3	UG Landfill MW	Abandoned
MW-7	10/1/1986	883.1	884.89	181	2	0.01 slot S.S.	168	178	715.1	705.1	UG Sprayfarm MW	
MW-8	10/10/1989	845.5	848.14	220	5	0.02 slot PVC	90	105	755.5	740.5	DG Sprayfarm MW	Two Screens
MW-8 cont.						0.02 slot PVC	115	130	730.5	715.5		
MW-8A	10/30/1991	845.5	847.42	95	2	0.01 slot S.S.	63	78	782.5	767.5	Replace MW-8	
MW-9	9/20/1991	898.7	901.44	210	5	0.01 slot PVC	63	83	835.7	815.7	UG Sprayfarm MW	
MW-10	12/27/1993	867.4	869.81	47	2	0.01 slot PVC	29.4	44.7	838.0	822.7	UG Sprayfarm MW	
MW-11	2/10/1995	791.7	794.75	41	2	0.01 slot PVC	25.5	40.5	766.2	751.2	DG Landfill MW	
MW-12	2/9/1995	823.5	826.33	62	2	0.01 slot PVC	46.5	61.5	777.0	762.0	UG Landfill MW	Decommissioned 2008
MW-12b	8/28/2008	825.4	828.16	80.5	2	0.01 slot PVC	60	80	765.4	745.4	Replace MW-12	
MW-14	8/12/1999	830.5	833.23	82	2	0.01 slot PVC	66	82	764.5	748.5	DG Landfill MW	
MW-15	7/17/2001	787.0	789.93	46.5	2	0.01 slot PVC	28	43	759.0	744.0	DG Landfill MW	
MW-16	8/31/2005	810.9	813.39	69	2	0.01 slot PVC	54	69	756.9	741.9	DG Landfill MW	
Garver	12/8/1967	870		1227	10	?	?	?			Water Supply	
GW-5	8/6/2009	841.1		48.5	0.5	0.03 slot Sch 80 PVC	25	30	816.1	811.1	Landfill Gas MW	
GW-6	8/6/2009	798.3		39	0.5	0.03 slot Sch 80 PVC	20	25	778.3	773.3	Landfill Gas MW	

Notes:

TOC = Top of casing
Ft Above MSL = Feet above mean sea level
Ft-BGL = Feet below ground level
S.S. = Stainless steel

DG = Downgradient
UG = Upgradient
MW = Groundwater Monitoring well
GW = Gas Monitoring Well

TABLE 2
SOIL ANALYTICAL DATA
INDEPENDENT REMEDIAL INVESTIGATION
City of Walla Walla Sudbury Road Landfill

Exploration	Date Sampled	Matrix	1,1-Dichloroethane (mg/kg)	Chloroethane (mg/kg)	Chloroform (mg/kg)	cis-1,2-Dichloroethene (mg/kg)	Dichlorodifluoromethane (mg/kg)	Tetrachloroethene (mg/kg)	Trichloroethene (mg/kg)	Trichlorofluoromethane (mg/kg)	Vinyl Chloride (mg/kg)
GP-3-21.5-22	7/6/2005	Soil	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030 U	0.030 U	0.10 U	0.10 U
GP-4-18-18.5	7/6/2005	Soil	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030 U	0.030 U	0.10 U	0.10 U
GP-6-15-15.5	7/6/2005	Soil	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030 U	0.030 U	0.10 U	0.10 U
B-9RI-35'	8/29/2005	Soil	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030 U	0.030 U	0.10 U	0.10 U
B-10RI-34'	8/30/2005	Soil	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030 U	0.030 U	0.10 U	0.10 U
B-11RI-34'	8/30/2005	Soil	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030 U	0.030 U	0.10 U	0.10 U
B-12RI-44'	8/30/2005	Soil	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.030 U	0.030 U	0.10 U	0.10 U

Notes
Samples collected from temporary Geoprobe well points.
Only volatile organic compounds detected on a regular basis in the landfill area groundwater are presented on table.
U = analyte not detected at or above the indicated laboratory reporting level.
mg/kg = milligrams per kilogram.

TABLE 3
GROUNDWATER ANALYTICAL DATA
INDEPENDENT REMEDIAL INVESTIGATION
City of Walla Walla Sudbury Road Landfill

Exploration	Date Sampled	Matrix	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	cis-1,2-Dichloroethene (µg/L)	Dichlorodifluoromethane (µg/L)	p-Isopropyltoluene (µg/L)	Tetrachloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Trichloroethene (µg/L)	Vinyl Chloride (µg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Nitrate-Nitrogen (mg/L)	Sulfate (mg/L)	Alkalinity (mg/L)
GP-3	7/6/2005	Water	12.0	1.0 U	1.0 U	1.59	1.0 U	24.5	31.0	1.0 U	1.0 U	2.08	1.88	0.603									
GP-4	7/6/2005	Water	19.0	4.51	6.2	2.43	1.0 U	62.8	9.57	1.0 U	6.21	1.0 U	9.97	3.76									
GP-5	7/6/2005	Water	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.58	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	248	42.2	156	43.7	878	214	12.7	52.4	
GP-6	7/7/2005	Water	1.47	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	3.10	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	399	68.6	246	46.9	933	199	12.6	38.6	
GP-8	7/7/2005	Water	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U									
B-9RI	8/29/2005	Water	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U									
B-17RI	9/1/2005	Water	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U									
MW-16	9/1/2005	Water	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.6	1.0 U	1.0 U	1.0 U	1.0 U	213	17.2		21.8		185	11.6	45.1	541
MW-16	6/21/2006	Water	0.5 U	1.0 U	1.0 U	0.5 U	0.54	0.5 U	0.74		1.0 U	1.8	0.5 U	0.5 U	213	7.80	51.9	23.6	618	130	9.5	42.6	256
MW-16	9/21/2006	Water	0.5 U	1.0 U	1.0 U	0.5 U	0.5 U	0.5 U	0.63		1.0 U	1.4	0.5 U	0.5 U	213	7.97	51.8	23.5	671	163	9.9	42.1	262
MW-16	3/24/2011	Water	0.5 U	1.0 U	1.0 U	0.5 U	0.57	0.5 U	0.54		1.0 U	0.74	0.5 U	0.5 U	213								

Notes
Samples collected from temporary Geoprobe well points.
Only volatile organic compounds historically detected on a regular basis in the landfill area are presented on table. Sampling methods for VOC may bias analytical results low.
Blank space indicates no analysis for that particular analyte.
U = analyte not detected at or above the indicated laboratory reporting level.
µg/L = micrograms per liter.
mg/L = milligrams per liter.

TABLE 4
LANDFILL GAS DATA
INDEPENDENT REMEDIAL INVESTIGATION
City of Walla Walla Sudbury Road Landfill

Sample Location	**MW-14**	**MW-15**		**MW-16**		**GW-5**		**GW-6**	
Field Measurements	**(Percent)**	**(Percent)**		**(Percent)**		**(Percent)**		**(Percent)**	
Methane	0.0	0.9		0.0		61.40		53.60	
Carbon Dioxide	0.0	13.9		0.0		39.60		35.00	
Oxygen	16.6	2.7		15.4		0.20		0.00	
EPA Method 25 C Analyte	**(ppmV)**	**(ppmV)**		**(ppmV)**		**(ppmV)**		**(ppmV)**	
Total Gaseous Nonmethane Organics as Hexane						150		70	
EPA TO-15 Analyte	**No Analysis**	**(µg/m³)**	**(ppbV)**	**(µg/m³)**	**(ppbV)**	**(µg/m³)**	**(ppbV)**	**(µg/m³)**	**(ppbV)**
Propene						430 U	250 U	13,000	7,600
Dichlorodifluoromethane (CFC 12)		650 M	130 M	150	29	430 U	88 U	7,900	1,600
Chloromethane		6.7 U	3.2 U	5.0 U	2.4 U	430 U	210 U	150	74
1,2-Dichloro-1,1,2,2-tetrafluoroethane						430 U	62 U	1,600	230
Vinyl Chloride		220	87	5.0 U	2.0 U	430 U	170 U	2,200	870
Chloroethane		36	14	5.0 U	1.9 U	430 U	160 U	970	370
Ethanol						10,000	5,300	6,600	3,500
Trichlorofluoromethane		6.7 U	1.2 U	16	2.9	430 U	77 U	160	29
2-Propanol (Isopropyl Alcohol)						5,100	2,100	1,300	530
1,1-Dichloroethene		8.8	2.2	5.0 U	1.3 U	430 U	110 U	220	55
Methylene Chloride		55	16	46	13	1,100	310	2,300	670
Carbon Disulfide		20	6.5	15	4.7	430 U	140 U	130 U	42 U
trans-1,2-Dichloroethene		6.7 U	1.7 U	5.0 U	1.3 U	430 U	110 U	260	67
1,1-Dichloroethane		99	24	5.0 U	1.2 U	430 U	110 U	470	120
2-Butanone (MEK)		6.7 U	2.3 U	5.0 U	1.7 U	3,000	1,000	990	330
cis-1,2-Dichloroethene		65	16	5.0 U	1.3 U	11,000	2,700	19,000	4,700
Ethyl Acetate						870 U	240 U	1,200	350
n-Hexane						1,900	530	5,800	1,700
Chloroform		6.7 U	1.4 U	5.0 U	1.0 U	430 U	89 U	130 U	27 U
Tetrahydrofuran (THF)						790	270	580	200
Benzene		6.7 U	2.1 U	5.0 U	1.6 U	940	290	1,700	540
Cyclohexane						1,600	450	5,300	1,500
1,2-Dichloropropane		12	2.5	5.0 U	1.10 U	430 U	94 U	130 U	28 U
Trichloroethene		190	36	20	3.8	2,000	380	3,200	600
n-Heptane						8,800	2,100	14,000	3,500
4-Methyl-2-pentanone		6.7 U	1.6 U	5.0 U	1.20 U	920	230	1,100	260
Toluene		28	7.4	23	6.0	52,000	14,000	26,000	6,900
n-Butyl Acetate						430 U	91 U	390	82
n-Octane						7,200	1,500	8,000	1,700
Tetrachloroethene		550	82	5.0 U	0.74 U	4,000	590	9,900	1,500
Ethylbenzene		6.7 U	1.5 U	6.5	1.5	6,400	1,500	3,900	910
m,p-Xylenes		24	5.4	23	5.4	15,000	3,500	8,200	1,900
Styrene		12	2.7	14	3.4	430 U	100 U	230	55
o-Xylene		8.0	1.9	6.1	1.4	3,300	760	2,400	550
n-Nonane						4,700	890	4,900	940
Cumene						430 U	88 U	250	50
alpha-Pinene						8,300	1,500	8,400	1,500
n-Propylbenzene						430 U	88 U	200	41
4-Ethyltoluene						430 U	88 U	220	44
1,3,5-Trimethylbenzene						450	92	230	47
1,2,4-Trimethylbenzene						970	200	420	86
d-Limonene						2,300	420	8,300	1,500

TABLE 4
LANDFILL GAS DATA
INDEPENDENT REMEDIAL INVESTIGATION
City of Walla Walla Sudbury Road Landfill

Notes:
MW-14, MW-15, and MW-16 gas samples collected on August 9, 2006 using a Landtech Gem 500 and tedlar bag.
GW-5 and GW-6 samples collected on August 12, 2009, using Lantec GA-90 and 6-liter Summa Canister.
Samples analyzed by Columbia Analytical Services by EPA Methods 25C and TO-15.
Blank indicates no analysis for particular analyte.
U = Compound was analyzed for, but not detected above the laboratory reporting limit.
M = Laboratory reported matrix interference. Result may be biased high.
Only detected analytes in one or more of the samples are reported on table.

TABLE 5
STATISTICAL SUMMARY OF GROUNDWATER VOC DATA
City of Walla Walla Sudbury Road Landfill

Constituent Name	Well	N	Mean	Standard Deviation	Standard Error	Median	Lower Quartile	Upper Quartile	Min.	Max.	% Non-Detects
1,1-Dichloroethane (ug/L)	MW05 (bg)	24	0.36	0.13	0.03	0.25	0.25	0.50	0.25	0.5	100
1,1-Dichloroethane (ug/L)	MW07 (bg)	4	0.21	0.08	0.04	0.25	0.18	0.25	0.1	0.25	100
1,1-Dichloroethane (ug/L)	MW09 (bg)	9	0.23	0.05	0.02	0.25	0.25	0.25	0.1	0.25	100
1,1-Dichloroethane (ug/L)	MW10 (bg)	4	0.21	0.08	0.04	0.25	0.18	0.25	0.1	0.25	100
1,1-Dichloroethane (ug/L)	MW12 (bg)	56	0.33	0.12	0.02	0.25	0.25	0.50	0.25	0.5	100
1,1-Dichloroethane (ug/L)	MW01	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
1,1-Dichloroethane (ug/L)	MW11	66	0.33	0.12	0.01	0.25	0.25	0.50	0.25	0.5	100
1,1-Dichloroethane (ug/L)	MW14	46	0.28	0.09	0.01	0.25	0.25	0.25	0.25	0.5	100
1,1-Dichloroethane (ug/L)	MW15	39	4.45	1.23	0.20	4.50	3.30	5.50	2.4	7.6	0
1,1-Dichloroethane (ug/L)	MW16	4	0.31	0.13	0.06	0.25	0.25	0.38	0.25	0.5	100
1,1-Dichloroethane (ug/L)	Camp	5	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
1,1-Dichloroethane (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
1,1-Dichloroethane (ug/L)	Small	10	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Chloroethane (ug/L)	MW05 (bg)	28	0.38	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Chloroethane (ug/L)	MW07 (bg)	4	0.31	0.13	0.06	0.25	0.25	0.38	0.25	0.5	100
Chloroethane (ug/L)	MW09 (bg)	9	0.42	0.13	0.04	0.50	0.25	0.50	0.25	0.5	100
Chloroethane (ug/L)	MW10 (bg)	4	0.31	0.13	0.06	0.25	0.25	0.38	0.25	0.5	100
Chloroethane (ug/L)	MW12 (bg)	56	0.33	0.12	0.02	0.25	0.25	0.50	0.25	0.5	100
Chloroethane (ug/L)	MW01	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Chloroethane (ug/L)	MW03	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Chloroethane (ug/L)	MW11	66	0.33	0.12	0.01	0.25	0.25	0.50	0.25	0.5	100
Chloroethane (ug/L)	MW14	46	0.28	0.09	0.01	0.25	0.25	0.25	0.25	0.5	100
Chloroethane (ug/L)	MW15	39	0.76	0.49	0.08	0.69	0.25	1.20	0.25	1.9	35.9
Chloroethane (ug/L)	MW16	4	0.31	0.13	0.06	0.25	0.25	0.38	0.25	0.5	100
Chloroethane (ug/L)	Camp	5	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Chloroethane (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Chloroethane (ug/L)	Small	10	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Chloroform (ug/L)	MW05 (bg)	24	0.72	0.22	0.05	0.73	0.50	0.89	0.5	1.3	41.67
Chloroform (ug/L)	MW07 (bg)	5	0.29	0.19	0.08	0.25	0.18	0.43	0.1	0.6	80
Chloroform (ug/L)	MW09 (bg)	11	0.85	0.48	0.14	0.87	0.25	1.30	0.1	1.5	27.27
Chloroform (ug/L)	MW10 (bg)	6	1.61	0.28	0.11	1.60	1.35	1.87	1.2	2.04	0
Chloroform (ug/L)	MW12 (bg)	56	0.59	0.26	0.04	0.51	0.50	0.61	0.25	2.2	41.07
Chloroform (ug/L)	MW01	29	0.66	0.23	0.04	0.50	0.50	0.90	0.25	1.1	58.62
Chloroform (ug/L)	MW03	29	0.54	0.12	0.02	0.50	0.50	0.60	0.25	1	58.62
Chloroform (ug/L)	MW11	66	1.02	0.26	0.03	1.10	0.98	1.20	0.5	1.5	16.67
Chloroform (ug/L)	MW14	46	0.55	0.20	0.03	0.56	0.38	0.73	0.25	0.9	39.13
Chloroform (ug/L)	MW15	39	0.26	0.06	0.01	0.25	0.25	0.25	0.25	0.5	100
Chloroform (ug/L)	MW16	4	0.47	0.15	0.07	0.52	0.38	0.56	0.25	0.57	50
Chloroform (ug/L)	Camp	5	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Chloroform (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Chloroform (ug/L)	Small	10	0.46	0.15	0.05	0.52	0.25	0.56	0.25	0.62	30

TABLE 5
STATISTICAL SUMMARY OF GROUNDWATER VOC DATA
City of Walla Walla Sudbury Road Landfill

Constituent Name	Well	N	Mean	Standard Deviation	Standard Error	Median	Lower Quartile	Upper Quartile	Min.	Max.	% Non-Detects
cis-1,2-Dichloroethene (ug/L)	MW05 (bg)	24	0.36	0.13	0.03	0.25	0.25	0.50	0.25	0.5	100
cis-1,2-Dichloroethene (ug/L)	MW07 (bg)	4	0.21	0.08	0.04	0.25	0.18	0.25	0.1	0.25	100
cis-1,2-Dichloroethene (ug/L)	MW09 (bg)	9	0.23	0.05	0.02	0.25	0.25	0.25	0.1	0.25	100
cis-1,2-Dichloroethene (ug/L)	MW10 (bg)	4	0.21	0.08	0.04	0.25	0.18	0.25	0.1	0.25	100
cis-1,2-Dichloroethene (ug/L)	MW12 (bg)	56	0.33	0.12	0.02	0.25	0.25	0.50	0.25	0.5	100
cis-1,2-Dichloroethene (ug/L)	MW01	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
cis-1,2-Dichloroethene (ug/L)	MW03	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
cis-1,2-Dichloroethene (ug/L)	MW11	66	0.33	0.12	0.01	0.25	0.25	0.50	0.25	0.5	100
cis-1,2-Dichloroethene (ug/L)	MW14	46	0.28	0.09	0.01	0.25	0.25	0.25	0.25	0.5	100
cis-1,2-Dichloroethene (ug/L)	MW15	39	8.44	1.19	0.19	8.40	7.70	8.80	6.5	12	0
cis-1,2-Dichloroethene (ug/L)	MW16	4	0.31	0.13	0.06	0.25	0.25	0.38	0.25	0.5	100
cis-1,2-Dichloroethene (ug/L)	Camp	5	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
cis-1,2-Dichloroethene (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
cis-1,2-Dichloroethene (ug/L)	Small	10	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Dichlorodifluoromethane (ug/L)	MW05 (bg)	1	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Dichlorodifluoromethane (ug/L)	MW07 (bg)	3	0.20	0.09	0.05	0.25	0.10	0.25	0.1	0.25	100
Dichlorodifluoromethane (ug/L)	MW09 (bg)	3	0.20	0.09	0.05	0.25	0.10	0.25	0.1	0.25	100
Dichlorodifluoromethane (ug/L)	MW10 (bg)	3	0.20	0.09	0.05	0.25	0.10	0.25	0.1	0.25	100
Dichlorodifluoromethane (ug/L)	MW12 (bg)	25	0.26	0.05	0.01	0.25	0.25	0.25	0.25	0.5	100
Dichlorodifluoromethane (ug/L)	MW11	35	0.61	0.23	0.04	0.69	0.50	0.80	0.25	0.94	28.57
Dichlorodifluoromethane (ug/L)	MW14	34	0.90	0.46	0.08	0.87	0.53	1.25	0.25	1.9	20.59
Dichlorodifluoromethane (ug/L)	MW15	35	6.19	3.11	0.53	5.30	3.80	9.40	0.285	13	2.857
Dichlorodifluoromethane (ug/L)	MW16	4	0.60	0.11	0.05	0.59	0.52	0.69	0.5	0.74	25
Dichlorodifluoromethane (ug/L)	Camp	5	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Dichlorodifluoromethane (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Dichlorodifluoromethane (ug/L)	Small	10	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Tetrachloroethene (ug/L)	MW05 (bg)	28	3.21	1.59	0.30	3.00	2.00	4.02	0.7	7.1	0
Tetrachloroethene (ug/L)	MW07 (bg)	5	0.42	0.47	0.21	0.25	0.18	0.76	0.1	1.26	80
Tetrachloroethene (ug/L)	MW09 (bg)	11	2.01	1.31	0.40	1.80	0.62	3.10	0.49	4.1	0
Tetrachloroethene (ug/L)	MW10 (bg)	6	0.34	0.13	0.05	0.25	0.25	0.51	0.25	0.52	66.67
Tetrachloroethene (ug/L)	MW12 (bg)	56	0.46	0.17	0.02	0.50	0.25	0.52	0.25	0.9	67.86
Tetrachloroethene (ug/L)	MW01	29	0.61	0.15	0.03	0.50	0.50	0.79	0.5	0.9	58.62
Tetrachloroethene (ug/L)	MW03	29	0.56	0.11	0.02	0.50	0.50	0.70	0.25	0.75	62.07
Tetrachloroethene (ug/L)	MW11	66	0.78	0.28	0.04	0.78	0.50	0.93	0.25	2.3	30.3
Tetrachloroethene (ug/L)	MW14	46	0.28	0.09	0.01	0.25	0.25	0.25	0.25	0.5	100
Tetrachloroethene (ug/L)	MW15	39	6.91	1.83	0.29	6.70	5.50	8.60	4	11	0
Tetrachloroethene (ug/L)	MW16	4	0.48	0.16	0.08	0.51	0.38	0.58	0.25	0.64	50
Tetrachloroethene (ug/L)	Camp	5	0.63	0.22	0.10	0.73	0.46	0.75	0.25	0.76	20
Tetrachloroethene (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Tetrachloroethene (ug/L)	Small	10	1.06	0.33	0.11	1.10	1.00	1.30	0.25	1.5	10

TABLE 5
STATISTICAL SUMMARY OF GROUNDWATER VOC DATA
City of Walla Walla Sudbury Road Landfill

Constituent Name	Well	N	Mean	Standard Deviation	Standard Error	Median	Lower Quartile	Upper Quartile	Min.	Max.	% Non-Detects
Toluene (ug/L)	MW05 (bg)	28	0.36	0.17	0.03	0.25	0.25	0.50	0.25	1	96.43
Toluene (ug/L)	MW07 (bg)	3	0.33	0.14	0.08	0.25	0.25	0.50	0.25	0.5	100
Toluene (ug/L)	MW09 (bg)	3	0.33	0.14	0.08	0.25	0.25	0.50	0.25	0.5	100
Toluene (ug/L)	MW10 (bg)	3	0.33	0.14	0.08	0.25	0.25	0.50	0.25	0.5	100
Toluene (ug/L)	MW12 (bg)	57	0.34	0.14	0.02	0.25	0.25	0.50	0.25	0.97	98.25
Toluene (ug/L)	MW01	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Toluene (ug/L)	MW03	29	0.46	0.36	0.07	0.50	0.25	0.50	0.25	2.2	96.55
Toluene (ug/L)	MW11	66	0.34	0.15	0.02	0.25	0.25	0.50	0.25	1.1	96.97
Toluene (ug/L)	MW14	46	0.29	0.09	0.01	0.25	0.25	0.25	0.25	0.61	97.83
Toluene (ug/L)	MW15	39	0.26	0.07	0.01	0.25	0.25	0.25	0.25	0.68	97.44
Toluene (ug/L)	MW16	4	0.31	0.13	0.06	0.25	0.25	0.38	0.25	0.5	100
Toluene (ug/L)	Camp	5	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Toluene (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Toluene (ug/L)	Small	10	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Trichloroethene (ug/L)	MW05 (bg)	28	2.31	1.04	0.20	2.55	2.00	3.00	0.25	4	14.29
Trichloroethene (ug/L)	MW07 (bg)	5	0.22	0.07	0.03	0.25	0.18	0.25	0.1	0.25	100
Trichloroethene (ug/L)	MW09 (bg)	11	2.09	1.03	0.31	2.30	1.40	2.60	0.25	4	9.091
Trichloroethene (ug/L)	MW10 (bg)	6	0.23	0.06	0.03	0.25	0.18	0.25	0.1	0.25	100
Trichloroethene (ug/L)	MW12 (bg)	56	0.33	0.12	0.02	0.25	0.25	0.50	0.25	0.5	100
Trichloroethene (ug/L)	MW01	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Trichloroethene (ug/L)	MW03	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Trichloroethene (ug/L)	MW11	66	0.36	0.33	0.04	0.25	0.25	0.50	0.25	2.8	98.48
Trichloroethene (ug/L)	MW14	46	0.28	0.09	0.01	0.25	0.25	0.25	0.25	0.5	100
Trichloroethene (ug/L)	MW15	39	2.46	0.65	0.10	2.50	1.90	3.00	1.4	3.8	0
Trichloroethene (ug/L)	MW16	4	0.31	0.13	0.06	0.25	0.25	0.38	0.25	0.5	100
Trichloroethene (ug/L)	Camp	5	0.34	0.20	0.09	0.25	0.25	0.48	0.25	0.7	80
Trichloroethene (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Trichloroethene (ug/L)	Small	10	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100

TABLE 5
STATISTICAL SUMMARY OF GROUNDWATER VOC DATA
City of Walla Walla Sudbury Road Landfill

Constituent Name	Well	N	Mean	Standard Deviation	Standard Error	Median	Lower Quartile	Upper Quartile	Min.	Max.	% Non-Detects
Trichlorofluoromethane (ug/L)	MW05 (bg)	28	0.37	0.14	0.03	0.25	0.25	0.50	0.25	0.6	92.86
Trichlorofluoromethane (ug/L)	MW07 (bg)	4	0.21	0.08	0.04	0.25	0.18	0.25	0.1	0.25	100
Trichlorofluoromethane (ug/L)	MW09 (bg)	9	0.23	0.05	0.02	0.25	0.25	0.25	0.1	0.25	100
Trichlorofluoromethane (ug/L)	MW10 (bg)	4	0.21	0.08	0.04	0.25	0.18	0.25	0.1	0.25	100
Trichlorofluoromethane (ug/L)	MW12 (bg)	56	0.33	0.12	0.02	0.25	0.25	0.50	0.25	0.5	100
Trichlorofluoromethane (ug/L)	MW01	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Trichlorofluoromethane (ug/L)	MW03	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Trichlorofluoromethane (ug/L)	MW11	66	0.36	0.19	0.02	0.25	0.25	0.50	0.25	1	93.94
Trichlorofluoromethane (ug/L)	MW14	46	0.28	0.09	0.01	0.25	0.25	0.25	0.25	0.5	100
Trichlorofluoromethane (ug/L)	MW15	39	1.04	0.24	0.04	1.10	0.92	1.10	0.25	1.6	2.564
Trichlorofluoromethane (ug/L)	MW16	4	1.11	0.60	0.30	1.07	0.62	1.60	0.5	1.8	25
Trichlorofluoromethane (ug/L)	Camp	5	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Trichlorofluoromethane (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Trichlorofluoromethane (ug/L)	Small	10	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Vinyl chloride (ug/L)	MW05 (bg)	28	0.33	0.15	0.03	0.25	0.25	0.50	0.1	0.5	100
Vinyl chloride (ug/L)	MW07 (bg)	4	0.21	0.08	0.04	0.25	0.18	0.25	0.1	0.25	100
Vinyl chloride (ug/L)	MW09 (bg)	9	0.15	0.08	0.03	0.10	0.10	0.25	0.1	0.25	100
Vinyl chloride (ug/L)	MW10 (bg)	4	0.21	0.08	0.04	0.25	0.18	0.25	0.1	0.25	100
Vinyl chloride (ug/L)	MW12 (bg)	56	0.33	0.12	0.02	0.25	0.25	0.50	0.25	0.5	100
Vinyl chloride (ug/L)	MW01	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Vinyl chloride (ug/L)	MW03	29	0.40	0.13	0.02	0.50	0.25	0.50	0.25	0.5	100
Vinyl chloride (ug/L)	MW11	66	0.33	0.12	0.01	0.25	0.25	0.50	0.25	0.5	100
Vinyl chloride (ug/L)	MW14	46	0.28	0.09	0.01	0.25	0.25	0.25	0.25	0.5	100
Vinyl chloride (ug/L)	MW15	39	1.83	0.92	0.15	1.60	0.96	2.40	0.55	3.8	0
Vinyl chloride (ug/L)	MW16	4	0.21	0.08	0.04	0.25	0.18	0.25	0.1	0.25	100
Vinyl chloride (ug/L)	Camp	5	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Vinyl chloride (ug/L)	Kinman	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100
Vinyl chloride (ug/L)	Small	10	0.25	0.00	0.00	0.25	0.25	0.25	0.25	0.25	100

Notes:
Statistics based on data collected from 1991 - March 24, 2011.
Statistics calculated with Sanitas for Groundwater V9.2.
MW-12 data include samples collected from MW-12 and MW-12b.
N = number of samples (sample population).

APPENDIX A

Beneficial Use Information

File Original and First Copy with
Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. ....

Permit No. ....

(1) OWNER: Name Bonneville Power Administration Address P.O. Box 1518, Walla Walla, Wa. 99362

(2) LOCATION OF WELL: County Walla Walla — NW ¼ SW ¼ Sec 23 T 7 N., R 35E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....

New well ☐ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☒ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well .... inches.
Drilled .... ft. Depth of completed well .... ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from 0 ft. to .... ft.
Threaded ☐ .... " Diam. from .... ft. to .... ft.
Welded ☒ .... " Diam. from .... ft. to .... ft.

Perforations: Yes ☐ No ☒
Type of perforator used ....
SIZE of perforations .... in. by .... in.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name ....
Type .... Model No. ....
Diam. .... Slot size .... from .... ft. to .... ft.
Diam. .... Slot size .... from .... ft. to .... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ....
Gravel placed from .... ft. to .... ft.

Surface seal: Yes ☐ No ☒ To what depth? .... ft.
Material used in seal ....
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? .... Depth of strata ....
Method of sealing strata off ....

(7) PUMP: Manufacturer's Name ....
Type: .... H.P. ....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... 450 ft.
Static level 173 ft. below top of well Date 6 Sept 76
Artesian pressure .... lbs. per square inch Date ....
Artesian water is controlled by .... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ....
Yield: .... gal./min. with .... ft. drawdown after .... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

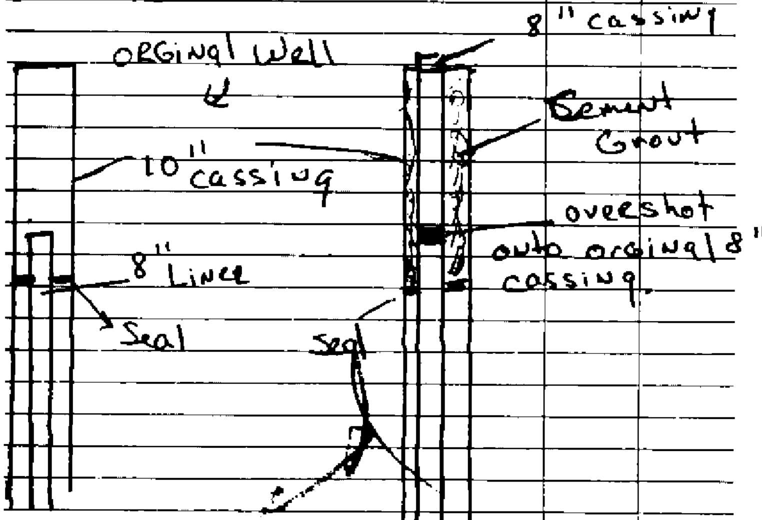
Time	Water Level	Time	Water Level	Time	Water Level

Date of test ....
Bailer test .... gal./min. with .... ft. drawdown after .... hrs.
Artesian flow .... g.p.m. Date ....
Temperature of water .... Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Orginally well was 10" with 8" Liner to Rock 450'. The seal between the 10" cassing & the 8" wasn't holding out some sand that was coming at 185 ft. where the 8" liner was cut off. So we ran 185 ft of 8" cassing with an overshot on the end, onto the orginal 8" cassing & cemented.		



RECEIVED
OCT 5 1976
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 26 Aug 1976. Completed 8 Sept 1976

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Jungmann & Kofler Drilling Co (Person, firm, or corporation) (Type or print)

Address P.O. Box # 474 Walla² Wa 99362

[Signed] Robert Kofler (Well Driller)

License No. 610 Date ...., 19....

10/4/76

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71)
ECY-070-28

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

WATER WELL REPORT

ECOLOGY Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

Construction/Decommission *("x" in circle)*
☒ Construction 124459
○ Decommission *ORIGINAL CONSTRUCTION Notice of Intent Number*

CURRENT Notice of Intent No. W156524

Unique Ecology Well ID Tag No. AHC-288

Water Right Permit No.

Property Owner Name BERT KINMAN

Well Street Address NONE

City County:

Location SW 1/4- 1/4 SW 1/4 Sec 16 Twn 7N R 35 EWM (circle one) or WWM

Lat/Long: (s,t,r still REQUIRED) Lat Deg Lat Min/Sec Long Deg Long Min/Sec

Tax Parcel No.

PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other

TYPE OF WORK: Owner's number of well (if more than one)
☒ New Well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven
☐ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 180 ft.
Depth of completed well 180 ft.

CONSTRUCTION DETAILS
Casing Installed: ☒ Welded 6 " Diam. from +1 ft. to 117 ft.
☒ Liner installed 4 PVC " Diam. from 110 ft. to 180 ft.
☐ Threaded " Diam. from ft. to ft.

Perforations: ☒ Yes ☐ No
Type of perforator used SAW
SIZE of perfs 1/8 in. by 12 in. and no. of perfs 66 from 140 ft. to 180 ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location
Manufacturer's Name
Type Model No.
Diam. Slot Size from ft. to ft.
Diam. Slot Size from ft. to ft.

Gravel/Filter packed: ☐ Yes ☒ No ☐ Size of gravel/sand
Materials placed from ft. to ft.

Surface Seal: ☒ Yes ☐ No To what depth? 18' ft
Materials used in seal BENTONITE
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? Depth of strata
Method of sealing strata off

PUMP: Manufacturer's Name
Type: H.P.

WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 70 ft. below top of well Date 12-2-02
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (cap,valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level.
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Yield: gal./min. with ft. drawdown after hrs.
Yield: gal./min. with ft. drawdown after hrs.
Recovery data (time taken as zero when pump turned off)(water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest 40 gal./min. with stem set at 179 ft. for 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? ☐ Yes ☒ No

CONSTRUCTION OR DECOMMISSION PROCEDURE
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
SOIL (LOESS)	0	67
BROWN CLAY	67	84
PARTIALLY CEMENTED GRAVEL	84	98
HARD BROWN CLAY	98	168
CEMENTED GRAVEL	168	180

RECEIVED DEC 16 2002 ... EASTERN REGIONAL OFFICE

Start Date 11-29-02 Completed Date 12-2-02

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) B.M. VOTH
Driller/Engineer/Trainee Signature BMV
Driller or Trainee License No. 2094

If trainee, licensed driller's Signature and License no.

Drilling Company FIVE STAR DRILLING
Address 36301 Hwy 12
City, State, Zip DAYTON, WA 99328
Contractor's Registration No. FIVESD*077MB Date 12-4-02

Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. W081715
ID# AAS 716
Water Right Permit No. ______

(1) OWNER: Name Mark or Kathleen Small Address Rt. 1, Box 13, Lowden, WA 99360

(2) LOCATION OF WELL: County Walla Walla E½ ¼ Sec 21 T 7N N., R 35E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Sudbury Rd., Walla Walla, WA 99362

(3) PROPOSED USE: ☑ Domestic ☐ Irrigation ☐ DeWater ☐ Industrial ☐ Test Well ☐ Municipal ☐ Other

(4) TYPE OF WORK: Owner's number of well (if more than one) AAS 716
Abandoned ☐ New well ☑ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Bored ☐ Cable ☐ Driven ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 100 feet. Depth of completed well 100 ft.

(6) CONSTRUCTION DETAILS:
Casing Installed: 6 " Diam. from +1 ft. to 95 ft.
Welded ☑ ______ " Diam. from ______ ft. to ______ ft.
Liner installed ☐ ______ " Diam. from ______ ft. to ______ ft.
Threaded ☐

Perforations: Yes ☐ No ☑
Type of perforator used ______
SIZE of perforations ______ in. by ______ in.
______ perforations from ______ ft. to ______ ft.
______ perforations from ______ ft. to ______ ft.
______ perforations from ______ ft. to ______ ft.

Screens: Yes ☐ No ☑
Manufacturer's Name ______
Type ______ Model No. ______
Diam ______ Slot size ______ from ______ ft. to ______ ft.
Diam. ______ Slot size ______ from ______ ft. to ______ ft.

Gravel packed: Yes ☐ No ☑ Size of gravel ______
Gravel placed from ______ ft. to ______ ft.

Surface seal: Yes ☑ No ☐ To what depth? 0 to 25 ft.
Material used in seal 3/8" bentonite, 11 sacks
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ______ Depth of strata ______
Method of sealing strata off ______

(7) PUMP: Manufacturer's Name ______
Type ______ H.P. ______

(8) WATER LEVELS: Land-surface elevation above mean sea level ______ ft.
Static level 41 ft. below top of well Date 2-11-98
Artesian pressure ______ lbs. per square inch Date ______
Artesian water is controlled by ______ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom? ______
Yield ______ gal./min. with ______ ft. drawdown after ______ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ______
Bailer test ______ gal./min. with ______ ft. drawdown after ______ hrs.
Airtest 50 gal./min. with stem set at 100 ft. for 1 hrs.
Artesian flow ______ g.p.m. Date ______
Temperature of water 62° Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Clay	0	68
Gravel	68	100 WB
Hole diameter:		
10" 0 to 25		
6" 25 to 100		

Work started 2-9-98 19. Completed 2-11-98 19.

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Wallace Drilling, Patrick Wallace (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address 1707 SW 18th, Pendleton, OR 97801
(Signed) Patrick Wallace (WELL DRILLER) License No. 1663
Contractor's Registration No. WALLAD-090NR Date 3-2-98, 19.

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20 (10-87)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

40~~X~~69

Application No. ....
Permit No. G3-24731P

(1) OWNER: Name Robin M. and Sharon R. Smith Address 50 Brookside Dr. W.W. Wn.

(2) LOCATION OF WELL: County Walla Walla NW - NW ¼ SW ¼ Sec. 23 T. 7 N., R. 35 W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 192 ft. Depth of completed well 192 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 147 ft.
Threaded ☐ ...... " Diam. from ...... ft. to ...... ft.
Welded ☒ ...... " Diam. from ...... ft. to ...... ft.

Perforations: Yes ☐ No ☒
Type of perforator used ......
SIZE of perforations ...... in. by ...... in.
...... perforations from ...... ft. to ...... ft.
...... perforations from ...... ft. to ...... ft.
...... perforations from ...... ft. to ...... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name ......
Type ...... Model No. ......
Diam. ...... Slot size ...... from ...... ft. to ...... ft.
Diam. ...... Slot size ...... from ...... ft. to ...... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ......
Gravel placed from ...... ft. to ...... ft.

Surface seal: Yes ☒ No ☐ To what depth? ...... ft.
Material used in seal CLAY FROM WELL
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ...... Depth of strata ......
Method of sealing strata off ......

(7) PUMP: Manufacturer's Name ......
Type: ...... H.P. ......

(8) WATER LEVELS: Land-surface elevation above mean sea level ...... ft.
Static level 60 ft. below top of well Date 2/14/76
Artesian pressure ...... lbs. per square inch Date ......
Artesian water is controlled by ...... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ......
Yield: ...... gal./min. with ...... ft. drawdown after ...... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ......
Bailer test 30 gal./min. with 6 ft. drawdown after 1 hrs.
Artesian flow ...... g.p.m. Date ......
Temperature of water ...... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
BROWN TOP SOIL	0	60
BROWN CLAY + GRAVEL	60	90
BLACK SAND	90	125
BROWN CLAY + GRAVEL	125	176
GRAVEL WATERBEARING	176	185
GRAVEL - WITH SOME CLAY (WATERBEARING	185	192

RECEIVED
JUN 25 1976
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 2/3, 1976 Completed 2/19, 1976

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME HARDING DRILLING CO.
(Person, firm, or corporation) (Type or print)

Address RT #3 So 3RD WALLA WALLA WASH

[Signed] Raymond Harding
(Well Driller)

License No. 0174 Date 6/21, 1976

6/24/76

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

270136

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Construction/Decommission *("x" in circle)*

☒ Construction

○ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ____

CURRENT Notice of Intent No. W206289

Unique Ecology Well ID Tag No. APC 699

Water Right Permit No. ____

Property Owner Name ROB SCHMIDT

Well Street Address 4598 W HWY 12

City WALLA WALLA County WALLA WALLA

Location NE 1/4-1/4 NW 1/4 Sec 28 Twn 7N R 35 EWM or WWM (circle one)

Lat/Long (s, t, r Still **REQUIRED**) Lat Deg ____ Lat Min/Sec ____ Long Deg ____ Long Min/Sec ____

Tax Parcel No. 350728110017

PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☒ Irrigation ☐ Test Well ☐ Other ____

TYPE OF WORK: Owner's number of well (if more than one) ____
☒ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 8 inches, drilled 620 ft.
Depth of completed well 620 ft.

CONSTRUCTION DETAILS

Casing Installed: ☒ Welded 10" Diam. from +1 ft. to 59 ft.
☐ Liner installed 8" Diam. from 54 ft. to 405 ft.
☐ Threaded 6" Diam. from 380 ft. to 460 ft.

Perforations: ☐ Yes ☒ No
Type of perforator used ____
SIZE of perfs ____ in. by ____ in. and no. of perfs ____ from ____ ft. to ____ ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location ____
Manufacturer's Name ____
Type ____ Model No. ____
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel/Filter packed: ☐ Yes ☐ No ☐ Size of gravel/sand ____
Materials placed from ____ ft. to ____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 59 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? UPPER ZONE Depth of strata 86-215
Method of sealing strata off CASED

PUMP: Manufacturer's Name ____
Type: ____ H.P. ____

WATER LEVELS: Land-surface elevation above mean sea level ____ ft.
Static level 210 ft. below top of well Date 7/27/07
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom? ____
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time | Water Level | Time | Water Level | Time | Water Level

380 AND

Date of test ____
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Airtest 400 gal./min. with stem set at 620 ft. for 2 hrs.
Artesian flow ____ g.p.m. Date ____
Temperature of water 69° Was a chemical analysis made? ☐ Yes ☒ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
LOESS	0	86
LOOSE GRAVEL	86	135
BROWN CLAY W/GRAVEL	135	154
TAN CLAY W/ SAND	154	194
LOOSE GRAVEL	194	215
BLUE/GRAY CLAY	215	320
GRAY CLAYSTONE W/ BLACK SANDSTONE	320	440
BROWN CLAYSTONE	440	450
BLACK BASALT	450	470
BROWN CLAYSTONE	470	511
GRAY CLAYSTONE	511	519
GRAY BASALT	519	526
HARD GRAY BASALT	526	579
MEDIUM " "	579	589
HARD " "	589	593
GRAY BASALT W/ BLUE CLAYSTONE	593	602
HARD GRAY BASALT	602	620

RECEIVED
AUG 27 2007
DEPARTMENT OF ECOLOGY
EASTERN REGIONAL OFFICE

Start Date 7/9/07 Completed Date 7/27/07

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) BILL MCHAFFIE JR.
Driller/Engineer/Trainee Signature ____
Driller or trainee License No. 2724

If TRAINEE,
Driller's Licensed No. ____
Driller's Signature Bill McHaffie

Drilling Company FIVE STAR DRILLING
Address 36301 HWY 12
City, State, Zip DAYTON, WA 99328
Contractor's Registration No. FIVESD*077MB Date 7/31/07

Ecology is an Equal Opportunity Employer.

ECY 050-1-20 (Rev 3/05)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

270137

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Construction/Decommission *("x" in circle)*
(X) Construction
○ Decommission *ORIGINAL INSTALLATION Notice of Intent Number* ______

CURRENT Notice of Intent No. W206287
Unique Ecology Well ID Tag No. APC700
Water Right Permit No. ______
Property Owner Name ROB SCHMIDT
Well Street Address 4598 W. HWY 12
City WALLAWALLA County WALLA WALLA
Location NE1/4-1/4 NW1/4 Sec 28 Twn 7N R35 (EWM) or WWM circle one
Lat/Long (s, t, r Still **REQUIRED**) Lat Deg ______ Lat Min/Sec ______ Long Deg ______ Long Min/Sec ______
Tax Parcel No. 350728110087

PROPOSED USE: [X] Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other ______

TYPE OF WORK: Owner's number of well (if more than one) ______
[X] New well ☐ Reconditioned Method: ☐ Dug ☐ Bored ☐ Driven
☐ Deepened ☐ Cable [X] Rotary ☐ Jetted

DIMENSIONS: Diameter of well 6 inches, drilled 122 ft.
Depth of completed well 122 ft.

CONSTRUCTION DETAILS
Casing Installed: [X] Welded 6" Diam. from +1 ft. to 118 ft.
☐ Liner installed ______" Diam. from ______ ft. to ______ ft.
☐ Threaded ______" Diam. from ______ ft. to ______ ft.

Perforations: ☐ Yes [X] No
Type of perforator used ______
SIZE of perfs ______ in. by ______ in. and no. of perfs ______ from ______ ft. to ______ ft.

Screens: ☐ Yes [X] No ☐ K-Pac Location ______
Manufacturer's Name ______
Type ______ Model No. ______
Diam. ______ Slot size ______ from ______ ft. to ______ ft.
Diam. ______ Slot size ______ from ______ ft. to ______ ft.

Gravel/Filter packed: ☐ Yes [X] No ☐ Size of gravel/sand ______
Materials placed from ______ ft. to ______ ft.

Surface Seal: [X] Yes ☐ No To what depth? 18 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? ☐ Yes [X] No
Type of water? ______ Depth of strata ______
Method of sealing strata off ______

PUMP: Manufacturer's Name ______
Type: ______ H.P. ______

WATER LEVELS: Land-surface elevation above mean sea level ______ ft.
Static level 62 ft. below top of well Date 7/27/07
Artesian pressure ______ lbs. per square inch Date ______
Artesian water is controlled by ______ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom? ______
Yield: ______ gal./min. with ______ ft. drawdown after ______ hrs.
Yield: ______ gal./min. with ______ ft. drawdown after ______ hrs.
Yield: ______ gal./min. with ______ ft. drawdown after ______ hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ______
Bailer test ______ gal./min. with ______ ft. drawdown after ______ hrs.
Airtest 40 gal./min. with stem set at 120 ft. for 1 hrs.
Artesian flow ______ g.p.m. Date ______
Temperature of water ______ Was a chemical analysis made? ☐ Yes [X] No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
LOESS	0	86
LOOSE GRAVEL	86	122

RECEIVED
AUG 27 2007
DEPARTMENT OF ECOLOGY
EASTERN REGIONAL OFFICE

Start Date 7/27/07 Completed Date 7/27/07

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

[X] Driller ☐ Engineer ☐ Trainee Name (Print) BILL MCHAFFIE JR
Driller/Engineer/Trainee Signature ______
Driller or trainee License No. 2724

If TRAINEE,
Driller's Licensed No. ______
Driller's Signature Bill McHaffie

Drilling Company FIVE STAR DRILLING
Address 36301 HWY 12
City, State, Zip DAYTON, WA 99328
Contractor's Registration No. FIVESD*077KB Date 7/31/07

Ecology is an Equal Opportunity Employer.

ECY 050-1-20 (Rev 3/05)

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

343025

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Construction/Decommission *("x" in circle)*
☒ Construction
○ Decommission *ORIGINAL INSTALLATION* Notice *of Intent Number* ____

CURRENT
Notice of Intent No. WE09797
Unique Ecology Well ID Tag No. APC-699
Water Right Permit No. [redacted] G3-27490C
Property Owner Name ROB SCHMIDT
Well Street Address 4598 W. HIGHWAY 12
City WALLA WALLA County WALLA WALLA
Location NE 1/4-1/4 NW 1/4 Sec 28 Twn 7N R 35 (EWM) or WWM circle one
Lat/Long (s, t, r Still **REQUIRED**) Lat Deg ____ Lat Min/Sec ____ Long Deg ____ Long Min/Sec ____
Tax Parcel No. 350728110017

PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☒ Irrigation ☐ Test Well ☐ Other ____

TYPE OF WORK: Owner's number of well (if more than one) ____
☐ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven
☒ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 10/8/6 inches, drilled 780 ft.
Depth of completed well 780 ft.

CONSTRUCTION DETAILS
Casing Installed: ☒ Welded 10" Diam. from +1 ft. to 59 ft.
☐ Liner installed 8" Diam. from -55 ft. to 405 ft.
☐ Threaded 6" Diam. from -382 ft. to 523 ft.

Perforations: ☐ Yes ☒ No
Type of perforator used ____
SIZE of perfs ____ in. by ____ in. and no. of perfs ____ from ____ ft. to ____ ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location ____
Manufacturer's Name ____
Type ____ Model No. ____
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel/Filter packed: ☐ Yes ☐ No ☐ Size of gravel/sand ____
Materials placed from ____ ft. to ____ ft.

Surface Seal: ☐ Yes ☐ No To what depth? ____ ft.
Material used in seal ____
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? ____ Depth of strata ____
Method of sealing strata off ____

PUMP: Manufacturer's Name ____
Type: ____ H.P. ____

WATER LEVELS: Land-surface elevation above mean sea level ____ ft.
Static level 210 ft. below top of well Date ____
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom? ____
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ____
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Airtest 500 gal./min. with stem set at 780 ft. for 2 hrs.
Artesian flow ____ g.p.m. Date ____
Temperature of water 69° Was a chemical analysis made? ☐ Yes ☒ No

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
DEEPENED FROM	620	780
HARD GRAY BASALT	620	633
BROWN SOFT BASALT	633	642
HARD GRAY BASALT	642	659
GRAY CLAYSTONE	659	667
GRAY BASALT	667	738
MED GRAY BASALT W/BLUE CLAYSTONE	738	780
* 6" CASING PULLED AND EXTENDED TO 523'		
* 6X8 K PACKERS PLACED AT 382.5' AND AT 388.5' BENTONITE PLUG PLACED BETWEEN PACKERS.		

RECEIVED
JUN 15 2009
DEPARTMENT OF ECOLOGY
EASTERN REGIONAL OFFICE

Start Date 4/21/2009 Completed Date 4/27/09

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) B. M. VOTH
Driller/Engineer/Trainee Signature [signature]
Driller or trainee License No. 2094

If TRAINEE,
Driller's Licensed No. ____
Driller's Signature ____

Drilling Company FIVE STAR DRILLING
Address 36301 HIGHWAY 12
City, State, Zip DAYTON, WA 99328
Contractor's Registration No. FIVESDF077NB Date 4/30/09

Ecology is an Equal Opportunity Employer.

Sudbury Landfill
414 Sudbury Road
Walla Walla, WA 99362

Inquiry Number: 3106242.2s
June 24, 2011

EDR NEPACheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR NEPACheck® DESCRIPTION

The National Environmental Policy Act of 1969 (NEPA) requires that Federal agencies include in their decision-making processes appropriate and careful consideration of all environmental effects and actions, analyze potential environmental effects of proposed actions and their alternatives for public understanding and scrutiny, avoid or minimize adverse effects of proposed actions, and restore and enhance environmental quality as much as possible.

The EDR NEPACheck provides information which may be used, in conjunction with additional research, to determine whether a proposed site or action will have significant environmental effect.

The report provides maps and data for the following items (where available). Search results are provided in the Map Findings Summary on page 2 of this report.

Section	**Regulation**
Natural Areas Map	
• Federal Lands Data:	
- Officially designated wilderness areas	47 CFR 1.1307(1)
- Officially designated wildlife preserves, sanctuaries and refuges	47 CFR 1.1307(2)
- Wild and scenic rivers	40 CFR 6.302(e)
- Fish and Wildlife	40 CFR 6.302
• Threatened or Endangered Species, Fish and Wildlife, Critical Habitat Data (where available)	47 CFR 1.1307(3); 40 CFR 6.302
Historic Sites Map	
• National Register of Historic Places	47 CFR 1.1307(4); 40 CFR 6.302
• State Historic Places (where available)	
• Indian Reservations	
Flood Plain Map	
• National Flood Plain Data (where available)	47 CFR 1.1307(6); 40 CFR 6.302
Wetlands Map	
• National Wetlands Inventory Data (where available)	47 CFR 1.1307(7); 40 CFR 6.302
FCC & FAA Map	
• FCC antenna/tower sites, FAA Markings and Obstructions, Airports, Topographic gradient	47 CFR 1.1307(8)
Key Contacts and Government Records Searched	

MAP FINDINGS SUMMARY

The databases searched in this report are listed below. Database descriptions and other agency contact information is contained in the Key Contacts and Government Records Searched section on page 29 of this report.

TARGET PROPERTY ADDRESS

SUDBURY LANDFILL
414 SUDBURY ROAD
WALLA WALLA, WA 99362

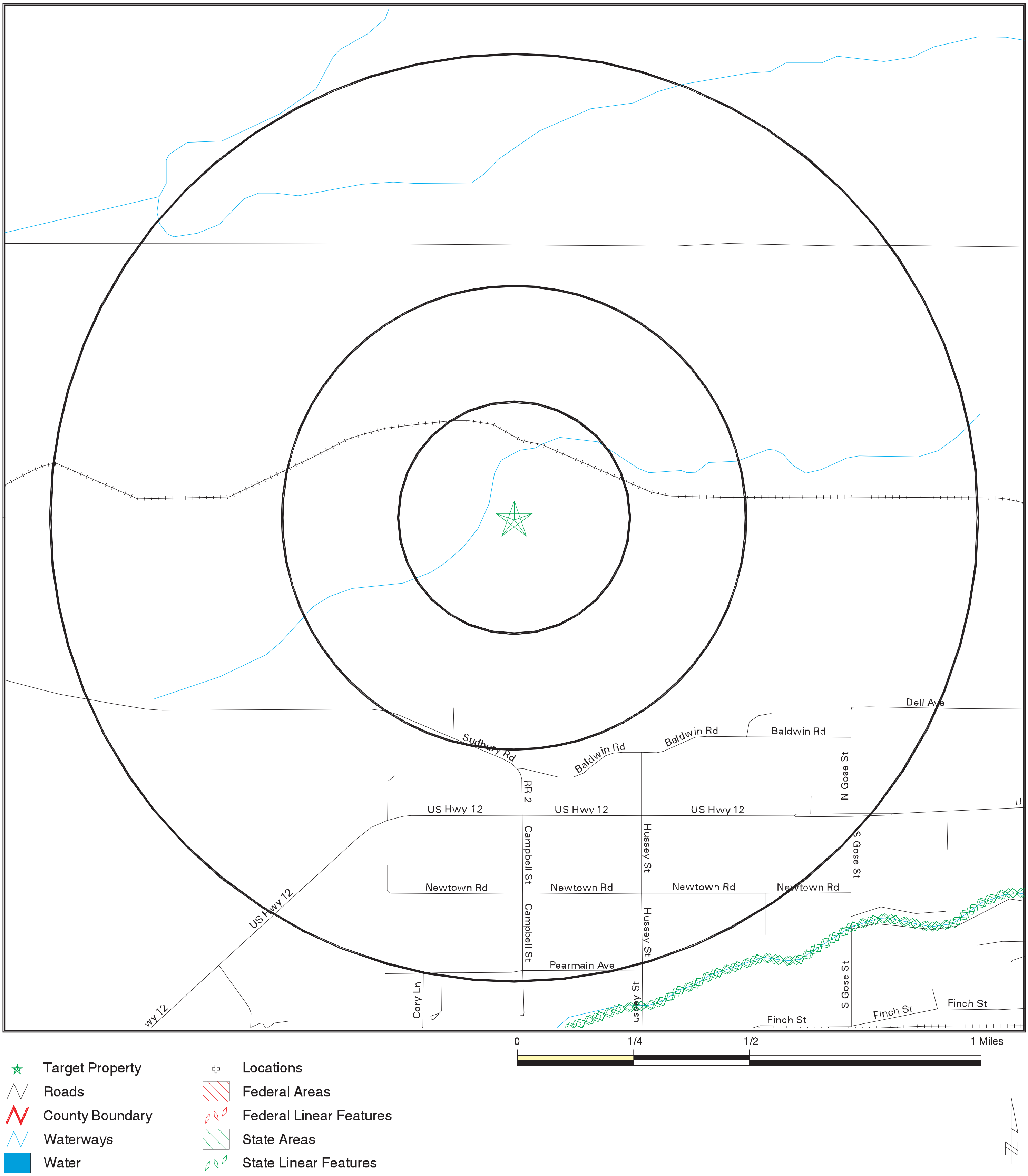
Inquiry #: 3106242.2s
Date: 6/24/11

TARGET PROPERTY COORDINATES

Latitude (North):	46.077099 - 46˚ 4’ 37.6’’
Longitude (West):	118.403702 - 118˚ 24’ 13.3’’
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	391456.4
UTM Y (Meters):	5103353.5

Applicable Regulation from 47 CFR/FCC Checklist	Database	Search Distance (Miles)	Within Search	Within 1/8 Mile
NATURAL AREAS MAP				
1.1307a (1) Officially Designated Wilderness Area	US Federal Lands	1.00	NO	NO
1.1307a (2) Officially Designated Wildlife Preserve	US Federal Lands	1.00	NO	NO
1.1307a (3) Threatened or Endangered Species or Critical Habitat	WA Natural Heritage-Puget Soun	1.00	NO	NO
1.1307a (3) Threatened or Endangered Species or Critical Habitat	Priority Habitats and Species	1.00	NO	NO
1.1307a (3) Threatened or Endangered Species or Critical Habitat	WA Streamnet	1.00	NO	NO
1.1307a (3) Threatened or Endangered Species or Critical Habitat	County Endangered Species	County	YES	N/A
HISTORIC SITES MAP				
1.1307a (4) Listed or eligible for National Register	National Register of Hist. Pla	1.00	NO	NO
1.1307a (4) Listed or eligible for National Register	WA Historic Sites	1.00	NO	NO
	Indian Reservation	1.00	NO	NO
FLOODPLAIN MAP				
1.1307 (6) Located in a Flood Plain	FLOODPLAIN	1.00	NO	NO
WETLANDS MAP				
1.1307 (7) Change in surface features (wetland fill)	NWI	1.00	NO	NO
FCC & FAA SITES MAP				
	Cellular	1.00	NO	NO
	4G Cellular	1.00	NO	NO
	Antenna Structure Registration	1.00	YES	NO
	Towers	1.00	YES	NO
	AM Antenna	1.00	YES	NO
	FM Antenna	1.00	NO	NO
	FAA DOF	1.00	YES	NO
	Airports	1.00	NO	---
	Power Lines	1.00	YES	---

Natural Areas Map



SITE NAME:	Sudbury Landfill	CLIENT:	Floyd Snider
ADDRESS:	414 Sudbury Road	CONTACT:	Tina Gary
	Walla Walla WA 99362	INQUIRY #:	3106242.2s
LAT/LONG:	46.0771 / 118.4037	DATE:	June 24, 2011

NATURAL AREAS MAP FINDINGS

Endangered Species Listed for: WALLA WALLA County, WA.

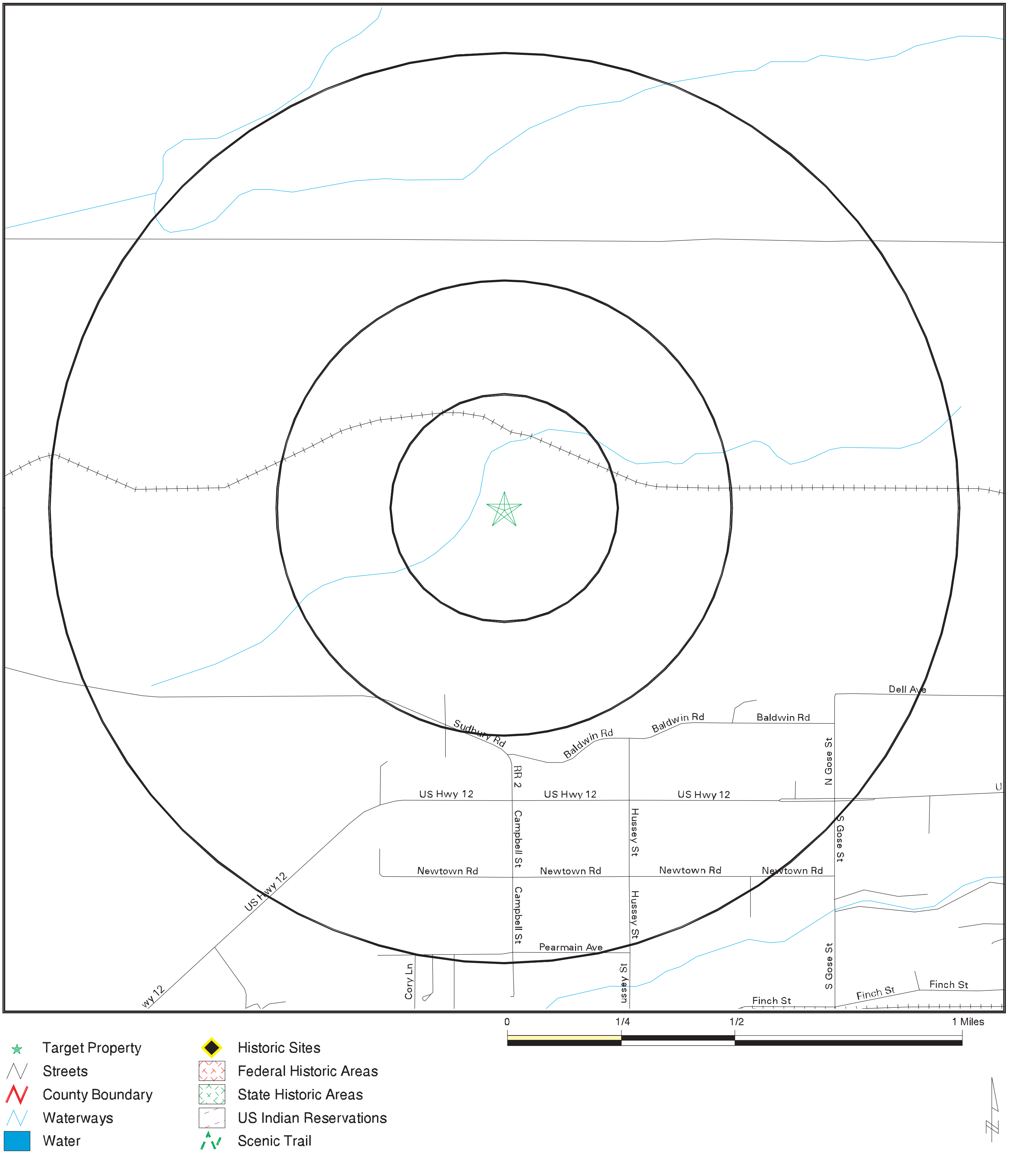
Source: EPA Endangered Species Protection Program Database

BIRD:	EAGLE, BALD
FISH:	SALMON, CHINOOK (SNAKE RIVER SPRING/SUMMER)
FISH:	SALMON, SOCKEYE (SNAKE RIVER POPULATION)
FISH:	STEELHEAD, MIDDLE COLUMBIA RIVER POPULATION
FISH:	STEELHEAD, UPPER COLUMBIA RIVER POPULATION
FISH:	STEELHEAD, SNAKE RIVER BASIN POPULATION
FISH:	SALMON, CHINOOK (UPPER COLUMBIA RIVER SPRING)
FISH:	SALMON, CHINOOK (SNAKE RIVER FALL RUN)
FISH:	TROUT, BULL

Map ID Direction Distance Distance (ft.)	EDR ID Database

No mapped sites were found in EDR's search of available government records within the search radius around the target property.

Historic Sites Map



SITE NAME: Sudbury Landfill ADDRESS: 414 Sudbury Road Walla Walla WA 99362 LAT/LONG: 46.0771 / 118.4037	CLIENT: Floyd Snider CONTACT: Tina Gary INQUIRY #: 3106242.2s DATE: June 24, 2011

HISTORIC SITES MAP FINDINGS

Map ID Direction Distance Distance (ft.)	EDR ID Database

No mapped sites were found in EDR’s search of available government records within the search radius around the target property.

UNMAPPABLE HISTORIC SITES

Due to poor or inadequate address information, the following sites were not mapped:

Status
EDR ID
Database

Unmappable
WA2008000001663
WA Historic Sites

Fname:	Bruce, William Perry, House
Faddress:	4th and Main Streets
Fcity:	Waitsburg
Fcnty:	Walla Walla County
Flisted:	(11/20/1975)
Remark:	Not Reported
Edr id:	WA2008000001663

Unmappable
WA2008000001671
WA Historic Sites

Fname:	Dacres Hotel
Faddress:	4th and Main Streets
Fcity:	Walla Walla
Fcnty:	Walla Walla County
Flisted:	(11/5/1974)
Remark:	Not Reported
Edr id:	WA2008000001671

Unmappable
WA2008000001691
WA Historic Sites

Fname:	Maxson School
Faddress:	Russell Creek Road and Foster Road
Fcity:	Walla Walla VICINITY
Fcnty:	Walla Walla County
Flisted:	(11/22/1991)
Remark:	*
Edr id:	WA2008000001691

Unmappable
WA2008000001679
WA Historic Sites

Fname:	Moore, Miles C., House
Faddress:	720 Bryant
Fcity:	Walla Walla
Fcnty:	Walla Walla County
Flisted:	(11/13/1989)
Remark:	Not Reported
Edr id:	WA2008000001679

Unmappable
WA2008000001682
WA Historic Sites

UNMAPPABLE HISTORIC SITES

Due to poor or inadequate address information, the following sites were not mapped:

Status
EDR ID
Database

Fname:	Saint Patrick Church, School and Rectory
Faddress:	West Alder Street, 400 Block
Fcity:	Walla Walla
Fcnty:	Walla Walla County
Flisted:	(1/20/1995)
Remark:	*
Edr id:	WA2008000001682

Unmappable
95000606
National Register of Hist. Places

Refnum:	95000606
Resname:	Saint Patrick Church, School and Rectory
Address:	400 Blk. W. Alder St.
Resource Type:	Building
Number buildings:	000003
Number sites:	000000
Number structs:	000000
Number objects:	000000
Non-contrib bldg:	000000
Non-contrib sites:	000000
Non-contrib structs:	000000
Non-contrib objects:	000000
Primary Certification:	Determined eligible/owner objection
Certification date:	19950505
Acreage:	10
Alternate name:	Not Reported
County:	Walla Walla
City:	Walla Walla
Applicable Criteria:	Event
Applicable Criteria:	Architecture/Engineering
Areas of significance:	Architecture
Areas of significance:	Education
Areas of significance:	Exploration/settlement
Current Function:	Religion
Current Function:	Vacant/not in use
Building Material:	Stone
Building Material:	Brick
Building Material:	Concrete
Building Material:	Adobe
Building Material:	Asphalt

Unmappable
76002273
National Register of Hist. Places

Refnum:	76002273
Resname:	Schwarz, Adolph, Building
Address:	27--33 E. Main St.
Resource Type:	Building

UNMAPPABLE HISTORIC SITES

Due to poor or inadequate address information, the following sites were not mapped: **Status EDR ID Database**

Number buildings:	000001
Number sites:	000000
Number structs:	000000
Number objects:	000000
Non-contrib bldg:	000000
Non-contrib sites:	000000
Non-contrib structs:	000000
Non-contrib objects:	000000
Primary Certification:	Removed from national register
Certification date:	19990101
Acreage:	9
Alternate name:	Not Reported
County:	Walla Walla
City:	Walla Walla
Applicable Criteria:	Event
Areas of significance:	Commerce
Current Function:	Commerce/trade
Building Material:	None listed
Building Material:	Brick
Building Material:	Stucco
Building Material:	Other
Building Material:	None listed
Alternate name:	Walla Walla Armory;Arcadia Dance Hall

Unmappable
WA2008000001667
WA Historic Sites

Fname:	Waitsburg Historic District
Faddress:	Main Street
Fcity:	Waitsburg
Fcnty:	Walla Walla County
Flisted:	(3/31/1978)
Remark:	Not Reported
Edr id:	WA2008000001667

Unmappable
WA2008000001685
WA Historic Sites

Fname:	Walla Walla Armory/Arcadia Dance Hall
Faddress:	27-33 East Main Street
Fcity:	Walla Walla
Fcnty:	Walla Walla County
Flisted:	(7/12/1990)
Remark:	Not Reported
Edr id:	WA2008000001685

Unmappable
WA2008000001686
WA Historic Sites

UNMAPPABLE HISTORIC SITES

Due to poor or inadequate address information, the following sites were not mapped:

Status
EDR ID
Database

Fname:	Walla Walla Fair Pavilion
Faddress:	363 Orchard Street
Fcity:	Walla Walla
Fcnty:	Walla Walla County
Flisted:	(1/28/2005)
Remark:	*
Edr id:	WA2008000001686

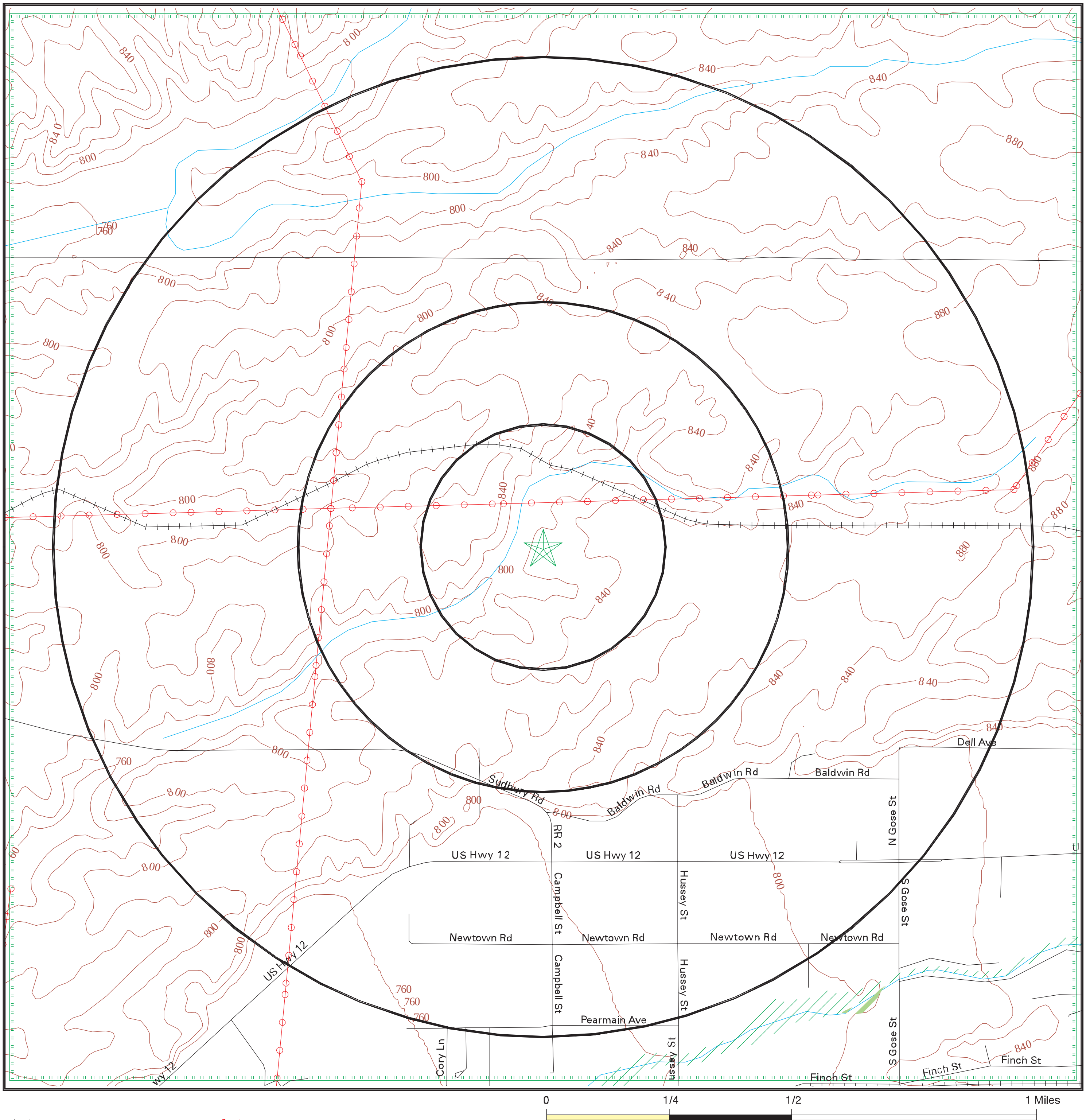
Unmappable
WA2008000001689
WA Historic Sites

Fname:	Washington School
Faddress:	501 North Cayuse
Fcity:	Walla Walla
Fcnty:	Walla Walla County
Flisted:	(11/21/1991)
Remark:	Not Reported
Edr id:	WA2008000001689

Unmappable
WA2008000001692
WA Historic Sites

Fname:	Whitman Mission National Historic Site
Faddress:	6 Miles West of Walla Walla off U.S. 410
Fcity:	Walla Walla VICINITY
Fcnty:	Walla Walla County
Flisted:	(10/15/1966)
Remark:	Not Reported
Edr id:	WA2008000001692

Flood Plain Map



- Major Roads
- Contour Lines
- Waterways
- County Boundary
- Power Lines
- Pipe Lines
- Fault Lines
- Water
- 100-year flood zone
- 500-year flood zone
- Electronic FEMA data available
- Electronic FEMA data not available

SITE NAME:	Sudbury Landfill	CLIENT:	Floyd Snider
ADDRESS:	414 Sudbury Road	CONTACT:	Tina Gary
	Walla Walla WA 99362	INQUIRY #:	3106242.2s
LAT/LONG:	46.0771 / 118.4037	DATE:	June 24, 2011

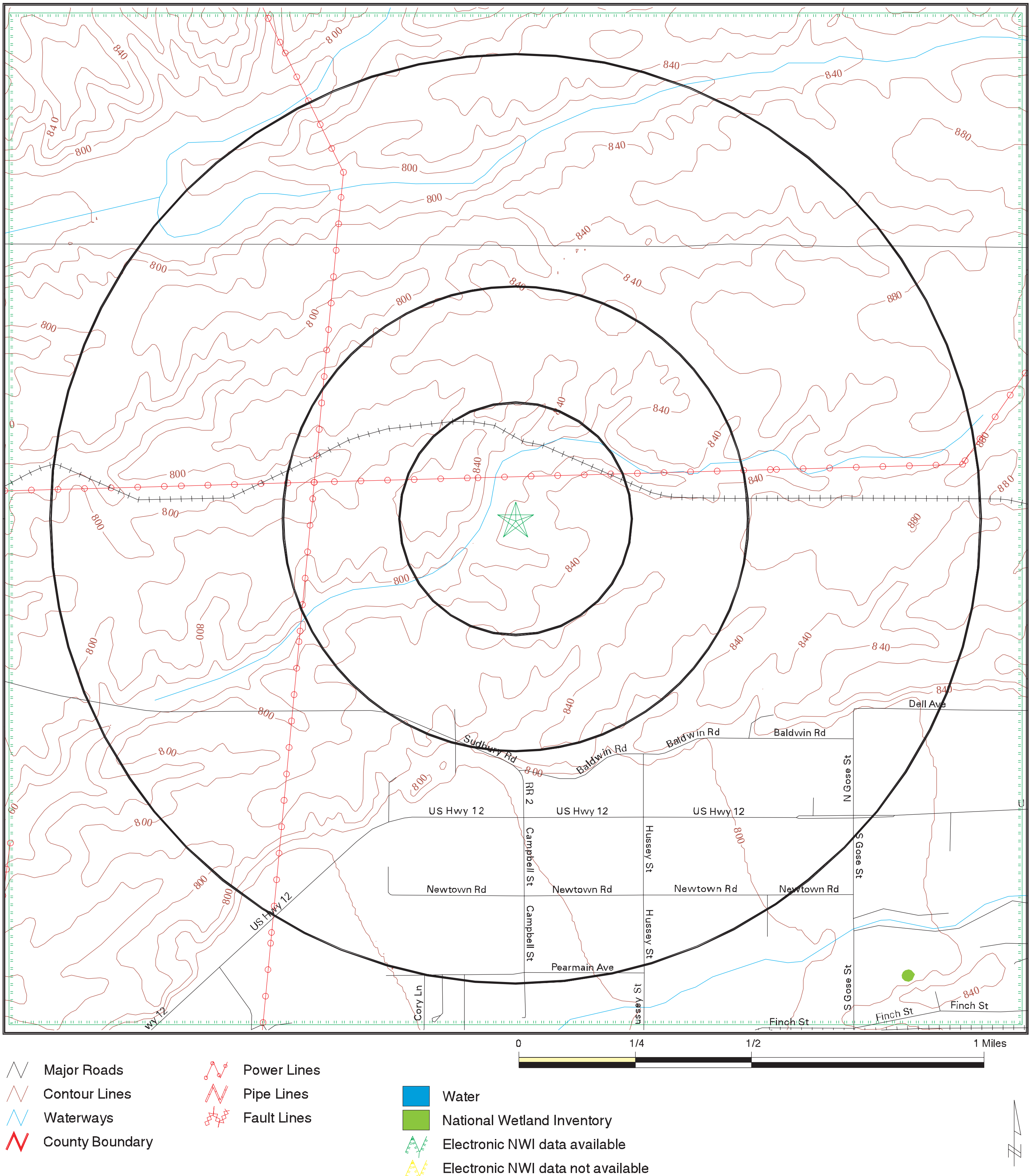
FLOOD PLAIN MAP FINDINGS

Source: FEMA DFIRM Flood Data, FEMA Q3 Flood Data

County	FEMA flood data electronic coverage
WALLA WALLA, WA	YES

Flood Plain panel at target property: 5301970000A (FEMA Q3 Flood data)
Additional Flood Plain panel(s) in search area:
5301940430B (FEMA Q3 Flood data)

National Wetlands Inventory Map



SITE NAME: Sudbury Landfill ADDRESS: 414 Sudbury Road Walla Walla WA 99362 LAT/LONG: 46.0771 / 118.4037	CLIENT: Floyd Snider CONTACT: Tina Gary INQUIRY #: 3106242.2s DATE: June 24, 2011

WETLANDS MAP FINDINGS

Source: Fish and Wildlife Service NWI data

NWI hardcopy map at target property: College Place
Additional NWI hardcopy map(s) in search area:
Not reported in source data

Map ID Direction Distance Distance (ft.)	Code and Description*	Database

No Sites Reported.

*See Wetland Classification System for additional information.

WETLANDS CLASSIFICATION SYSTEM

National Wetland Inventory Maps are produced by the U.S. Fish and Wildlife Service, a sub-department of the U.S. Department of the Interior. In 1974, the U.S. Fish and Wildlife Service developed a criteria for wetland classification with four long range objectives:

- to describe ecological units that have certain homogeneous natural attributes,
- to arrange these units in a system that will aid decisions about resource management,
- to furnish units for inventory and mapping, and
- to provide uniformity in concepts and terminology throughout the U.S.

High altitude infrared photographs, soil maps, topographic maps and site visits are the methods used to gather data for the productions of these maps. In the infrared photos, wetlands appear as different colors and these wetlands are then classified by type. Using a hierarchical classification, the maps identify wetland and deepwater habitats according to:

- system
- subsystem
- class
- subclass
- modifiers

(as defined by Cowardin, et al. U.S. Fish and Wildlife Service FWS/OBS 79/31. 1979.)

The classification system consists of five systems:

1. marine
2. estuarine
3. riverine
4. lacustrine
5. palustrine

The marine system consists of deep water tidal habitats and adjacent tidal wetlands. The riverine system consists of all wetlands contained within a channel. The lacustrine systems includes all nontidal wetlands related to swamps, bogs & marshes. The estuarine system consists of deepwater tidal habitats and where ocean water is diluted by fresh water. The palustrine system includes nontidal wetlands dominated by trees and shrubs and where salinity is below .5% in tidal areas. All of these systems are divided in subsystems and then further divided into class.

National Wetland Inventory Maps are produced by transferring gathered data on a standard 7.5 minute U.S.G.S. topographic map. Approximately 52 square miles are covered on a National Wetland Inventory map at a scale of 1:24,000. Electronic data is compiled by digitizing these National Wetland Inventory Maps.

SYSTEM — **MARINE**

SUBSYSTEM — **1 - SUBTIDAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RF-REEF	OW-OPEN WATER / Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 5 Unknown Submergent	1 Coral 3 Worm	

SUBSYSTEM — **2 - INTERTIDAL**

CLASS	AB-AQUATIC BED	RF-REEF	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE
Subclass	1 Algal 3 Rooted Vascular 5 Unknown Submergent	1 Coral 3 Worm	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic

SYSTEM — **E - ESTUARINE**

SUBSYSTEM — **1 - SUBTIDAL**

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RF-REEF	OW-OPEN WATER / Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	2 Mollusk 3 Worm	

SUBSYSTEM — **2 - INTERTIDAL**

CLASS	AB-AQUATIC BED	RF-REEF	SB - STREAMBED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	EM-EMERGENT	SS-SCRUB SHRUB	FO-FORESTED
Subclass	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	2 Mollusk 3 Worm	1 Cobble- Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble	1 Cobble- Gravel 2 Sand 3 Mud 4 Organic	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen

SYSTEM: R - RIVERINE

SUBSYSTEM: 1 - TIDAL | 2 - LOWER PERENNIAL | 3 - UPPER PERENNIAL | 4 - INTERMITTENT | 5 - UNKNOWN PERENNIAL

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	*SB-STREAMBED	AB-AQUATIC BED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	**EM-EMERGENT	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic 7 Vegetated	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

* STREAMBED is limited to TIDAL and INTERMITTENT SUBSYSTEMS, and comprises the only CLASS in the INTERMITTENT SUBSYSTEM.
**EMERGENT is limited to TIDAL and LOWER PERENNIAL SUBSYSTEMS.

SYSTEM: L - LACUSTRINE

SUBSYSTEM: 1 - LIMNETIC

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	

SUBSYSTEM: 2 - LITTORAL

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	EM-EMERGENT	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

SUBSYSTEM — P - PALUSTRINE

CLASS	RB--ROCK BOTTOM	UB--UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	US--UNCONSOLIDATED SHORE	ML--MOSS-LICHEN	EM--EMERGENT	SS--SCRUB-SHRUB	FO--FORESTED	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble 3 Mud 4 Organic	1 Cobble-Gravel 2 Sand	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	1 Moss 2 Lichen	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6Deciduous 7 Evergreen	

MODIFIERS

In order to more adequately describe wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.

WATER REGIME

Non-Tidal	Tidal		
A Temporarily Flooded	H Permanently Flooded	K Artificially Flooded	*S Temporary-Tidal
B Saturated	J Intermittently Flooded	L Subtidal	*R Seasonal-Tidal
C Seasonally Flooded	K Artificially Flooded	M Irregularly Exposed	*T Semipermanent -Tidal
D Seasonally Flooded/ Well Drained	W Intermittently Flooded/Temporary	N Regularly Flooded	V Permanent -Tidal
E Seasonally Flooded/ Saturated	Y Saturated/Semipermanent/ Seasonal	P Irregularly Flooded	U Unknown
F Semipermanently Flooded	Z Intermittently Exposed/Permanent		
G Intermittently Exposed	U Unknown		

*These water regimes are only used in tidally influenced, freshwater systems.

WATER CHEMISTRY

Coastal Halinity	Inland Salinity	pH Modifiers for all Fresh Water
1 Hyperhaline	7 Hypersaline	
2 Euhaline	8 Eusaline	a Acid
3 Mixohaline (Brackish)	9 Mixosaline	t Circumneutral
4 Polyhaline	0 Fresh	i Alkaline
5 Mesohaline		
6 Oligohaline		
0 Fresh		

SOIL

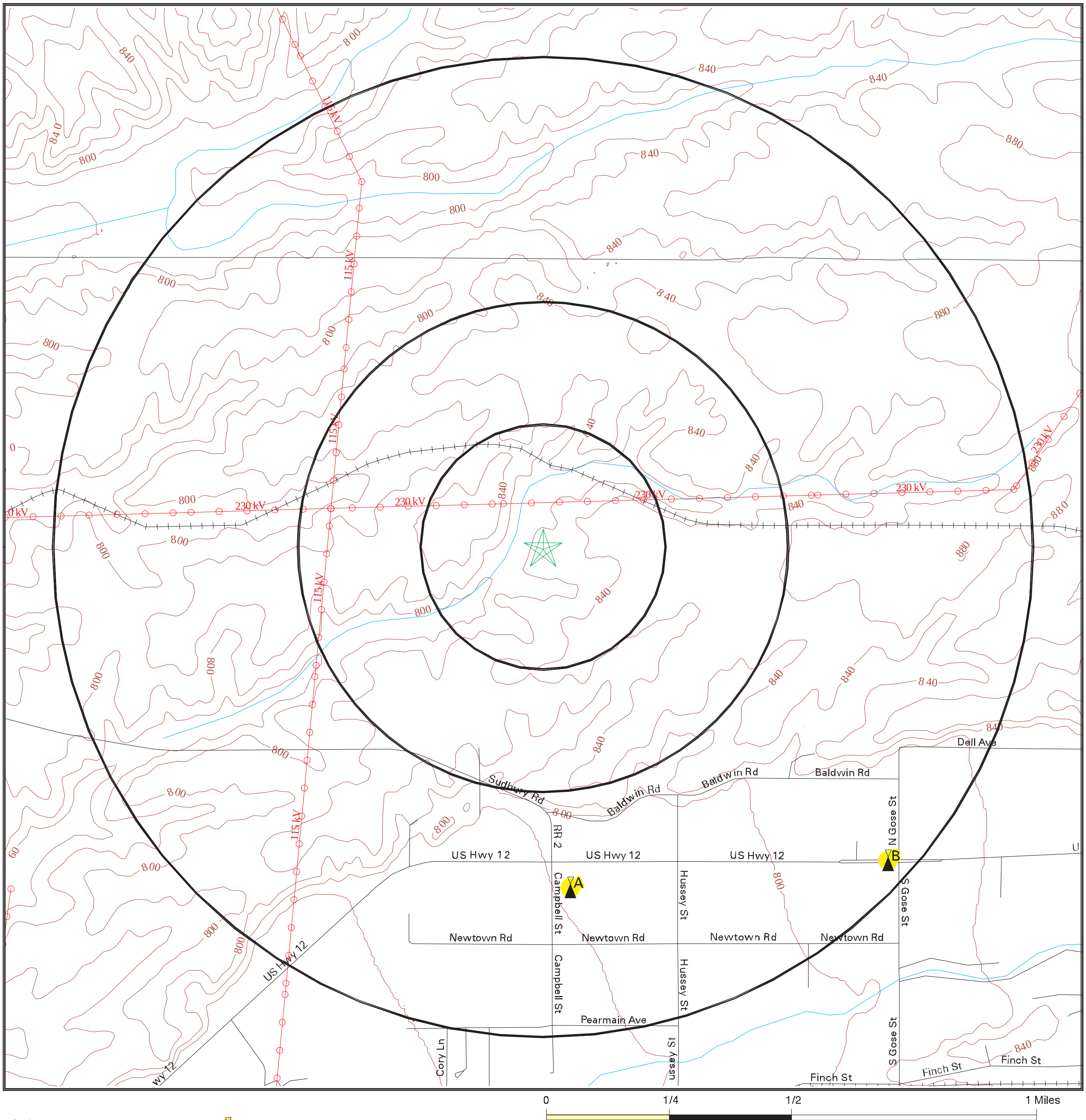
- g Organic
- n Mineral

SPECIAL MODIFIERS

- b Beaver
- d Partially Drained/Ditched
- f Farmed
- h Diked/Impounded
- r Artificial Substrate
- s Spoil
- x Excavated

Source: U.S. Department of the Interior
Fish and Wildlife Service
National Wetlands Inventory

FCC & FAA Sites Map



Streets
Contour Lines
County Boundary
Waterways
Power Lines
Water
Sites

SITE NAME: Sudbury Landfill ADDRESS: 414 Sudbury Road Walla Walla WA 99362 LAT/LONG: 46.0771 / 118.4037	CLIENT: Floyd Snider CONTACT: Tina Gary INQUIRY #: 3106242.2s DATE: June 24, 2011

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID Direction Distance Distance (ft.)	EDR ID Database
A1 South 1/2-1 mi 3553	TOW100000066200 TOWER

Tower id:	53947
City:	WALLA WALLA
Date active:	May 9 1994
Date const:	99/99/1999
Date faa:	Not Reported
Date fcc:	Not Reported
Hgt antenna:	0.0000
Hgt antenna (M):	0.0000
Hgt beacon:	0.0000
Hgt beacon (M):	0.0000
Elevation:	984.0000
Elev FAA:	0.0000
Elev FAA (M):	0.0000
Elev (M):	299.9000
Hgt structure:	204.0000
Hgt struc faa:	0.0000
Hgt stru faa (M):	0.0000
Hgt struc (M):	62.2000
Supporting Struc Hgt:	0.0000
Supp. Struct Hgt (M):	0.0000
Tower Hgt:	0.0000
Tower (M):	0.0000
Id asb acc:	Y
Faa id:	Not Reported
File num:	BR-69 (KUJ)
Name owner:	KUJ
State:	WA
Address:	US HWY 410 & SUDBURY RD
Action:	MOD
Type stru:	TOW
Type tower:	E
Key site:	69877
Id exam:	PRB5
Xmit lat:	460403
Xmit long:	1182408
Lat deg:	46
Lat min:	4
Lat sec:	3
Lat second:	165843
Long deg:	118
Long min:	24
Long sec:	8
Long secon:	426248
Key rem:	Not Reported
The date:	Not Reported
Type pl:	1 12 21 3
Spec cond1:	Not Reported

Map ID
Direction
Distance
Distance (ft.)

EDR ID
Database

Spec cond2:	Not Reported
Remarks:	Not Reported
Edr id:	TOW100000066200

This record is for a license, and it may or may not indicate a site which has been built.

A2
South
1/2-1 mi
3673

AMT100000004830
AM_ANTENNA

Callsign:	KUJ
Frequency:	1420 kHz
Service:	AM
Class:	B
Status:	LIC
City:	WALLA WALLA
State:	WA
Country:	US
Filenum:	BL -20051107AGD
Facid:	35718
Lat:	46-4-2N
Lon:	118-24-5W
Licensee:	ALEXANDRA COMMUNICATIONS, INC.
Latdd:	46.0672
Londd:	118.4014
Edr id:	AMT100000004830

This record is for a license, and it may or may not indicate a site which has been built.

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID Direction Distance Distance (ft.)		EDR ID Database
A3 South 1/2-1 mi 3721		DOF200000132724 NOAA_DOF

Obstacle n:	53-000097
O or u:	O
Country:	US
State:	WA
City:	WALLA WALLA
Lat deg:	46
Lat min:	4
Lat sec:	01.00N
Lon deg:	118
Lon min:	24
Lon sec:	08.00W
Obstacle type:	TOWER
Quantity:	2
Agl ht:	204
Amsl ht:	984
Lighting:	R
Horiz acc:	1
Vert acc:	D
Marking:	M
Faa num:	Not Reported
Action:	C
Julian:	1983355 22
Edr id:	DOF200000132724

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID Direction Distance Distance (ft.)	EDR ID Database
A4 South 1/2-1 mi 3731	ANT200000110872 ANTREG

Regnum:	1037809
Filenum:	A0044557
Issuedate:	2/12/1998
Entity:	THOMAS D. HODGINS
Lat dms:	46,4,1
Lat dir:	1
Lon dms:	118,24,9
Lon dir:	-1
Dd temp:	46.0669
Dd temp0:	-118.4025
Strucht:	60.1
Strucadd:	TWR 1 - INT OF CAMPBELL RD & RT 12
Struccity:	WALLA WALLA
Strucstate:	WA
Faastudy:	97-ANM-1363-OE
Faacirc:	70/7460-1J
Licid:	Not Reported
Contname:	TOM HODGINS
Contadd:	ROUTE # 5 BOX 513
Contpo:	Not Reported
Contcity:	WALLA WALLA
Contstate:	WA
Contzip:	99362
Edr id:	ANT200000110872

This record is for a license, and it may or may not indicate a site which has been built.

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID Direction Distance Distance (ft.)	EDR ID Database
A5 South 1/2-1 mi 3738	ANT200000110873 ANTREG

Regnum:	1037810
Filenum:	A0044558
Issuedate:	2/12/1998
Entity:	THOMAS D. HODGINS
Lat dms:	46,4,1
Lat dir:	1
Lon dms:	118,24,8
Lon dir:	-1
Dd temp:	46.0669
Dd temp0:	-118.4022
Strucht:	60.2
Strucadd:	TWR 2 - INT OF CAMPBELL RD & RT 12
Struccity:	WALLA WALLA
Strucstate:	WA
Faastudy:	97-ANM-1364-OE
Faacirc:	Not Reported
Licid:	Not Reported
Contname:	TOM HODGINS
Contadd:	ROUTE # 5 BOX 513
Contpo:	Not Reported
Contcity:	WALLA WALLA
Contstate:	WA
Contzip:	99362
Edr id:	ANT200000110873

This record is for a license, and it may or may not indicate a site which has been built.

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID Direction Distance Distance (ft.)	EDR ID Database
B6 SE 1/2-1 mi 4979	DOF200000132727 NOAA_DOF

Obstacle n:	53-020482
O or u:	O
Country:	US
State:	WA
City:	WALLA WALLA
Lat deg:	46
Lat min:	4
Lat sec:	04.00N
Lon deg:	118
Lon min:	23
Lon sec:	21.70W
Obstacle type:	T-L TWR
Quantity:	1
Agl ht:	86
Amsl ht:	899
Lighting:	N
Horiz acc:	5
Vert acc:	D
Marking:	N
Faa num:	2009ANM01560OE
Action:	C
Julian:	2009335 31
Edr id:	DOF200000132727

FCC & FAA SITES MAP FINDINGS
TOWERS

Map ID Direction Distance Distance (ft.)	EDR ID Database
B7 SE 1/2-1 mi 5069	DOF200000132729 NOAA_DOF

Obstacle n:	53-020485
O or u:	O
Country:	US
State:	WA
City:	WALLA WALLA
Lat deg:	46
Lat min:	4
Lat sec:	04.41N
Lon deg:	118
Lon min:	23
Lon sec:	19.41W
Obstacle type:	T-L TWR
Quantity:	1
Agl ht:	86
Amsl ht:	902
Lighting:	N
Horiz acc:	5
Vert acc:	D
Marking:	N
Faa num:	2009ANM01565OE
Action:	C
Julian:	2009335 31
Edr id:	DOF200000132729

FCC & FAA SITES MAP FINDINGS
AIRPORTS

EDR ID
Database

No Sites Reported.

FCC & FAA SITES MAP FINDINGS
POWERLINES

EDR ID
Database

POW10000004877
POWERLINES

Name:	OR618
Id:	5619
Kv:	115
Label:	115 kV
Company:	PacifiCorp
Companyabb:	PacifiCorp
Edr id:	POW10000004877

POW10000014641
POWERLINES

Name:	WA546
Id:	2547
Kv:	230
Label:	230 kV
Company:	Bonneville Power Administration
Companyabb:	BPA
Edr id:	POW10000014641

POW10000005834
POWERLINES

Name:	WA153
Id:	6154
Kv:	115
Label:	115 kV
Company:	PacifiCorp
Companyabb:	PacifiCorp
Edr id:	POW10000005834

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Various Federal laws and executive orders address specific environmental concerns. NEPA requires the responsible offices to integrate to the greatest practical extent the applicable procedures required by these laws and executive orders. EDR provides key contacts at agencies charged with implementing these laws and executive orders to supplement the information contained in this report.

NATURAL AREAS
Officially designated wilderness areas
Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 12/31/2005

Federal Contacts for Additional Information

National Park Service, Pacific West Region
600 Harrison Street, Suite 600
San Francisco, CA 94107
415-427-1300

USDA Forest Service, Pacific Northwest
333 SW First Street P.O. Box 3623
Portland, OR 97208
503-326-3865

BLM - Oregon State Office
1515 SW 5th Ave.
Portland, OR 92208-2965
503-952-6002

Fish & Wildlife Service, Region 1
Eastside Federal Complex 911 NE 11th Avenue
Portland, OR 97232-4181
503-231-6188

Officially designated wildlife preserves, sanctuaries and refuges
Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 12/31/2005

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Federal Contacts for Additional Information
Fish & Wildlife Service, Region 1
Eastside Federal Complex 911 NE 11th Avenue
Portland, OR 97232-4181
503-231-6188

State Contacts for Additional Information
Dept. of Fish & Wildlife 360-902-2200

Wild and scenic rivers
Government Records Searched in This Report
FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service, Forest Service, and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 12/31/2005

Federal Contacts for Additional Information
Fish & Wildlife Service, Region 1
Eastside Federal Complex 911 NE 11th Avenue
Portland, OR 97232-4181
503-231-6188

Endangered Species

Government Records Searched in This Report
Endangered Species Protection Program Database
A listing of endangered species by county.
Source: Environmental Protection Agency
Telephone: 703-305-5239

WA Natural Heritage-Puget Soun: Washington Natural Heritage Information System
Locations of endangered, threatened and sensitive species and select ecosystems.
Source: Department of Natural Resources.
Telephone: 360-902-1349

Priority Habitats and Species Database: WA Endangered Plants and Rare Ecosystems
Rare plant species and endangered ecosystems
Source: Dept. of Natural Resources.
Telephone: 360-902-1125

WA Streamnet: WA Streamnet
Source: Dept of Fish and Wildlife.
Telephone: 360-902-2543

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Federal Contacts for Additional Information

Fish & Wildlife Service, Region 1
Eastside Federal Complex 911 NE 11th Avenue
Portland, OR 97232-4181
503-231-6188

State Contacts for Additional Information

Natural Heritage Program, Dept. of Natural Resources 360-902-1340

LANDMARKS, HISTORICAL, AND ARCHEOLOGICAL SITES
Historic Places

Government Records Searched in This Report

National Register of Historic Places:
The National Register of Historic Places is the official federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. These contribute to an understanding of the historical and cultural foundations of the nation. The National Register includes:
- All prehistoric and historic units of the National Park System;
- National Historic Landmarks, which are properties recognized by the Secretary of the Interior as possessing national significance; and
- Properties significant in American, state, or local prehistory and history that have been nominated by State Historic Preservation Officers, federal agencies, and others, and have been approved for listing by the National Park Service.

Date of Government Version: 03/23/2006

WA Historic Sites: Historic Places in Washington
Listing of historic sites on the National and State Register.
Source: Office of Community Development. Office of Archaeology and Historic Preservation
Telephone: 360-407-0753

Federal Contacts for Additional Information

Park Service; Advisory Council on Historic Preservation
1849 C Street NW
Washington, DC 20240
Phone: (202) 208-6843

State Contacts for Additional Information

Office of Archeology & Historic Preservation 360-407-0753

Indian Religious Sites

Government Records Searched in This Report

Indian Reservations:
This map layer portrays Indian administrated lands of the United States that have any area equal to or greater than 640 acres.
Source: USGS
Phone: 888-275-8747
Date of Government Version: 12/31/2005

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Federal Contacts for Additional Information

Department of the Interior- Bureau of Indian Affairs
Office of Public Affairs
1849 C Street, NW
Washington, DC 20240-0001
Office: 202-208-3711
Fax: 202-501-1516

National Association of Tribal Historic Preservation Officers
1411 K Street NW, Suite 700
Washington, DC 20005
Phone: 202-628-8476
Fax: 202-628-2241

State Contacts for Additional Information

A listing of local Tribal Leaders and Bureau of Indian Affairs Representatives can be found at:
http://www.doi.gov/bia/areas/agency.html

Portland Area Office, Bureau of Indian Affiars
911 N.E. 11th Avenue
Portland, OR 97232
503-231-6702

Spokane Tribe of Indians
P.O. Box 100
Wellpinit, WA 99040

Confederated Tribes of the Colville Reservation
P.O. Box 150
Nespelem, WA 99155

Scenic Trails

State Contacts for Additional Information

Pacific Crest Trail Association
5325 Elkhorn Boulevard, #256
Sacramento, California 95842
916-349-2109

FLOOD PLAIN, WETLANDS AND COASTAL ZONE

Flood Plain Management

Government Records Searched in This Report

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

Federal Contacts for Additional Information

Federal Emergency Management Agency 877-3362-627

State Contacts for Additional Information

State Military Department, Emergency Management 253-512-7000

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Wetlands Protection

Government Records Searched in This Report

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2004 from the U.S. Fish and Wildlife Service.

Federal Contacts for Additional Information

Fish & Wildlife Service 813-570-5412

State Contacts for Additional Information

Dept. of Fish & Wildlife 360-902-2200

Coastal Zone Management

Government Records Searched in This Report

CAMA Management Areas
Dept. of Env., Health & Natural Resources
919-733-2293

Federal Contacts for Additional Information

Office of Ocean and Coastal Resource Management
N/ORM, SSMC4
1305 East-West Highway
Silver Spring, Maryland 20910
301-713-3102

State Contacts for Additional Information

Shorelands & Env. Assistance Program, Dept. of Ecology 360-407-6600

FCC & FAA SITES MAP

For NEPA actions that come under the authority of the FCC, the FCC requires evaluation of Antenna towers and/or supporting structures that are to be equipped with high intensity white lights which are to be located in residential neighborhoods, as defined by the applicable zoning law.

Government Records Searched in This Report

Cellular

Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

4G Cellular

Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

Antenna Structure Registration

Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Towers
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

AM Antenna
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

FM Antenna
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554
888-225-5322

FAA Digital Obstacle File
Federal Aviation Administration (FAA)
1305 East-West Highway, Station 5631
Silver Sprinng, MD 20910-3281
Telephone: 301-713-2817
Describes known obstacles of interest to aviation users in the US. Used by the Federal Aviation Administration (FAA) and the National Oceanic and Atmospheric Administration to manage the National Airspace System.

Airport Landing Facilities
Federal Aviation Administration
Telephone (800) 457-6656
Private and public use landing facilities.

Electric Power Transmission Line Data
Rextag Strategies Corp.
14405 Walters Road, Suite 510
Houston, TX 77014
281-769-2247
U.S. Electric Transmission and Power Plants systems Digital GIS Data.

Excessive Radio Frequency Emission
For NEPA actions that come under the authority of the FCC, Commission actions granting construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities, require the determination of whether the particular facility, operation or transmitter would cause human exposure to levels of radio frequency in excess of certain limits.

Federal Contacts for Additional Information
Office of Engineering and Technology
Federal Communications Commission
445 12th Street SW
Washington, DC 20554
Phone: 202-418-2470

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

OTHER CONTACT SOURCES

STREET AND ADDRESS INFORMATION

APPENDIX B

Site Well Logs and Drillers Well Reports

Schwyn Environmental Services

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

MW-1

WATER WELL REPORT
STATE OF WASHINGTON

Application No. ....

Permit No. ....

(1) OWNER: Name City of Walla Walla Address Box 478

(2) LOCATION OF WELL: County Walla Walla SW ¼ NE ¼ Sec 22 T 7 N., R 35 E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☒ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 1
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2" inches.
Drilled 121 ft. Depth of completed well 121' ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 2" Diam. from +2 ft. to 118 ft.
Threaded ☒ ....." Diam. from ..... ft. to ..... ft.
Welded ☐ ....." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type 316 Model No.
Diam. 2 Slot size .010 from 108 ft. to 118 ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? ..... ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ..... Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: ..... H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ..... ft.
Static level 23' ft. below top of well Date 10-22-86
Artesian pressure ..... lbs. per square inch Date
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 12 gal./min. with 1 ft. drawdown after 1 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
0.00	23'				
.00	24'				
.01	23'				

Date of test 9-8-86
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date
Temperature of water 54 Was a chemical analysis made? Yes ☐ No ☒

10/29/86

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Topsoil	0	23
Sand + Brown Clay	23	42
Sand	42	48
Brown Clay + Gravel	48	73
Brown Clay	73	79
Brown Clay + Gravel	79	87
Brown Clay	87	92
Brown Clay + Gravel	92	97
Gravel - water	97	121

7 Sacks Filter Sand 10-20 From 121 To 90 FT

Pumped in 15 Sacks Vol Clay From 90 To 6'

1 FT of Sand 6' To 5'

Put in 6 Sacks Portland Cem From 5' To Ground Level

Work started 8-27 1986. Completed 9-18 1986

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Harding Drilling Co (Person, firm, or corporation) (Type or print)

Address RT 3 Box 67 Walla Walla, W

[Signed] Mike Harding (Well Driller)

License No. 173 Date 10-28 1986

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

MW-1A - ABANDONED

WATER WELL REPORT

STATE OF WASHINGTON

Application No. ....
Permit No. ....

(1) OWNER: Name Walla Walla City Land Fill Address

LOCATION OF WELL: County Walla Walla SEE BELOW ¼ ¼ Sec. ___ T. ___ N., R. ___ W.M.

Bearing and distance from section or subdivision corner NE¼ NE¼ NE¼ SEC 22

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☑ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) #1
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☑ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 5 inches.
Drilled 65 ft. Depth of completed well 65 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 5" Diam. from 0 ft. to 65 ft.
Threaded ☐ ___" Diam. from ___ ft. to ___ ft.
125# PVC Welded ☑ ___" Diam. from ___ ft. to ___ ft.

Perforations: Yes ☑ No ☐
Type of perforator used Machine
SIZE of perforations 1/2 in. by 3 in.
___ perforations from ___ ft. to ___ ft.
40 perforations from 25 ft. to 65 ft.
___ perforations from ___ ft. to ___ ft.

Screens: Yes ☐ No ☑
Manufacturer's Name
Type ___ Model No. ___
Diam. ___ Slot size ___ from ___ ft. to ___ ft.
Diam. ___ Slot size ___ from ___ ft. to ___ ft.

Gravel packed: Yes ☑ No ☐ Size of gravel: 3/4-1 1/4
Gravel placed from 25 ft. to 65 ft.

Surface seal: Yes ☑ No ☐ To what depth? 25 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ___ Depth of strata ___
Method of sealing strata off ___

(7) PUMP: Manufacturer's Name None
Type: ___ H.P. ___

(8) WATER LEVELS: Land-surface elevation above mean sea level ___ ft.
Static level 27 ft. below top of well Date Nov 21-76
Artesian pressure ___ lbs. per square inch Date ___
Artesian water is controlled by ___ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom?
Yield: ___ gal./min. with ___ ft. drawdown after ___ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ___
Bailer test 4 gal./min. with 35 ft. drawdown after 1/2 hrs.
Artesian flow ___ g.p.m. Date ___
Temperature of water 58 Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG: T7N R35E

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil & Brown clay	0	35
Brown clay with Fine Sand Some water	35	36
Clay Brown	36	38
Gravel - Cement - Brown	38	49
Clay - Brown	49	53
Gravel - Cement - Brown	53	65

W. W. Land Fill #1

BEGIN AT THE NORTHEAST CORNER OF SECTION 22 IN TOWNSHIP 7 NORTH, RANGE 35 EAST OF THE WILLAMETTE MERIDIAN AND RUNNING THENCE SOUTHERLY ALONG THE EAST LINE OF SAID SECTION 22, A DISTANCE OF 533 FEET; THENCE WESTERLY AT RIGHT ANGLES TO THE EAST LINE OF SAID SECTION 22, A DISTANCE OF 471 FEET TO THE SITE OF TEST WELL #1

RECEIVED
JAN 11 1977
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started Nov 15 1976. Completed Nov 22 1976

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Lowell W. Marlatt (Person, firm, or corporation) (Type or print)
Address RT# 2 Box 111 Milton Freewater Or
[Signed] Lowell W Marlatt (Well Driller)
License No. C-81 Date Dec 16, 1976

1/11/77

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON Well-2

Application No. .... Permit No. ....

(1) OWNER: Name Walla Walla City Address

(2) LOCATION OF WELL: County .... — ¼ SE ¼ Sec. T. N., R. W. SEE BELOW
Bearing and distance from section or subdivision corner SE¼ NE¼ NE¼ SEC 22

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☑ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) #2
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☑ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 5 inches.
Drilled 155 ft. Depth of completed well 155 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 5" Diam. from 0 ft. to 155 ft.
Threaded ☐ ...." Diam. from .... ft. to .... ft.
125# PVC Welded ☑ ...." Diam. from .... ft. to .... ft.

Perforations: Yes ☑ No ☐
Type of perforator used Machine
SIZE of perforations 1/2 in. by 3 in.
.... perforations from .... ft. to .... ft.
80 perforations from 80 ft. to 155 ft.
.... perforations from .... ft. to .... ft.

Screens: Yes ☐ No ☑
Manufacturer's Name ....
Type .... Model No. ....
Diam. .... Slot size .... from .... ft. to .... ft.
Diam. .... Slot size .... from .... ft. to .... ft.

Gravel packed: Yes ☑ No ☐ Size of gravel: 3/4 x 1 1/4
Gravel placed from 30 ft. to 155 ft.

Surface seal: Yes ☑ No ☐ To what depth? 30 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? .... Depth of strata ....
Method of sealing strata off ....

(7) PUMP: Manufacturer's Name None
Type: .... H.P. ....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... .... ft.
Static level 75 ft. below top of well Date Dec. 14-76
Artesian pressure .... lbs. per square inch Date ....
Artesian water is controlled by .... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom? ....
Yield: .... gal./min. with .... ft. drawdown after .... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ....
Bailer test 50 gal./min. with 30 ft. drawdown after 1 hrs.
Artesian flow .... g.p.m. Date ....
Temperature of water 59 Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG: T 7 N R 35

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil & clay - Brown	0	57
Clay - Tan	57	79
Gravel Cement - Brown	79	95
Clay - Brown	95	97
Gravel Cement - Brown	97	106
Gravel Med - Some water	106	115
Gravel Cement - Brown	115	120
Clay - Brown	120	122
Gravel Cement - Brown	122	124
Clay - Brown	124	127
Gravel Water bearing	127	155

BEGIN AT THE NORTHEAST CORNER OF SECTION 22 IN TOWNSHIP 7 NORTH. RANGE 35 EAST OF THE WILLAMETTE MERIDIAN AND RUNNING THENCE SOUTHERLY ALONG THE EAST LINE OF SAID SECTION 22, A DISTANCE OF 1270 FEET, THE WESTERLY AT RIGHT ANGLES TO THE EAST LINE OF SAID SECTION 22, A DISTANCE OF 150 FEET TO THE SITE OF TEST WELL #2

Work started Dec 1 1976 Completed Dec 15 1976

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Lowell W. Marlatt (Person, firm, or corporation) (Type or print)

Address RT.#2 Box 111 Milton Freewater

[Signed] Lowell W. Marlatt (Well Driller)

License No. C-81 Date Dec 16, 1976

(USE ADDITIONAL SHEETS IF NECESSARY)

MW-3

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. ....
Permit No. ....

OWNER: Name City of Walla Walla Address Box 478

(2) **LOCATION OF WELL:** County Walla Walla — NW ¼ NE ¼ Sec 22 T 7 N., R 35 W.M.
Bearing and distance from section or subdivision corner

(3) **PROPOSED USE:** Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☒ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one) 3
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) **DIMENSIONS:** Diameter of well .... inches.
Drilled .... ft. Depth of completed well .... ft.

(6) **CONSTRUCTION DETAILS:**
Casing installed: 2" Diam. from +2 ft. to 118 ft.
Threaded ☒ ....." Diam. from ..... ft. to ..... ft.
Welded ☐ ....." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used ....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type 316 Model No. ....
Diam. 2 Slot size .010 from 108 ft. to 118 ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? ..... ft.
Material used in seal ....
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ..... Depth of strata .....
Method of sealing strata off ....

(7) **PUMP:** Manufacturer's Name ....
Type: .... H.P. .....

(8) **WATER LEVELS:** Land-surface elevation above mean sea level ..... ft.
Static level 26 ft. below top of well Date 10-22-86
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by .... (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 10 gal./min. with 2 ft. drawdown after 1 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
00	28	:01	26		

Date of test 10-1-86
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water 54 Was a chemical analysis made? Yes ☐ No ☒

10/29/86

(10) **WELL LOG:**
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Topsoil	0	23
Brown Clay + Sand	23	42
Sand	42	59
Brown Clay	59	61
Sand + Gravel	61	74
Brown Clay + Gravel	74	96
Brown Clay	96	101
Gravel · Water	101	121

Put in 8 Sacks 10-20 Filter San[d]
From 121' To 90'

Pumped in 13 Sacks Vol Clay
From 90 To 16'

Put in Sand From 16' To 10'

Put in 9 Sacks Portland Cem
From 10' To Ground Level

Work started 9-18 1986 Completed 10-21 1986

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Harding Drilling Co (Person, firm, or corporation) (Type or print)
Address RT 3 Box 67 Walla Walla Wa.
[Signed] Mike Harding (Well Driller)
License No. 173 Date 10-29, 1986

MW - 3A

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. ....
Permit No. ....

(1) OWNER: Name Walla Walla City Address

LOCATION OF WELL: County Walla Walla - SEE BELOW Sec T 7 N., R 35 W.M.
Bearing and distance from section or subdivision corner NW 1/4 NE 1/4 NE 1/4 Sec 22

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☑ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 3
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☑ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 5 inches.
Drilled 85 ft. Depth of completed well 80 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 5" Diam. from 0 ft. to 80 ft.
Threaded ☐ ......" Diam. from ...... ft. to ...... ft.
125# PVC Welded ☑ ......" Diam. from ...... ft. to ...... ft.

Perforations: Yes ☑ No ☐
Type of perforator used machine
SIZE of perforations 1/2 in. by 3 in.
...... perforations from ...... ft. to ...... ft.
52 perforations from 25 ft. to 80 ft.
...... perforations from ...... ft. to ...... ft.

Screens: Yes ☐ No ☑
Manufacturer's Name
Type ...... Model No.
Diam. ...... Slot size ...... from ...... ft. to ...... ft.
Diam. ...... Slot size ...... from ...... ft. to ...... ft.

Gravel packed: Yes ☑ No ☐ Size of gravel: 1/4 - 1 1/4
Gravel placed from 25 ft. to 86 ft.

Surface seal: Yes ☑ No ☐ To what depth? 25 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ...... Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name None
Type: ...... H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 28 ft. below top of well Date Nov 21-76
Artesian pressure ...... lbs. per square inch Date
Artesian water is controlled by ...... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 25 gal./min. with 40 ft. drawdown after 1 hrs.
Artesian flow ...... g.p.m. Date
Temperature of water 58 Was a chemical analysis made? Yes ☐ No ☑

1/12/77

(USE ADDITIONAL SHEETS IF NECESSARY)

(10) WELL LOG: T 7 N R 35

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Top Soil & Clay Brown	0	20
Gravel in Brown clay	20	21
Clay - Brown	21	29
Clay - Tan	29	34
Gravel Brown ~~[illegible]~~	34	62
Clay - Brown	62	64
Gravel some water 62'		
Casing 80-86	64	86

BEGIN AT THE NORTHWEST CORNER OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION [22], TOWNSHIP 7 NORTH RANGE 35, EAST OF THE WILLAMETTE MERIDIAN AND RUNNING THENCE SOUTHERLY ALONG THE WEST LINE OF SAID NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 22, A DISTANCE OF 100 FEET; THE EASTERLY AT RIGHT ANGLES TO SAID WEST LINE OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 22, A DISTANCE OF 50 FEET TO THE SITE OF TEST WELL #3

Work started Nov 14 1976 Completed Nov 21 1976

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Lowell W. Marlatt (Person, firm, or corporation) (Type or print)
Address Rt 2 Box 111 Milton Freewater
[Signed] Lowell W. Marlatt (Well Driller)
License No. C-81 Date Dec. 16, 1976

MW-4

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. ....
Permit No. ....

(1) **OWNER:** Name CITY OF WALLA WALLA Address C/o Public Works Department P. O. Box 478, Walla Walla, WA 99362

(2) **LOCATION OF WELL:** County Walla Walla — SW ¼ SW ¼ Sec. 14 T. 7 N., R. 35 E.W.M.
Bearing and distance from section or subdivision corner SW of Sec. 14 – N16°E 1000 FT. (approx.)

(3) **PROPOSED USE:** Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☒ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one) ....
New well ☒ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Bored ☐ Cable ☒ Driven ☐ Rotary ☐ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 82 ft. Depth of completed well 82 ft.

(6) **CONSTRUCTION DETAILS:**
Plastic Casing installed: 5" Diam. from 0 ft. to 82 ft.
Threaded ☐ ....." Diam. from ..... ft. to ..... ft.
Welded ☐ ....." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☒ No ☐
Type of perforator used DRill
SIZE of perforations 1/8 in. by 6" centers in.
160 perforations from 62 ft. to 82 ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 35 ft.
Material used in seal PORTLAND Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) **PUMP:** Manufacturer's Name .....
Type: ..... H.P. .....

(8) **WATER LEVELS:** Land-surface elevation above mean sea level 810 ft.
Static level 41 ft. below top of well Date 9-14-83
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) **WELL LOG:**

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Topsoil	0	23
Gravel	23	25
Brown Clay + Gravel	25	38
Sand	35	63
Gravel - water	63	82

RECEIVED
OCT 24 1983
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 9-8 1983 Completed 9-15 1983

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME HARDING DRILLING Co. (Person, firm, or corporation) (Type or print)
Address RT 3 So 3RD Walla Walla Wa
[Signed] Mike Harding (Well Driller)
License No. 173 Date 9-19 1983

13/E4/05

(USE ADDITIONAL SHEETS IF NECESSARY)

MW-5

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. ....
Permit No. ....

(1) OWNER: Name CITY OF WALLA WALLA Address C/o Public Works Department P. O. Box 478, Walla Walla, WA 99362

(2) LOCATION OF WELL: County Walla Walla — NW ¼ SE ¼ Sec. 14 T. 7 N., R. 35E W.M.
Bearing and distance from section or subdivision corner SW of Sec. 14 - N. 55°E 4100 FT (approx.)

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☒ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 71 ft. Depth of completed well 71 ft.

(6) CONSTRUCTION DETAILS:
Plastic Casing installed: 5" Diam. from 0 ft. to 71 ft.
Threaded ☐ ....." Diam. from ..... ft. to ..... ft.
Welded ☐ ....." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☒ No ☐
Type of perforator used DRill
SIZE of perforations 1/2 in. by 6" centers in.
160 perforations from 51 ft. to 71 ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 40 ft.
Material used in seal PORTLAND Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level 310 ft.
Static level 32 ft. below top of well Date 8-5-83
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Topsoil	0	41
Gravel	41	56
Brown Clay & Gravel - water	56	71

RECEIVED
OCT 24 1983
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 8-1 1983 Completed 8-6 1983

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME HARDING Drilling Co. (Person, firm, or corporation) (Type or print)
Address Rt 3 So 3rd Walla Walla Wa.
[Signed] Mike Harding (Well Driller)
License No. 173 Date 9-19, 1983

10/24/83

(USE ADDITIONAL SHEETS IF NECESSARY)

MW-6

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. ....

Permit No. ....

(1) OWNER: Name City of Walla Walla Address Box 478

(2) LOCATION OF WELL: County Walla Walla SW ¼ NW ¼ Sec 23 T 7 N., R 35 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☒ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 6

New well ☒ Deepened ☐ Reconditioned ☐

Method: Dug ☐ Bored ☐ Cable ☒ Driven ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2 inches.
Drilled 151 ft. Depth of completed well 151 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 2" Diam. from T 2 ft. to 148 ft.
Threaded ☒ ......" Diam. from ...... ft. to ...... ft.
Welded ☐ ......" Diam. from ...... ft. to ...... ft.

Perforations: Yes ☐ No ☒
Type of perforator used ......
SIZE of perforations ...... in. by ...... in.
...... perforations from ...... ft. to ...... ft.
...... perforations from ...... ft. to ...... ft.
...... perforations from ...... ft. to ...... ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type 316 Model No. ......
Diam. 2 Slot size .010 from 138 ft. to 148 ft.
Diam. ...... Slot size ...... from ...... ft. to ...... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ......
Gravel placed from ...... ft. to ...... ft.

Surface seal: Yes ☒ No ☐ To what depth? ...... ft.
Material used in seal ......
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ...... Depth of strata ......
Method of sealing strata off ......

(7) PUMP: Manufacturer's Name ......
Type: ...... H.P. ......

(8) WATER LEVELS: Land-surface elevation above mean sea level ...... ft.
Static level 63 ft. below top of well Date 10-22-86
Artesian pressure ...... lbs. per square inch Date ......
Artesian water is controlled by ...... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 8 gal./min. with 2 ft. drawdown after 1 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
00	65	01	63		

Date of test 8-26-86
Bailer test ...... gal./min. with ...... ft. drawdown after ...... hrs.
Artesian flow ...... g.p.m. Date ......
Temperature of water 53 Was a chemical analysis made? Yes ☐ No ☒

10/29/86 RW

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Topsoil	0	20
Sand + Brown Clay	20	25
Brown Clay	25	77
Sand + Gravel	77	83
Sand	83	95
Brown Clay + Gravel-wat	95	143
Gravel: water	143	151

7 Sacks 10-20 Filter Sand From 151' To 122'

Pumped in 15 Sacks Vol Clay From 122 To 16'

Sand From 16 To 10'

Put in 12 Sacks Cement From 10' To Ground Level

Work started 8-18 1986 Completed 9-18 1986

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Harding Drilling Co (Person, firm, or corporation) (Type or print)

Address Rt 3 Box 67 Walla Walla W.

[Signed] Mike Harding (Well Driller)

License No. 173 Date 10-24 1986

MW-7

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. ....
Permit No. ....

(1) OWNER: Name City of Walla Walla Address Box 478

(2) LOCATION OF WELL: County Walla Walla SE ¼ SW ¼ Sec 13 T 7 N., R 35 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☒ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 7
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2 inches.
Drilled 181 ft. Depth of completed well 181 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 2" Diam. from 2 ft. to 178 ft.
Threaded ☐ ......" Diam. from ...... ft. to ...... ft.
Welded ☐ ......" Diam. from ...... ft. to ...... ft.

Perforations: Yes ☐ No ☒
Type of perforator used ....
SIZE of perforations ...... in. by ...... in.
...... perforations from ...... ft. to ...... ft.
...... perforations from ...... ft. to ...... ft.
...... perforations from ...... ft. to ...... ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type 304 Model No. ......
Diam. 2 Slot size .010 from 168 ft. to 178 ft.
Diam. ...... Slot size ...... from ...... ft. to ...... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ......
Gravel placed from ...... ft. to ...... ft.

Surface seal: Yes ☒ No ☐ To what depth? ...... ft.
Material used in seal ......
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ...... Depth of strata ......
Method of sealing strata off ......

(7) PUMP: Manufacturer's Name ......
Type: ...... H.P. ......

(8) WATER LEVELS: Land-surface elevation above mean sea level...... ft.
Static level 39 ft. below top of well Date 10-22-86
Artesian pressure ...... lbs. per square inch Date ......
Artesian water is controlled by ...... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 10 gal./min. with 3 ft. drawdown after 1 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
00	42	01	39		

Date of test 10-13-86
Bailer test ...... gal./min. with ...... ft. drawdown after ...... hrs.
Artesian flow ...... g.p.m. Date ......
Temperature of water 53 Was a chemical analysis made? Yes ☐ No ☒

10/29/86 [illegible]

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Topsoil	0	28
Brown Clay	28	40
Brown Clay + Gravel	40	45
Sand	45	68
Sand + Brown Clay	68	79
Brown Clay	79	145
Gravel + a little Brown Clay	145	160
Gravel - water	160	181

7 Sack 10-20 Filter Sand From 181 To 148

Pumped in 15 Sack Vol Clay Fr. 148 To 16

Put in Sand From 16' To 10'

Put in 9 Sacks Portland Cem To Ground Level

Work started 10-1 1986 Completed 10-21 1986

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Harding Drilling Co (Person, firm, or corporation) (Type or print)

Address Rt 3 Box 67 Walla Walla Wa

[Signed] Mike Harding (Well Driller)

License No. 173 Date 10-28 1986

MW-8

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. ______

Water Right Permit No. ______

(1) OWNER: Name City of Walla Walla Address Box 478

(2) LOCATION OF WELL: County Walla Walla NW ¼ NE ¼ Sec 22 T 7N N., R 35 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) ______

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☒ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 12
Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☒ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 10" inches.
Drilled 220 feet. Depth of completed well 130 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 5" Diam. from 130 ft. to +2 ft.
Welded ☐ ______" Diam. from ______ ft. to ______ ft.
Liner installed ☐ ______" Diam. from ______ ft. to ______ ft.
Threaded ☒

Perforations: Yes ☐ No ☒
Type of perforator used ______
SIZE of perforations ______ in. by ______ in.
______ perforations from ______ ft. to ______ ft.
______ perforations from ______ ft. to ______ ft.
______ perforations from ______ ft. to ______ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type PVC Sch 40 Model No. 1A-98
Diam. 5" Slot size .020 from 90 ft. to 105 ft.
Diam. 5" Slot size .020 from 115 ft. to 130 ft.

Gravel packed: Yes ☒ No ☐ Size of gravel 1/4 To 3/4
Gravel placed from 220 ft. to 130 ft.

Surface seal: Yes ☒ No ☐ To what depth? 75' ft.
Material used in seal Bentonite and Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ______ Depth of strata ______
Method of sealing strata off ______

(7) PUMP: Manufacturer's Name ______
Type: ______ H.P. ______

(8) WATER LEVELS: Land-surface elevation above mean sea level ______ ft.
Static level 59 ft. below top of well Date 10-24
Artesian pressure ______ lbs. per square inch Date ______
Artesian water is controlled by ______ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 26 gal./min. with 66 ft. drawdown after 4 hrs.
[redacted] " " "
[redacted] " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
0:00	125				
:03	45				
:08	59				

Date of test 12-5-89

Bailer test ______ gal./min. with ______ ft. drawdown after ______ hrs.
Airtest ______ gal./min. with stem set at ______ ft. for ______ hrs.
Artesian flow ______ g.p.m. Date ______
Temperature of water 52° Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Topsoil	0	21
Silt	21	52
Med-Gravel + Sand	52	58
Med-Gravel	58	63
Med-Gravel + Brown Clay	63	76
Med-Gravel (Water)	76	84
Med-Gravel + Brown Clay	84	121
Brown Clay	121	124
Med Gravel (Water)	124	132
Brown Clay	132	134
Med-Gravel + Brown Clay	134	168
Brown Clay + Small Gravel	168	175
Med Gravel + Brown Clay	175	178
Brown Clay	178	220

10/20 Filter Sand Around 5" Screens From 130' To 75'

From 75' To 13' - Filled with EnviroPl.

From 13' To 10' - Sand Cushion

From 10' To 0' - Neat Cement

RECEIVED
DEC 28 1989
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 10-10 1989 Completed 12-7 1989

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Harding Drilling Co. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address Rt 8 Box 140 Walla Walla Wa.

(Signed) Mike Harding (WELL DRILLER) License No. 173

Contractor's Registration No. HARDIDC132KC Date 12-11 1989

(USE ADDITIONAL SHEETS IF NECESSARY)

8A MW-8A

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 055642

77/2

Water Right Permit No.

(1) OWNER: Name City of Walla Walla Address Box 478 Walla Walla

(2) LOCATION OF WELL: County Walla Walla SW ¼ SW ¼ Sec 35 T. 7 N., R. 14 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Walla Walla Land Fill

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☒ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)

Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☒ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 2 inches.
Drilled 95 feet. Depth of completed well 84 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.
Liner installed ☐
Threaded ☒ 2 " Diam. from +2 ft. to 63 ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type Stainless Steel Model No 316L
Diam. 2 Slot size .010 from 63 ft. to 28 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 61 ft.
Material used in seal Cement Vol-Clay
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 62 ft. below top of well Date 11-18-91
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 15 gal./min. with 3 ft. drawdown after 1 hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date 11-18-91
Temperature of water 57° Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Topsoil	0	21
Silt	21	52
Gravel + Sand	52	58
Gravel - water	58	63
Gravel + Brown Clay	63	76
Gravel - water	76	84
Gravel + Brown Clay	84	95
Vol-Clay From 95 To 84'		
10/20 Filter Sand 84' To 61'		
Vol-Clay From 61' To 10'		
Neat Cement From 10' To 0'		

Work started 10-30, 1991 Completed 11-18, 1991

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Harding Drilling Co. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address Rt 8 Box 106 Walla Walla, W.
(Signed) Mike Harding (WELL DRILLER) License No. 173
Contractor's Registration No. HARDIDC#132KK Date 11-20, 1991

(USE ADDITIONAL SHEETS IF NECESSARY)

Well #9 MW-9

File Original and First Copy with Department of Ecology
Second Copy—Owner's Copy
Third Copy—Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 055647

Water Right Permit No.

(1) OWNER: Name City of Walla Walla Address Box 478 Walla Walla

(2) LOCATION OF WELL: County Walla Walla NE ¼ NE ¼ Sec 23 T 7 N., R 35 W.M.

(2a) STREET ADDDRESS OF WELL (or nearest address) Walla Walla Landfill

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☒ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 9

Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☒ Rotary ☐ Bored ☐ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 10 inches.
Drilled 210 feet. Depth of completed well 83 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 10" Diam. from +1 ft. to 73 ft.
Welded ☐ 5" Diam. from +2 ft. to 83 ft.
Liner installed ☐ " Diam. from ft. to ft.
Threaded ☐

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name Johnson
Type PVC-Type [illegible] Model No.
Diam. 5 Slot size .010 from 63 ft. to 83 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 61 ft.
Material used in seal Vol-Clay, [illegible]
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Grundfos
Type: Sub. H.P. ½

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 65 ft. below top of well Date 10-29-91
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 15 gal./min. with 5 ft. drawdown after 1 hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date 10-25-91
Temperature of water 54 Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Topsoil - Br. clay	0	35
Br. clay	35	47
medium gravel Br. clay	47	55
Sm. gravel Br. clay	55	66
Br. clay	66	68
Sm gravel Br. clay water	68	75
Sm gravel Blue clay	75	83
Sm gravel Brown clay	83	102
Brown-Red clay sm gravel	102	119
Sm gravel Brown clay	119	140
Brown-Red clay - sm gravel	140	182
Fine silt & sand light Br. clay	182	188
Fine sand light Br. clay w/yellow	188	210
Blue clay	210	211
Vol-Clay From 211 To 85'		
10/20 Filter Sand Around 5" PVC		
Screen From 85' To 61		
Vol-Clay From 61' To 10'		
Neat Cement 10' To 0		
Back filled to 83'		

Work started 9-20, 1991 Completed Oct 29, 1991

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Harding Drilling Co (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address Rt 8 Box 106 Walla Walla Wa 99
(Signed) Gerald L Harding (WELL DRILLER) License No 1698
Contractor's Registration No. HARDIDC#132NC Date 11-25, 1991

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

MW-10

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 0760?
UNIQUE WELL I.D. # AAW?
Water Right Permit No. ______

(1) OWNER: Name City of Walla Walla Address ______

(2) LOCATION OF WELL: County Walla Walla NW 1/4 ______ 1/4 Sec 12 T. 7N N., R.?

(2a) STREET ADDRESS OF WELL (or nearest address) farmers field

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☒ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (If more than one) MW-10
Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐ Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☒ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 47 feet. Depth of completed well 45.6 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 2" Diam. from T3 ft. to 30.6 ft.
Welded ☐ ______" Diam. from ______ ft. to ______ ft.
Liner installed ☐ ______" Diam. from ______ ft. to ______ ft.
Threaded ☒

Perforations: Yes ☐ No ☒
Type of perforator used ______
SIZE of perforations ______ in. by ______ in.
______ perforations from ______ ft. to ______ ft.
______ perforations from ______ ft. to ______ ft.
______ perforations from ______ ft. to ______ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type PVC Sch 40 Model No. ______
Diam. ______ Slot size ______ from ______ ft. to ______ ft.
Diam. ______ Slot size ______ from ______ ft. to ______ ft.

Gravel packed: Yes ☒ No ☐ Size of gravel 10-20 Sand
Gravel placed from 32 ft. to 47 ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal Bentonite Chips
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ______ Depth of strata ______
Method of sealing strata off ______

(7) PUMP: Manufacturer's Name N/A
Type: ______ H.P. ______

(8) WATER LEVELS: Land-surface elevation above mean sea level ______ ft.
Static level ______ ft. below top of well Date ______
Artesian pressure ______ lbs. per square inch Date ______
Artesian water is controlled by ______ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ______
Yield: ______ gal./min. with ______ ft. drawdown after ______ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ______
Bailer test ______ gal./min. with ______ ft. drawdown after ______ hrs.
Airtest ______ gal./min. with stem set at ______ ft. for ______ hrs.
Artesian flow ______ g.p.m. Date ______
Temperature of water ______ Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTI[ON]

Formation: Describe by color, character, size of material and structure, and show thickne[ss] and the kind and nature of the material in each stratum penetrated, with at least one e[ntry for each] change of information.

MATERIAL	FROM
MW # 10	
Soft moist silt	0
Hard silt trace of gravel	25
Silt moist med brown	36
Hard silt trace of basalt,	40
Gravel fine to course	
Saturated	
Perched water	25

Work Started 12-27-93, 19__. Completed 12-27-93

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this we[ll, and its] compliance with all Washington well construction standards. Materials [used and] the information reported above are true to my best knowledge and belief.

NAME Environmental West Exp. I. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address ______
(Signed) [signature] (WELL DRILLER) License No. 18
Contractor's Registration No. ENVIRWE101PP Date 12-27

(USE ADDITIONAL SHEETS IF NECESSARY)

TOTAL P.02

LOG OF EXPLORATORY BORING

PROJECT NAME	Stokely USA, Inc.	BORING NO.	10
LOCATION	Walla Walla, Washington	PAGE	1 OF 3
DRILLED BY	Environmental West Exploration	GROUND ELEV.	
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	47.00'
LOGGED BY	Craig Schwyn	DATE COMPLETED	12/27/93

SAMPLING METHOD AND NUMBER	PID (in ppm)	BLOWS PER 6-INCHES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
								0 to 27.0 feet: SILT (ML), grayish brown, trace fine to medium sand, low plasticity, damp.
		5-11-15		5				@ 5.0 feet: no sand, mottled white, 1/8-inch laminations.
		8-7-8		10				@ 10.0 feet: light olive brown, trace angular fine sand.
		3-5-6		15				@ 14.5 to 14.8 feet: lense with some medium to fine sand.
		4-4-4		20				

REMARKS

LOG OF EXPLORATORY BORING

PROJECT NAME	Stokely USA, Inc.	BORING NO.	10
LOCATION	Walla Walla, Washington	PAGE	2 OF 3
DRILLED BY	Environmental West Exploration	GROUND ELEV.	
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	47.00'
LOGGED BY	Craig Schwyn	DATE COMPLETED	12/27/93

SAMPLING METHOD AND NUMBER	PID (in ppm)	BLOWS PER 6-INCHES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
								0 to 27.0 feet: SILT (ML), continued.
		5-7-30	24.22					
				25				@ 25.0 feet: trace sand, mottled brown and reddish brown, saturated.
								27.0 to 34.0 feet: SILTY GRAVEL (GM), reddish brown, little fine to coarse sand with some silt. Angular basalt gravel up to 1 1/2-inch diameter.
		33-38-50						
				30				
		1-1-1						34.0 to 37.0 feet: GRAVELLY SILT (CL), silt with some gravel, very soft.
				35				
								37.0 to 47.0 feet: SILTY GRAVEL (GM), reddish brown, little fine to coarse sand, angular basalt gravel, very hard drilling.
				40				

REMARKS

LOG OF EXPLORATORY BORING

PROJECT NAME	Stokely USA, Inc.	BORING NO.	10
LOCATION	Walla Walla, Washington	PAGE	3 OF 3
DRILLED BY	Environmental West Exploration	GROUND ELEV.	
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	47.00'
LOGGED BY	Craig Schwyn	DATE COMPLETED	12/27/93

SAMPLING METHOD AND NUMBER	PID (in ppm)	BLOWS PER 6-INCHES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	WELL DETAILS	LITHOLOGIC DESCRIPTION
								37.0 to 47.0 feet: SILTY GRAVEL (GM), continued.
				45				
								@ 47.0 feet: no sample attempt: hard gravel.
								Total depth drilled = 47.0 feet.
				50				
				55				
				60				

WELL COMPLETION DETAILS:

+2.3 to 29.4 feet: 2-inch-diameter, flush-threaded, schedule 40 PVC blank riser pipe.

29.4 to 44.7 feet: 2-inch-diameter, flush-threaded, schedule 40 PVC well screen with 0.010-inch machined slots and a 2-inch-diameter threaded end cap.

+3.0 to 3.0 feet: 6-inch-diameter, locking steel riser pipe.

+0.4 to 2.0 feet: Concrete.

2.0 to 27.0 feet: Bentonite chips hydrated with potable water.

27.0 to 47.0 feet: 10 - 20 Colorado Silica Sand.

REMARKS

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 17772
UNIQUE WELL I.D. # ABJ 926
Water Right Permit No. ______

(1) OWNER: Name City of Walla Walla Address P.O. Box 478 Walla Walla, WA 99362

(2) LOCATION OF WELL: County Walla Walla — NE 1/4 NE 1/4 Sec 22 T. 7N N., R 35E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Walla Walla, landfill

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☒ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (If more than one) MW# 11
Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☒ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 41 feet. Depth of completed well 41 ft.

(6) CONSTRUCTION DETAILS:
Casing Installed: 2 " Diam. from +3 ft. to 26 ft.
Welded ☐ " Diam. from ___ ft. to ___ ft.
Liner installed ☐
Threaded ☒ " Diam. from ___ ft. to ___ ft.

Perforations: Yes ☐ No ☒
Type of perforator used ______
SIZE of perforations ___ in. by ___ in.
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.
___ perforations from ___ ft. to ___ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type PVC Sch40 Model No. ___
Diam. 2" Slot size .010 from 26 ft. to 41 ft.
Diam. ___ Slot size ___ from ___ ft. to ___ ft.

Gravel packed: Yes ☒ No ☐ Size of gravel 10/20 Sand
Gravel placed from 23 ft. to 41 ft.

Surface seal: Yes ☒ No ☐ To what depth? 23 ft.
Material used in seal Bentonite Chips
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ___ Depth of strata ___
Method of sealing strata off ___

(7) PUMP: Manufacturer's Name N/A
Type: ___ H.P. ___

(8) WATER LEVELS: Land-surface elevation above mean sea level ___ ft.
Static level ___ ft. below top of well Date ___
Artesian pressure ___ lbs. per square inch Date ___
Artesian water is controlled by ___ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ___
Yield: ___ gal./min. with ___ ft. drawdown after ___ hrs.
" " " "
" " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ___
Bailer test ___ gal./min. with ___ ft. drawdown after ___ hrs.
Airtest ___ gal./min. with stem set at ___ ft. for ___ hrs.
Artesian flow ___ g.p.m. Date ___
Temperature of water ___ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MW# 11 MATERIAL	FROM	TO
silt, dark brown saturated at 29 ft.	0	41

Work Started 2-10, 1995 Completed 2-10, 1995

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Environmental West Exploration (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address P.O. Box 11095, Spokane, WA
(Signed) Dan Claassen (WELL DRILLER) License No. 1827

Contractor's Registration No. ENVIROE101PP Date 2-11, 1995

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (206) 407-6600. The TDD number is (206) 407-6006.

ECY 050-1-20 (9/93)

LOG OF EXPLORATORY BORING

PROJECT NAME	**Walla Walla, Washington**	BORING NO.	**MW-11**
LOCATION	**Sudbury Road Landfill**	PAGE	**1 OF 2**
DRILLED BY	**Environmental West**	GROUND ELEV.	**791.65'**
DRILL METHOD	**Hollow Stem Auger**	TOTAL DEPTH	**41.00'**
LOGGED BY	**John Latta**	DATE COMPLETED	**02/10/95**

SAMPLING METHOD AND NUMBER	GROUND WATER LEVELS	BLOWS PER 6 INCHES	DEPTH IN FEET	SAMPLES	BORING DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
			0				**0 to 14.0 feet: SILT (ML)**, dark olive gray, stiff, damp. Mottled appearance. Roots. Micaceous. (FILL)
SS		14-16-30	5				
SS		12-20-29	10				
			14				14.0 to 41.5 feet: SILT (ML), light brownish gray, a few percent fine to medium sand, soft, damp. (ALLUVIUM)
SS		4-5-8	15				@ 15.0 feet: roots.
SS		2-4-8	20				
SS		6-14-24	25				@ 25.0 feet: light orange gray locally due to mottled iron oxide staining, stiff.
SS	▽ 2/10/95 29.50'	4-6-11	30				@ 30.0 feet: wet, mottled iron oxide stain.
SS		9-15-23	35				@ 35.0 feet: mottled iron oxide stain, micaceous, wet.
			40				

REMARKS

(1) Washington Department of Ecology Unique Well No. ABJ 926. (2) SS = Split-spoon sampler driven by a 140-pound hammer with a 30-inch drop. Split-spoon is 2-1/2 I.D. unless otherwise noted. (3) Consistency of fines based upon blow counts.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	Walla Walla, Washington	BORING NO.	MW-11
LOCATION	Sudbury Road Landfill	PAGE	2 OF 2
DRILLED BY	Environmental West	GROUND ELEV.	791.65'
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	41.00'
LOGGED BY	John Latta	DATE COMPLETED	02/10/95

SAMPLING METHOD AND NUMBER	GROUND WATER LEVELS	BLOWS PER 6 INCHES	DEPTH IN FEET	SAMPLES	BORING DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
SS		11-30-50/5"					**14.0 to 41.5 feet: SILT (ML)**, continued. @ 40.0 feet: orange gray to light brownish gray, very stiff to hard, wet, mottled iron oxide stain. Total depth drilled = 41.0 feet. Total depth sampled = 41.5 feet.
			45				
			50				
			55				
			60				
			65				
			70				
			75				
			80				

WELL COMPLETION DETAILS:

0 to 25.5 feet: 2-inch-diameter, flush-threaded, Schedule 40 PVC blank riser pipe.

25.5 to 40.5 feet: 2-inch-diameter, flush-threaded, Schedule 40 PVC well screen with 0.010-inch machined slots (screened 26.0 to 40.0 feet).

40.5 to 41.0 feet: 2-inch-diameter threaded end cap.

0 to 1.0 foot: Concrete.

1.0 to 23.0 feet: Bentonite chips hydrated with potable water.

23.0 to 41.0 feet: 10 - 20 Colorado Silica Sand.

REMARKS

(1) Washington Department of Ecology Unique Well No. ABJ 926. (2) SS = Split-spoon sampler driven by a 140-pound hammer with a 30-inch drop. Split-spoon is 2-1/2 I.D. unless otherwise noted. (3) Consistency of fines based upon blow counts.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	Walla Walla, Washington	BORING NO.	MW-12
LOCATION	Sudbury Road Landfill	PAGE	1 OF 2
DRILLED BY	Environmental West	GROUND ELEV.	823.53'
DRILL METHOD	Hollow Stem Auger	TOTAL DEPTH	62.00'
LOGGED BY	John Latta	DATE COMPLETED	02/10/95

SAMPLING METHOD AND NUMBER	GROUND WATER LEVELS	BLOWS PER 6 INCHES	DEPTH IN FEET
SS		2-4-6	5
SS		9-13-17	10
SS		9-20-20	15
SS		14-20-25	20
SS		7-26-40	25
SS		29-50/5"	30
SS		36-33-39	35
			40

LITHOLOGIC DESCRIPTION

0 to 17.0 feet: SILT (ML), light brownish gray with a trace of fine to medium sand, stiff, damp. Bedded and laminated locally. Micaceous.

17.0 to 23.0 feet: CLAYEY SILT (ML/CL), light brownish gray to brown, silt with a little to few percent clay, very stiff, damp. Laminated and bedded.

23.0 to 45.0 feet: SILT (ML), light brownish gray to brown, hard, damp.

@ 30.0 feet: 1/2-inch-thick vertical clastic dike filled with fine to medium sand.

REMARKS

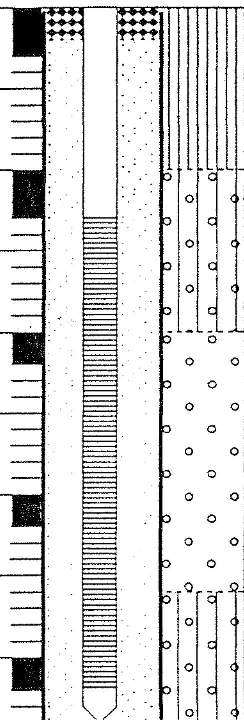
(1) Washington Department of Ecology Unique Well No. ABJ 927. (2) SS = Split-spoon sampler driven by a 140-pound hammer with a 30-inch drop. Split-spoon is 2-1/2 I.D. unless otherwise noted. (3) Consistency of fines based upon blow counts.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	**Walla Walla, Washington**	BORING NO.	**MW-12**
LOCATION	**Sudbury Road Landfill**	PAGE	**2 OF 2**
DRILLED BY	**Environmental West**	GROUND ELEV.	**823.53'**
DRILL METHOD	**Hollow Stem Auger**	TOTAL DEPTH	**62.00'**
LOGGED BY	**John Latta**	DATE COMPLETED	**02/10/95**

SAMPLING METHOD AND NUMBER	GROUND WATER LEVELS	BLOWS PER 6 INCHES	DEPTH IN FEET	LITHOLOGIC DESCRIPTION
SS		14-30-50/3"		**23.0 to 45.0 feet: SILT (ML)**, continued. @ 40.0 feet: mottled appearance due to caliche.
3" SS		8-23-50	45	**45.0 to 50.0 feet: SILTY GRAVEL (GP-GM)**, brown, medium to coarse subrounded basaltic gravel and some silt, hard, wet.
3" SS	▽ 2/10/95 50.75'	40-50/5"	50	**50.0 to 58.0 feet: GRAVEL (GP)**, dark brownish gray, coarse to medium subrounded basaltic gravel, a few percent fine subrounded basaltic gravel, a few percent coarse to fine sand, and a trace silt, hard drilling, wet to moist.
3" SS		9/1'-50/4"	55	
3" SS		6/1"-50/2"	60	**58.0 to 62.0 feet: SILTY SANDY GRAVEL (GP-GM)**, brown, fine subrounded basaltic gravel with a few percent of medium to coarse; subrounded basaltic gravel, some coarse to medium sand, some fine sand and some silt, hard drilling, wet.
			65	Total depth drilled = 62.0 feet. Total depth sampled = 62.0 feet.
			70	
			75	
			80	



WELL COMPLETION DETAILS:

0 to 46.5 feet: 2-inch-diameter, flush-threaded, Schedule 40 PVC blank riser pipe.

46.5 to 61.5 feet: 2-inch-diameter, flush-threaded, Schedule 40 PVC well screen with 0.010-inch machined slots (screened 47.0 to 61.0 feet).

61.5 to 62.0 feet: 2-inch-diameter threaded end cap.

0 to 41.0 feet: Bentonite chips hydrated with potable water.

41.0 to 62.0 feet: 10 - 20 Colorado Silica Sand.

REMARKS

(1) Washington Department of Ecology Unique Well No. ABJ 927. (2) SS = Split-spoon sampler driven by a 140-pound hammer with a 30-inch drop. Split-spoon is 2-1/2 I.D. unless otherwise noted. (3) Consistency of fines based upon blow counts.

EMCON

MW-12

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. R 17774
UNIQUE WELL I.D. # ABJ 927
Water Right Permit No.

(1) OWNER: Name City of Walla Walla Address P.O. Box 478 Walla Walla, WA 99362

(2) LOCATION OF WELL: County Walla Walla SE 1/4 SW 1/4 Sec 14 T. 7 N., R 36E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) Walla Walla landfill

(3) PROPOSED USE: ☐ Domestic ☐ Irrigation ☐ DeWater Industrial ☐ Test Well ☒ Municipal ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (If more than one) MW#12
Abandoned ☐ New well ☒ Deepened ☐ Reconditioned ☐
Method: Dug ☐ Cable ☐ Rotary ☐ Bored ☒ Driven ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 62 feet. Depth of completed well 62 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 2" Diam. from +3 ft. to 47 ft.
Welded ☐ " Diam. from ft. to ft.
Liner installed ☐ " Diam. from ft. to ft.
Threaded ☒

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☒ No ☐
Manufacturer's Name Johnson
Type PVC Sch 40 Model No.
Diam. 2" Slot size .010 from 47 ft. to 62 ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☒ No ☐ Size of gravel 10/20 sand
Gravel placed from 41 ft. to 62 ft.

Surface seal: Yes ☒ No ☐ To what depth? 41 ft.
Material used in seal Bentonite chips
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name N/A
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level ft. below top of well Date
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Airtest gal./min. with stem set at ft. for hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MW#12 MATERIAL	FROM	TO
silt, light brown, dry	0	20
clayey silt, brown	20	25
silt, dark brown dry	25	45
silty gravel, cobbles, some fine sand.	45	62
saturated at 50 ft.		

Work Started 2-9, 19 95 Completed 2-10, 19 95

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Environmental West Exploration (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address P.O. Box 11095, Spokane WA
(Signed) Dan Claassen (WELL DRILLER) License No. 1827
Contractor's Registration No. ENVIRWE101PP Date 2-11, 19 95

(USE ADDITIONAL SHEETS IF NECESSARY)

Garver Well

Appli. 8758
Per. 8090

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

WELL LOG

Record by: Driller

Source: Driller's Record

Location: State of WASHINGTON

County: Walla Walla

Area:

Map:

NE ¼ SW ¼ sec 14 T 7 N., R 35E E. W.

Diagram of Section

Drilling Co. Moore & Anderson

Address: P. O. Box 1228- Walla Walla, Washington

Method of Drilling: cable Date: November 30 19 67

Owner: Richard Garver

Address: P. O. Box 1002 Walla Walla, Washington

Land surface, datum ... ft. above / below

SWL: 150' Date: Dec. 8, 19 67 Dims.: 12x10"x 1227

(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)

Correlation	Material	From (feet)	To (feet)
	Irrigation		
	Clay and soil	0	29
	Clay w/coarse sand & some gravel, brn	3	32
	Clay, brown, some gravel	11	43
	Clay, brown	28	71
	Clay and gravel	3	74
	Gravel	14	88
	Clay & gravel	5	93
	Gravel (water to drill with at 116')	57	150
	Gravel with clay	10	160
	Gravel (Static level 100')	19	179
	Gravel & clay	18	197
	Gravel	13	210
	Clay & Gravel, sticky brown	6	216
	Clay, gray	4	220

Turn up

Sheet ___ of ___ sheets

Garver Well

WELL LOG.—Continued

No.........../...........-...........

Correlation	Material	From (feet)	To (feet)
	Depth forward	68	288
	Clay, greenish gray		
	Clay, blue	21	309
	Clay, dark blue	25	334
	Clay, dark, green	38	372
	Clay, lighter green with some hard shale	10	382
	Clay, dark green	28	410
	Shale, dark gray, hard	2	412
	Rock & Gravel, broken with some clay	10	422
	Shale, brwon	10	432
	Gravel, with some clay	13	445
	Clay, brown	14	459
	Clay, brown, sticky	3	462
	Clay, brown	35	497
	Clay, blue	25	522
	Shale, blue	10	532
	Blackrock	8	540
	Rock, gray	10	550
	Soapstone, yellow-white, reddish brn.	6	556
	Rock, reddish brown, harder	4	560
	Rock, gray, hard	57	617
	Rock, dark gray	23	640
	Rock, dark gray, softer	10	650
	Rock, black w/some blue, broken soapstone (Static level 200')	13	663
	Rock, black	23	686
	Rock, black w/ grn shale	33	719
	Shale, brown	2	721
	Rock, black	9	730
	Rock, blck w/blue soapstone	27	757
	Rock, black(Static level 173')	24	781

S. F. No. 7449—OS—12-65.

Garver Well

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

WELL LOG

Record by..

Source..

Location: State of WASHINGTON

County..

Area..

Map..

........¼ ....¼ sec........T........N., R........ E. W.

Diagram of Section

Drilling Co...

Address..

Method of Drilling........................ Date........................, 19......

Owner..

Address..

Land surface, datum........................ft. above below

SWL:.................... Date........................, 19...... Dims.:....................

Correlation	Material	From (feet)	To (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Rock, black, harder	15	796
	Rock, black, softer	33	829
	Rock, gray, softer	36	865
	Rock, gray, hard	11	876
	Rock, black	176	1052
	Rock, gray	9	1061
	Rock, black(Water at 1077')	137	1198
	Changed to 10" hole at 1100'		
	Static level 169' hole at 1131'		
	Static level 162' hole at 1136'		
	Static level 159' hole at 1151'		
	Static level 157' hole at 1170'		
	Rock, gray	2	1200
	Rock, black (Static level 155')	18	1218
	Rock, gray " " 154'	9	1227
	After pumping Static level was	at 150'	

Turn up

Sheet........of........sheets

Schwyn Environmental Services

Log of Exploration

Exploration No. **MW-12b**

Sheet 1 of 5

Project: City of Walla Walla Sudbury Road Landfill Monitoring Well MW-12 Replacement

Start Date: 8/28/2008
Finish Date: 8/29/2008
Weather Conditions: Clear, Warm
Geologist: Craig Schwyn
Driller: Environmental West Exp.
Method: 6-in dia. TUBEX

Well Construction
Ground El: 825.37 PVC Casing El: 828.26 Datum: NAVD 88
Total Depth (BGL): 80.5 ft
Completion: 6-in. dia. locking steel monument with concrete surface pad
Seal (BGL): Bentonite chips 1.5 to 58 ft
Sandpack (BGL): Colo. silica sand (6 ft 10/20 & 16.5 ft 20/40) 58 to 80.5 ft.
Casing: 2-in. dia. flush threaded PVC +2.8 to 60.0 ft BGL
Screen: 0.01-in. slot PVC 60 to 80 ft BGL, with 4 in. bottom cap

Water Level Information

Date:	8/28/08	8/29/08
Time:	3:00	1:40
Depth to Water (ft BGL):	59.7	
Depth to Water (ft BTOC):		62.20

Sample Number	Sample Interval Top/Bot	Blows per 6-inch Interval	Sampler Type	Depth (feet)	USCS Symbol	**Sample Description**	Comments Drilling Action
	0		Grab	0	**ML**	Light brown **Silt**, trace sand, low plasticity, laminated, soft, dry.	
				1			
				2			
				3			
				4			
	5		Drill Chips	5			
				6			
				7			
				8			
	9.5 / 11	10 / 12 / 11	1.5-in SPT	9		Damp	
				10			
				11			
				12			
				13			
				14			
	15		Drill Chips	15			
				16			
				17			
				18			
	19.5 / 21	7 / 10 / 14	1.5-in SPT	19		Moist	
				20			

Schwyn Environmental Services

Log of Exploration

Exploration No. **MW-12b**

Project: City of Walla Walla Sudbury Road Landfill Monitoring Well MW-12 Replacement

Sample Number	Sample Interval Top / Bot	Blows per 6-inch Interval	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
				21	**ML**	Light brown **Silt** (continued) trace sand, low plasticity, laminated, stiff, moist.	
				22			
				23			
				24			
	25		Drill Chips	25			
				26			
				27			
				28			
	29.5 / 31	12 / 16 / 17	1.5-in SPT	29			
				30			
				31			
				32			
				33			
				34			
	35		Drill Chips	35			
				36			
				37			
				38			
				39		Clayey silt, whitish mottling, moderate plasticity.	
	39.5 / 41	8 / 12 / 16	1.5-in SPT	40			
				41			
				42			
				43			
				44			
	45		Drill Chips	45			

Project: City of Walla Walla Sudbury Road Landfill Monitoring Well MW-12 Replacement

Sample Number	Sample Interval Top / Bot	Blows per 6-inch Interval	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
				46–47	ML	Light brown **Silt** (continued) trace sand, low plasticity, laminated, stiff, moist.	
	49.5 / 50	100 / 8"	1.5-in SPT	48–50	GM	Brown silty **Gravel** with sand, 0.5 - 1" sub-rounded basalt gravel, up to 40% clay/silt matrix, very dense, moist.	Drilling slows @ 48'
	55		Drill Chips	55		Dark brown, sandy Gravel with little silt.	
	59.5 / 61	9 / 16 / 25	1.5-in SPT	59–60	SM	Dark reddish brown fine **Sand** with little silt, dense, wet. @ 60.5: Whitish brown Silt with some fine sand.	∇ ATD Water @ 59.7' BGL
				61	GM	Grayish brown gravely **Sand** with silt. Sub-rounded gravel up to 1/2 inch, very dense, wet.	Interlayered wet and moist zones from 60 to 72 ft.
	64.5 / 65	100 / 6"	1.5-in SPT	64–65		Dark brown fine **Gravel** with silty sand matrix, sub-angular gravel, approx. 40% silty sand matrix, very dense, wet.	
	69.5 / 71	6 / 8 / 15	1.5-in SPT	69–70	ML	Reddish brown **Silt** with clay and little fine to medium sand, with clay and little fine to medium sand, hematite red staining,	

Exploration No. **MW-12b**

Sheet 4 of 5

Log of Exploration

Project: City of Walla Walla Sudbury Road Landfill Monitoring Well MW-12 Replacement

Sample Number	Sample Interval Top / Bot	Blows per 6-inch Interval	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
				71	**ML**	Reddish brown **Silt** (continued) with clay and little fine to medium sand, hematite red staining, very stiff, moist to wet.	
				72			Drilling slows
				73			
				74			
	74.5 / 75	100 / 5"	1.5-in SPT	75	**GM**	Grayish brown **Gravel** with little silty sand, sub-rounded basaltic gravel up to 1.5 inches, very dense, wet.	
				76			Producing substantial water
				77			
				78			
				79			
	79.5 / 80	100 / 7"	1.5-in SPT	80		Approximate 30% silt sand matrix	Water @ 59.7' BGL

Boring terminated at 80.5 ft

Notes:
1. Lithologic descriptions and stratigraphic contacts are based on field interpretations and are approximate.
2. Refer to "Soil Classification and Key" figure for explanation of graphics and symbols.
3. BGL = below ground level
4. BTOC = blow top of casing
5. ATD = at time of drilling

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COURSE GRAINED SOILS More than 50% retained on No. 200 sieve	**GRAVEL** More than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND More than 50% of coarse fraction retained on No. 4 sieve	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% passes No. 200 sieve	**SILT AND CLAY** liquid limit less than 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY liquid limit more than 50	INORGANIC	MH	HIGH-PLASTICITY SILT, ELASTIC SILT
			CH	HIGH-PLASTICITY CLAY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

Notes:
1. Field classification is based on visual examination of soil in general accordance with ASTM D2488.
2. Where laboratory index testing has been conducted, soil classification is based on ASTM D2487.
3. USCS group symbols correspond to the symbols used by the Unified Soil Classification System and ASTM Classification methods.

Schwyn Environmental Services

Soil Classification and Key

MW-14

SAMPLE DATA

Sample Number & Interval	Sampler Type	Blows/Foot	Test Data
1	b2	22	
2	b2	27	
3	b2	41	
4	b2	33	
5	b2	42	
6	b2	45	
7	b2	53	
8	b2	36	
9	b2	45	
10	b2	38	
11	b2	33	
12	b2	23	
13	b2	NA	

SOIL PROFILE

Drilling Method: Hollow-stem Auger

Ground Elevation (ft): 831 (MSL)

Drilled By: Environmental West

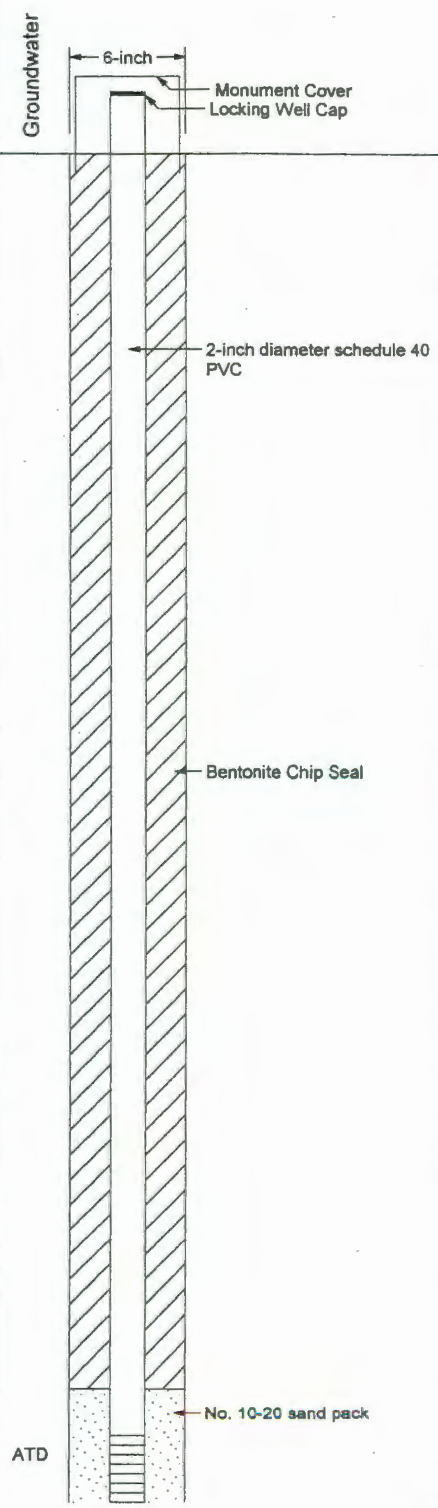
USCS Symbol: ML

Brown SILT.
Silt with trace clay. Low plasicity. Very stiff. Damp.

Light brown silt with trace subangular fine sand. Low plasticity. Very stiff. Wet.

Moisture increasing.

WELL DETAIL



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

Log of Boring and Well MW-14

MW-14

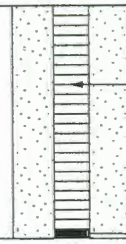
Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Soil Profile	Groundwater
70	14	b2	35			ML	Silt with clay, and fine to medium angular sand. Capillary fringe. Wet.	
	15	b2	22					
						GM	**SILTY GRAVEL with sand.** Based on drilling action.	
80								

Drilling Method: Hollow-stem Auger

Ground Elevation (ft): 831 (MSL)

Drilled By: Environmental West

WELL DETAIL



Boring Completed 08/12/99
Total Depth of Boring = 82.0 ft.

Well Completed 08/12/99
Elevation at Top of Protective Casing = 833.46 ft.
Elevation at Top of Well Casing = 833.23 ft.
Total Depth of Well = 82 ft.

90

100

110

120

130

140

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

MW-15

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

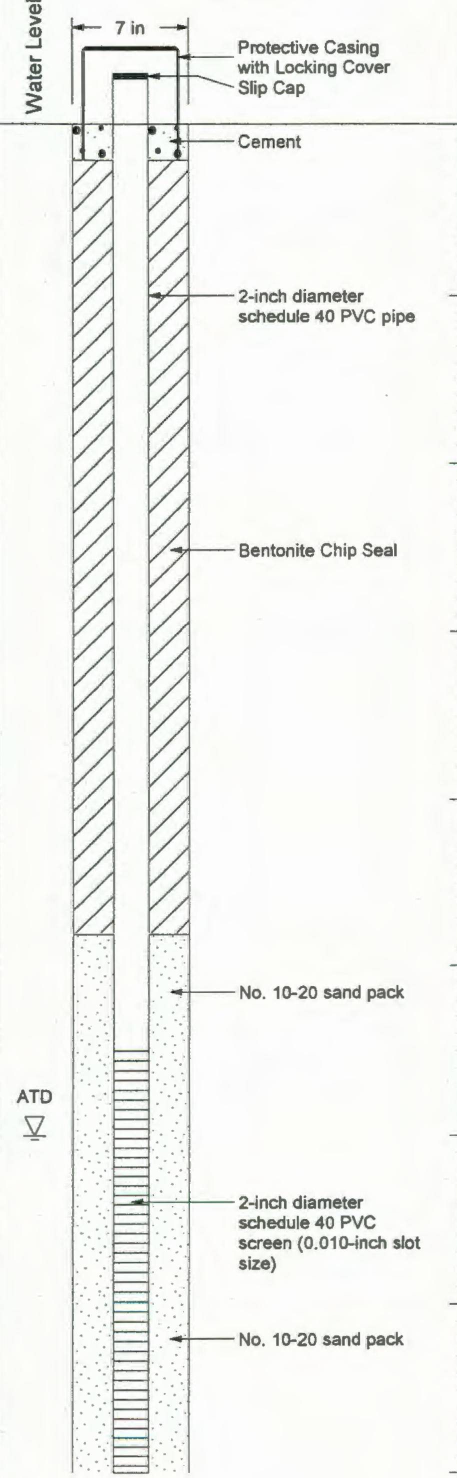
Drilling Method: TUBEX Air Rotary

Ground Elevation (ft): 787.0 (MSL)

Drilled By: Environmental West

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Description	Water Level
0						ML ML	Brown SILT. Low plasticity. moist.	
10	D-1	b2	21			ML	Brown SILT. Low plasticity. Very stiff, moist.	
20	D-2	b2	36			ML	Brown SILT. Low plasticity. Very stiff, moist.	
30	D-3	b2	50/4"			ML	Brown SILT interbedded with 1/4-inch lenses of fine, basalt sand. Subangular. Hard, very moist to wet.	ATD ∇
35	D-4	b2	85			ML	Brown SILT. Hard, moist.	

Well Detail



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

MW-15

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Description	Water Level
40	D-5	b2	66			ML	Brown SILT with trace of sand and 1-inch rounded gravel. Hard, wet.	
						GW		
45	D-6	b2	50/5"				Brown sandy GRAVEL with silt. Surounded. Very dense, wet.	

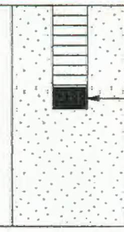
SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: TUBEX Air Rotary

Ground Elevation (ft): 787.0 (MSL)

Drilled By: Environmental West

Well Detail



Boring Completed 07/17/01
Total Depth of Boring = 46.5 ft.

Well Completed 07/17/01
Total Depth of Well = 43.0 ft.

Depth (ft): 40, 45, 50, 55, 60, 65, 70, 75, 80

Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

Landau Associates

Sudbury Road Landfill
Walla Walla, Washington

Log of Boring and Well MW-15

Figure A-2 (2 of 2)

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS[2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to the symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM) for a sand or gravel indicate a soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*, as outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the *Standard Test Method for Classification of Soils for Engineering Purposes*, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent: > 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents: > 30% and ≤ 50% - "very gravelly," "very sandy," "very silty," etc.
> 15% and ≤ 30% - "gravelly," "sandy," "silty," etc.
Additional Constituents: > 5% and ≤ 15% - "with gravel," "with sand," "with silt," etc.
≤ 5% - "trace gravel," "trace sand," "trace silt," etc., or not noted.

Drilling and Sampling Key

SAMPLE NUMBER & INTERVAL

Sample Identification Number
Recovery Depth Interval
1 Sample Depth Interval
Portion of Sample Retained for Archive or Analysis

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Other - See text if applicable

Groundwater

▽ ATD Approximate water elevation at time of drilling (ATD) or on date noted. Groundwater levels can fluctuate due to precipitation, seasonal conditions, and other factors.

Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Log of Exploration

Schwyn Environmental Services

Monitoring Well ID: MW-16

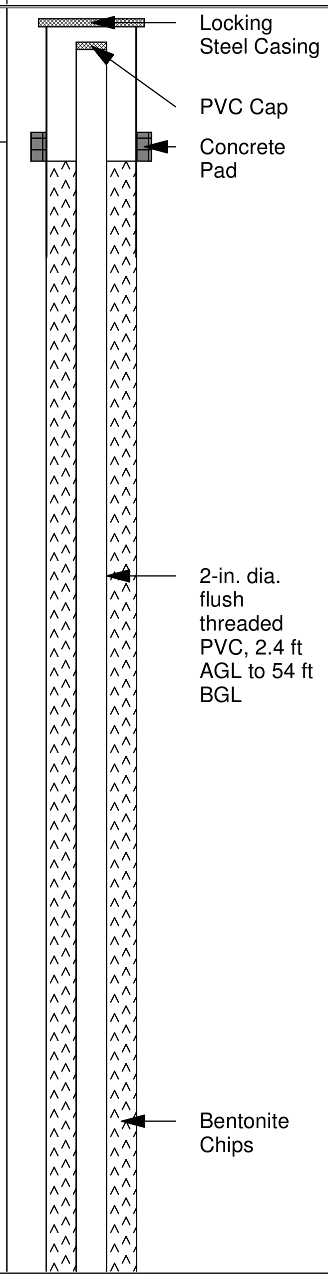
Drill Date: 8/31/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6" Tubex
Sample Method: Grab/2.4" SS
Boring Diameter: 6.5-in
Boring Depth (ft BGS): 69 ft.
Groundwater (ft BTOC): 58.02

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road Landfill
Ground Surf Elev. & Datum: 810.9 ft. MSL
Casing Elevation: 813.39 ft. MSL
Coordinate System: NAD 83
Latitude/Northing: 278,211.43
Longitude/Easting: 2,169,578.97

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description
			-3		
			-2		
			-1		
Grab			0		ML: Brown Silt, trace sand and clay, low plasticity, damp.
			1		
			2		
			3		
			4		
Drill Chips			5		
			6		
			7		
			8		
			9		
Drill Chips			10		
			11		
			12		
			13		
			14		
Drill Chips			15		
			16		
			17		
			18		
			19		
Drill Chips			20		
			21		
			22		
			23		
			24		
Drill Chips			25		
			26		
			27		
			28		
			29		

Well Construction Detail



Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Monitoring Well ID: MW-16

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description
Drill Chips			30		Silt, cont.
Drill Chips			34–35		
Drill Chips			39–40		
Drill Chips			44–45		@45 ft.: moist
2.4-in SS		10 8 8	50–51		@50 ft.: stiff, wet.
Drill Chips			54–55		
			58 ▼		
Drill Chips			59–60		@ 60 ft.: no free water in casing while drilling
2.4-in SS		39 50/5"	65–66		
			66	GM	GM: Brown silty Gravel with trace sand, 0.75 - 2" sub-rounded basalt gravel dense, wet.

Well Construction Detail

2-in. dia. flush threaded PVC, 2.4 ft AGL to 54 ft BGL

10-20 Colo. silica sand

0.01-in. slot PVC, 54 to 69 ft BGL, with threaded bottom cap

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

Start Date: 8/6/2009 Finish Date: 8/6/2009 Weather Conditions: Warm, Windy Geologist: Craig Schwyn Drilling Method: 6-in dia. Sonic Sample Method: 4-in. dia. Core Operator: Enviro. West Exp.	**Landfill Gas Well Completion** Surface Elevation: 841.05 ft MSL Total Boring Depth (BGL): 48.5 ft Total Casing Depth (BTOC): 32.80 ft Completion: Locking steel above ground monument with concrete surface pad Seal (BGL): Bentonite chips, 2 to 18.3 ft and 35 to 48.5 ft Gravel pack (BGL): 5/8-minus rounded gravel, 18.3 to 35 ft Casing: 1/2-in. dia. flush threaded Sch. 80 PVC, +2.80 to 25 ft BGL Screen (BGL): 0.03-in. slot Sch. 80 PVC, 25 to 30 ft BGL, with bottom cap

Project: Walla Walla Sudbury Road Landfill Onsite RI

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
	0 / 7		4-in Core	1	ML	Grayish brown **Silt**, trace sand, low plasticity, soft, dry. 2 ft recovery, saturated with drilling water	
				2			
				3			
				4			
				5			
				6			
	7 / 17		4-in Core	7			
				8			
				9			
				10			
				11			
				12			
				13		**Municipal Solid Waste**. Medium dense MSW consisting of fabric, wood, paper, & yard waste, with 6" thick layers of silt interspersed.	
				14			
				15			
				16			
	17 / 27		4-in Core	17		@ 17 to 20 ft: engine parts, metal, wire, and soil.	
				18			
				19			

Total Depth: 48.5 ft. Continued [X]

Schwyn Environmental Services

Log of Exploration

Exploration No. **GW-5**

Project: Walla Walla Sudbury Road Landfill Onsite RI

Start Date: 8/6/2009
Finish Date: 8/7/2009
Geologist: Craig Schwyn
Drilling Method: 6-in dia. Sonic
Sample Method: 4-in. dia. Core
Surface Elevation: 841.05 ft MSL

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
				20		**Municipal Solid Waste** (cont.) @ 20 to 22 ft: gray silt, moist, compact.	
				21			
				22		@ 22 to 27 ft: black, wood, tires, and decomposed MSW.	
				23			
				24			
				25			
				26			
	27 / 37		4-in Core	27		@ 27 to 30 ft: black, paper, wood, and decomposed MSW.	
				28			
				29			
				30		@ 30 to 31 ft: silt.	
				31		@ 31 to 36 ft: glass, rock, and paper.	
				32			
				33			
				34			
				35		@ 35.5 to 36.5 ft: disturbed silt.	
				36	ML	Grayish brown Silt, with little clay and fine sand, stiff, low plasticity, moist. Some bedding structure observed in the silt with medium to coarse sand.	
	37 / 47		4-in Core	37			
				38			
				39			

Total Depth: 48.5 ft.

Continued [X]

Project: Walla Walla Sudbury Road Landfill Onsite RI

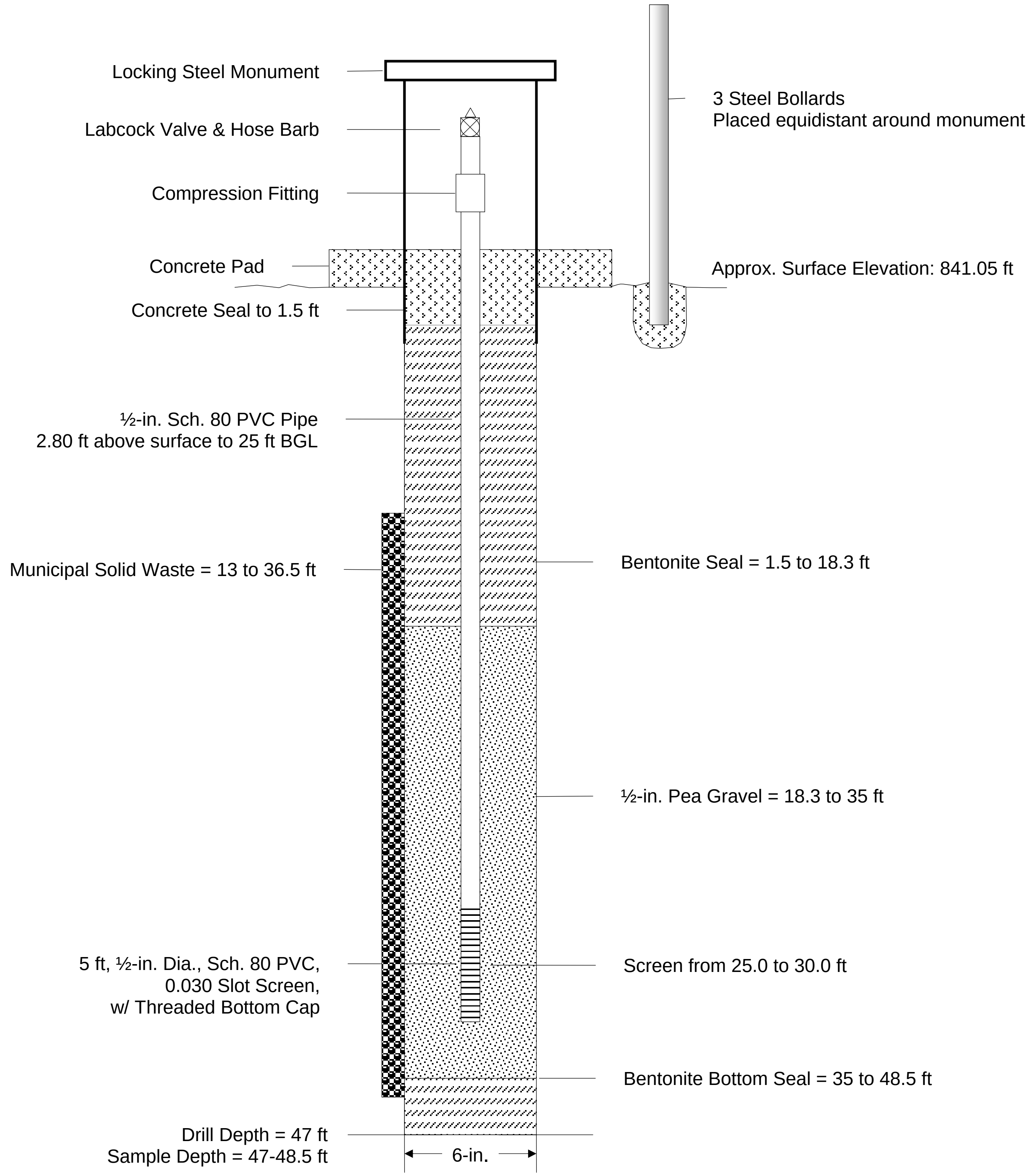
Start Date: 8/6/2009
Finish Date: 8/7/2009
Geologist: Craig Schwyn
Drilling Method: 6-in dia. Sonic
Sample Method: 4-in. dia. Core

Surface Elevation: 841.05 ft MSL

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
				40	ML	**Grey brown Silt,** with little clay and sand, stiff, low plasticity, moist.	
				41			
				42		@ 42 ft: Light brown	
				43			
				44			
				45			
				46			
S-1a	47	23	3-in	47		Light brown Silt with medium to coarse subangular basaltic sand, interspersed with layers of brown, very dense, silt; moist.	
S-1b	48.5	33	SS				
S-1c		51		48	SM	Grades to very fine Sand with silt and medium to coarse sand.	

Boring drilled to 47 feet and sampled to 48.5 feet.
Gas well constructed in boring to 30 ft BGL.

Notes:
1. Lithologic descriptions and stratigraphic contacts are based on field interpretations and are approximate.
2. Refer to "Soil Classification and Key" figure for explanation of graphics and symbols.
3. BGL = below ground level
4. AGL = above ground level
5. TOC = top of casing
6. BTOC = below top of casing
7. SS = Split Spoon Sampler (2.42 -in. I.D.)
8. SPT = Standard Penetration Test Sampler (1.5 -in. I.D.)



Not To Scale

Schwyn Environmental Services

GW-5
Landfill Gas Probe Detail

Figure
A1

Schwyn Environmental Services

Log of Exploration

Exploration No. **GW-6**

Sheet 1 of 2

Start Date: 8/6/2009 Finish Date: 8/7/2009 Weather Conditions: Warm, Windy Geologist: Craig Schwyn Drilling Method: 6-in dia. Sonic Sample Method: 4-in. dia. Core Operator: Enviro. West Exp.	**Landfill Gas Well Completion** Surface Elevation: 798.25 ft MSL Total Boring Depth (BGL): 39 ft Total Casing Depth (BTOC): 27.48 ft Completion: Locking steel above ground monument with concrete surface pad Seal (BGL): Bentonite chips, 1.5 to 13 ft and 30 to 39 ft Gravel pack (BGL): 5/8-minus rounded gravel, 13 to 30 ft Casing: 1/2-in. dia. flush threaded Sch. 80 PVC, +2.48 to 20 ft BGL Screen (BGL): 0.03-in. slot Sch. 80 PVC, 20 to 25 ft BGL, with bottom cap

Project: Walla Walla Sudbury Road Landfill Onsite RI

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
	0 / 7		4-in Core	1	**ML**	Grayish brown **Silt**, trace sand, low plasticity, soft, dry. (Landfill Cover)	
				2			
				3			
				4		**Municipal Solid Waste** @ about 3 to 5 ft. Medium dense MSW consisting of wood, yard waste, with 6" thick layers of silt interspersed. Plug of paper @ 7 ft is dated 8/10/1980	
				5			
				6			
	7 / 17		4-in Core	7		@ 7 to 11 ft: 4 ft recovery Silt, paper, glass, and kitchen rubbish.	
				8			
				9			
				10			
				11			
				12			
				13			
				14			
				15			
				16			
	17 / 27		4-in Core	17		@ 17 to 27 ft: tires, paper, cardboard, carpet pads, wood, MSW interspersed with layers of silt. Material with sales prediction date of 1979.	Rapid drilling
				18			
				19			

Total Depth: 39 ft. Continued [X]

Schwyn Environmental Services

Log of Exploration

Exploration No. **GW-6**

Sheet 2 of 2

Project: Walla Walla Sudbury Road Landfill Onsite RI

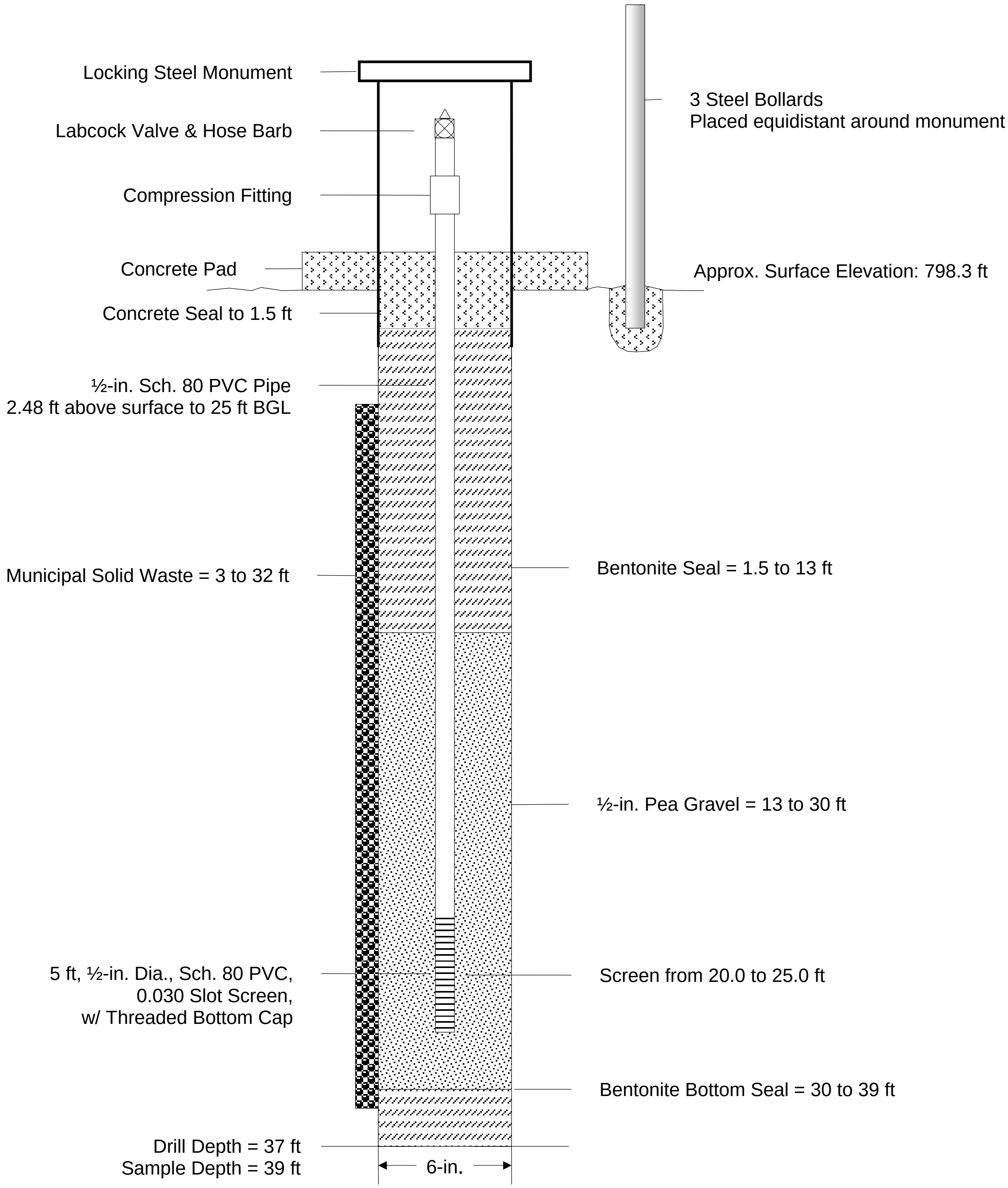
Start Date: 8/6/2009
Finish Date: 8/7/2009
Geologist: Craig Schwyn
Drilling Method: 6-in dia. Sonic
Sample Method: 4-in. dia. Core

Surface Elevation: 798.25 ft MSL

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
				20		**Municipal Solid Waste** (cont.)	
				21			
				22			
				23			
				24			
				25			
				26			
	27 / 37		4-in Core	27		@ 27 to 32 ft: black, paper, wood, metal, and decomposed MSW. Newspaper dated October 1979.	
				28			
				29			
				30			
				31			
				32	ML	Olive brown **Silt**, with trace clay and little fine sand, dense low plasticity, very moist.	
				33			
				34			
				35			
				36		@ 36 to 37 ft: Olive brown Silt, with little clay and fine to medium grained sand lenses up to 1/2-in. thick, firm, very moist.	
S-1a S-1b S-1c S-1d	37 / 39	7 9 12 15	3-in SS	37		@ 37 to 39 ft: Olive Silt, with trace clay and some fine to medium grained sand, mottled, low plasticity, wet.	
				38			

Boring drilled to 37 feet and sampled to 39 feet.
Gas well constructed in boring to 25 ft BGL.

Notes:
1. Lithologic descriptions and stratigraphic contacts are based on field interpretations and are approximate.
2. Refer to "Soil Classification and Key" figure for explanation of graphics and symbols.
3. BGL = below ground level
4. AGL = above ground level
5. TOC = top of casing
6. BTOC = below top of casing
7. SS = Split Spoon Sampler (2.42 -in. I.D.)
8. SPT = Standard Penetration Test Sampler (1.5 -in. I.D.)



Not To Scale

Schwyn Environmental Services

GW-6
Landfill Gas Probe Detail

Figure A2

APPENDIX C

Independent Remedial Investigation Methods

Independent Remedial Investigation Field Methods
Sudbury Road Landfill Remedial Action
Walla Walla, Washington

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

LIST OF ABBREVIATIONS AND ACRONYMS

AO	Agreed Order No. 8456
bgl	Below ground level
City	City of Walla Walla, Washington
Ecology	Washington State Department of Ecology
FS	Feasibility Study
LFG	Landfill gas
MSW	Municipal solid waste
MTCA	Washington State Model Toxics Control Act
PVC	Polyvinyl chloride
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
Site	Sudbury Road Landfill
Schwyn	Schwyn Environmental Services, LLC
TDS	Total dissolved solids
TOC	Total Organic Carbon
USCS	Uniform Soil Classification System
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound
Work Plan	Remedial Investigation Work Plan
WAC	Washington Administrative Code
WWCHD	Walla Walla County Health Department

1.0 INTRODUCTION

This appendix summarizes the Independent Remedial Investigation (RI) field activities conducted in 2005, 2006, and 2009 at the Sudbury Road Landfill (Site) in Walla Walla, Washington. The RI activities were conducted by Schwyn Environmental Services, LLC (Schwyn) on behalf of the City of Walla Walla, Washington (City) in general accordance with the Washington Administrative Code (WAC) Chapter 173-351 Criteria for Municipal Solid Waste Landfills (Ecology 1993) and the Washington State Model Toxics Control Act (MTCA) regulations (Ecology 2001).

The scope of work for this investigation was described in the RI Work Plan, dated April 22, 2004 (LAI 2004). The scope of work for the installation of two gas wells was further developed in the Landfill Gas Probe Work Plan submitted to the Walla Walla County Health Department (WWCHD) and Ecology on July 31, 2009 (Schwyn 2009).The Independent RI field work included the following activities:

- Assessed the extent and thickness of the municipal solid waste (MSW) in Areas 2 and 5;
- Conducted a Geoprobe investigation and installed borings in the vicinity of Area 5, Area 6, and Area 7, and along the north drainage ditch;
- Installed one monitoring well on the western property boundary, south of MW-15; and
- Installed landfill gas (LFG) Wells GW-5 and GW-6; and
- Conducted LFG monitoring in MW-14, MW-15, MW-16, GW-5, and GW-6.

1.1 BACKGROUND AND PURPOSE

The Site is an active MSW landfill operated by the City consistent with chapter WAC 173-351. The landfill encompasses approximately 125 acres and is located on the western side of a much larger City-owned property (Figures 1 and 2). The City installed a groundwater monitoring system in 1976 and has monitored groundwater quality hydraulically upgradient and downgradient of the landfill since 1977. A number of monitoring system changes have occurred since inception. In 2001, Monitoring Well MW-15 was installed to replace MW-3, which is screened deeper into the aquifer. Numerous volatile organic compounds (VOCs) and inorganic constituents were detected at statistically elevated levels in groundwater samples collected from MW-15. An assessment monitoring program was initiated in September 2002 in accordance with WAC 173-351-440, and the results suggested that some of the VOCs and inorganic constituents detected in the MW-15 samples were indicators of landfill impact to groundwater. Subsequent steps required by the solid waste regulation are described in WAC 173-351-440(6), which states that when constituents are detected at levels greater than background levels and the groundwater protection standard, the owner must:

- (6)(a): Characterize chemical composition of the release, the contaminant fate and transport characteristics, and extent of contamination in all groundwater flow paths by installing additional monitoring wells; and

- (6)(d): Initiate an assessment, selection, and implementation of corrective measures as required by the MTCA.

In 2004, the City initiated an Independent RI to fulfill the requirements of WAC 173-351-440(6). A remedial action work plan was prepared to guide the RI process (LAI 2004). A historical study report of the landfilling operations was published in 2006 (Schwyn 2006). RI field studies were conducted in 2005 and 2006 by Schwyn; however, funding was not available to complete the report at that time. In 2009 and 2010, additional Independent RI field studies were initiated and documented as part of an Interim Action associated with the closure of Area 6. In January 2010, the Washington State Department of Ecology (Ecology) submitted an Early Notice Letter to the City. The Early Notice Letter indicated that Ecology was aware that a release of hazardous substances had occurred at the Sudbury Road Landfill, and that the Site would be added to the database of known or suspected contaminated sites, with further remedial actions to be taken in accordance with the MTCA. In 2011, the City and Ecology entered into an Agreed Order (AO) to initiate a cleanup action in accordance with the MTCA. The AO stipulated that the methods and findings of the work conducted in 2005 and 2006 be documented in a report. The field methods for the work conducted in 2005 and 2006 are documented in the following sections. The field methods for the work conducted in 2009 are provided in the attached Landfill Gas Well Installation Report (Schwyn 2010).

2.0 FIELD METHODS

2.1 AREA 2 WASTE EVALUATION

MSW was placed in Area 2 during the late 1970s with little documentation of the area boundaries, disposal method, or waste thickness. On May 24, 2005, 28 test pits were excavated at the locations shown on Figure 3 to determine the extent and thickness of the waste. The test pits were excavated by City personnel using a John Deere 410D backhoe. Schwyn logged the soil cover thickness, waste thicknesses, and the extent of the MSW.

The findings of the test pit program indicate that the volume of MSW in Area 2 is small. The waste appeared to be deposited directly on the native soil surface, with little to no preliminary soil excavation. Over most of the area, MSW was observed to be less than 2 feet thick. The MSW was up to 4 feet thick in the central portion of the area, but the extent of the thicker layer of waste appeared to be limited. All of the MSW was covered with a silty-soil layer between 2 and 3 feet thick. Based on the test pit program, the limits of the solid waste are shown on Figure 3.

2.2 GEOPROBE INVESTIGATION

Geoprobe explorations GP-1 through GP-8 (Figure 4) were drilled by Environmental West Exploration of Spokane, Washington, from July 5 to 8, 2005. The explorations were drilled to provide preliminary information about the waste extent and thickness, subsurface lithology, depth to groundwater, and groundwater quality in the vicinity of Area 5, Area 6, and Area 7. The Geoprobe program was abandoned before all of these objectives were gained because the penetration into the subsurface silt was very slow, penetration refusal was encountered at shallow depths in the waste areas, collapsing silts obstructed the Geoprobe boring during macro-core change out, and groundwater samples could not be collected by industry standard sampling practices.

When successful, the Geoprobe borings were advanced to depths up to 52 feet below ground level (bgl) using static force and percussion to drive a 4-foot long, 2.125-inch diameter macro-core sampler into the subsurface soils. The macro-core sampler was lined with a disposable polyethylene liner, pushed through its 4-foot length and then retrieved to the surface. The liner was removed from the macro-core sampler and sliced open for lithologic evaluation of the soil core. Selected soil samples were also collected from the macro-core sampler for laboratory analysis. After retrieval of each soil core a new disposable liner was loaded into a macro-core sampler, and the sampler was driven through the next 4-foot interval using 4-foot long, 1-inch diameter drive rods. This process was continued until the desired depth was reached, groundwater samples were collected, or until refusal. To collect groundwater samples, a retractable stainless steel screen with disposable drive point was inserted into the macro-core sampler and driven to the desired sampling depth. At that point the macro-core sampler was pulled back 3 to 4 feet to expose the screen section to the native materials and allow the macro-core and drive rod interior void to fill with groundwater. Groundwater samples were then collected as described below. When the Geoprobe sampling process was finished the borehole was filled with fine granular bentonite.

Soil samples collected from the macro-core sampler were classified according to the Uniform Soil Classification System (USCS), and lithologic descriptions were recorded on a field log along with information on drilling conditions, LFG odor, and locations of water-bearing strata. This information is summarized on the attached boring logs presented in this Appendix. Soil cuttings generated while drilling were either spread on the ground surface around the boring or placed in drums. Other investigation-derived waste generated while drilling was placed in drums and disposed of in the active cell (Area 6) of the landfill.

Select soil samples were collected for laboratory analysis of VOCs from GP-3 at 21.5 to 22 feet bgl, GP-4 at 18 to 18.5 feet bgl, and GP-6 at 15 to 15.5 feet bgl. The sample intervals were selected to assess the soil quality in the vadose zone near to the Area 5 MSW. Five-gram soil samples were collected from the selected sample interval using an EasyDraw Syringe® and Powerstop Handle® and placed in methanol preserved 40-milliliter glass vials with septum screw cap in accordance with U.S. Environmental Protection Agency (USEPA) Method 5035A Closed System Analysis for VOCs. The soil vials were labeled, logged onto a chain-of-custody form, placed in a chilled cooler, and transported to North Creek Analytical (now TestAmerica Analytical Testing Corporation) in Spokane, Washington via next day delivery service. The laboratory analytical reports are attached within this Appendix.

Groundwater samples were collected for analysis of VOCs from GP-3, GP-4, GP-5, GP-6, and GP-8. Groundwater samples were also collected for analysis of inorganic constituents (alkalinity, calcium, chloride, magnesium, nitrate as nitrogen, potassium, sodium, sulfate, and total dissolved solids [TDS]) from GP-5 and GP-6. Standard sampling protocols were not achieved during the sampling process. Silt in the groundwater tended to prop the sampling bailer check valve open allowing the groundwater to drain out of the bailer during retrieval. Therefore, the sampling method consisted of lowering 0.25-inch diameter polyethylene tubing to the base of the screen, using a peristaltic pump to draw groundwater up into the tubing (approximately 20 feet), and then pulling the tubing to the surface to discharge the groundwater from the tubing. Samples were collected into laboratory prepared sample vials after three to eight tubing volumes were purged from the boring. The groundwater sample vials were labeled, logged onto a chain-of-custody form, placed in a chilled cooler, and transported to North Creek Analytical for analysis. The laboratory analytical reports are attached within this Appendix.

2.3 BORING INVESTIGATION

Ten borings (B-9RI through B-12RI, B-14RI through B-18 RI, and MW-16) were drilled by Environmental West Exploration of Spokane, Washington, from August 29 through September 1, 2005, in accordance with the Washington State Minimum Standards for Construction and Maintenance of Wells, WAC 173-160. The boring locations are shown on Figure 4. The boring program was conducted to provide preliminary information about the waste extent and thickness, subsurface lithology, depth to groundwater, and groundwater quality in the vicinity of Area 5 and Area 6 that could not be obtained from the Geoprobe investigation conducted in July 2005. Difficulties were encountered during the boring program when drilling through the waste. Differential lateral pressure from the solid waste tended to bind or bend the drill casing, causing breakage. This prevented achievement of the desired depth and collection of groundwater samples in some borings, and shortened the exploration program to reduce costs for the equipment damage.

The borings were advanced using air rotary drilling methods with 6-inch diameter casing (TUBEX) to total depths that ranged from 13 feet (B-15RI) to 69 feet (MW-16) bgl. Soil samples were collected at 5 foot intervals from drill cuttings as drilling progressed. Select soil samples were collected with a split spoon sampler. All samples were classified according to the USCS, and lithologic descriptions were recorded on a field log along with information on drilling conditions, LFG odor, and location of water-bearing strata. This information is summarized on the boring logs presented in this Appendix. Soil cuttings and other investigation-derived waste generated while drilling were placed in drums and disposed of in the active cell (Area 6) of the landfill. All borings except MW-16 were backfilled to the surface with bentonite chips (3/8-inch minus) and hydrated with potable water as the casing was withdrawn.

Select soil samples were collected for laboratory analysis of VOCs from B-9RI at 35 feet bgl, B-10RI at 34 feet bgl, B-11RI at 34 feet bgl, and B-12RI at 44 feet bgl. The sample intervals were selected to assess the soil quality in the vadose zone beneath the MSW. Five-gram soil samples were collected from the selected sample intervals in accordance with USEPA Method 5035A Closed System Analysis for VOCs. The soil vials were labeled, logged onto a chain-of-custody form, placed in a chilled cooler, and transported to North Creek Analytical in Spokane, Washington via next day delivery service. The laboratory analytical reports are attached within this Appendix.

Temporary monitoring wells were installed in borings B-9RI and B-17RI so that groundwater samples could be collected. The temporary wells were constructed with 5 feet of 2-inch diameter, 0.010-inch machine slotted polyvinyl chloride (PVC) screen with a flush threaded end cap on the bottom. Flush threaded 2-inch diameter PVC casing was extended to the surface and number 10/20, washed, rounded silica sand was placed in the annular space around the screen. Each temporary well was developed with a bailer or Grundfos RediFlow2 submersible pump prior to sample collection. After the groundwater samples were collected, the PVC casing was removed and the boring was filled to surface with bentonite chips.

A permanent monitoring well was installed in MW-16 using flush-threaded 2-inch diameter schedule 40 PVC screen and riser pipe. The well was screened using 15 feet of 0.010-inch machine slotted PVC screen with a flush threaded end cap on the bottom. Number 10/20, washed, rounded silica sand was placed in the annular space around the screen to 3.5 feet above the top of the screened section. Bentonite chips (3/8-inch minus) were placed above the sandpack to within 0.5 feet of ground surface and hydrated with potable water. The PVC casing was protected with a concrete surface pad, aboveground locking steel vault, and three steel bollards. The top of casing elevation was surveyed by USKH, Inc., of Walla Walla, Washington. Monitoring well construction details are recorded on the exploration logs presented in this Appendix.

Monitoring Well MW-16 was developed by bailing fine grained soil and groundwater from the screened interval, followed by purging approximately 40 gallons of groundwater from the well using a Grundfos RediFlo2 submersible pump. Groundwater samples were collected with a disposable bailer the following day after purging three additional well volumes of groundwater with a decontaminated Grundfos RediFlo2 submersible pump.

Groundwater samples from B-9RI, B-17RI, and MW-16 were collected into laboratory prepared sample vials, labeled, logged onto a chain-of-custody form, placed in a chilled cooler, and transported to North Creek Analytical for analysis. All samples were analyzed for VOCs and the sample from MW-16 was also analyzed for alkalinity, calcium, chloride, nitrate as nitrogen, potassium, sodium, and sulfate. The laboratory analytical reports are presented in this Appendix.

2.4 LANDFILL GAS SAMPLING

On August 9, 2006, LFG samples were collected from Monitoring Wells MW-14, MW-15, and MW-16 to assess the potential impact for VOCs from landfill gas to impact groundwater. Each sample was collected from directly above the water table using a Landtec GEM 500 LFG sampling meter. Prior to use, the meter was calibrated with oxygen and methane calibration gases in accordance with manufacture specifications. Polyethylene tubing (0.0625-inch inside diameter) was lowered to within one foot of the water table and connected to the gas sampler. Measurements of methane, carbon dioxide, oxygen, other gas balances, and the meter pumping period (measured in seconds) were recorded.

Gas samples were collected in 1-liter Tedlar bags for laboratory analysis from Monitoring Wells MW-15 and MW-16. Ambient gas readings observed in MW-14 did not indicate the presence of landfill gases and therefore a gas sample was not obtained for laboratory analysis from that well.

The MW-15 and MW-16 gas samples were collected by attaching a Tedlar bag to the Landtec GEM 500 exhaust port with flexible nylon tubing, opening the Tedlar bag port and filling the bag approximately ½ to ¾ full, and then closing the sample port and detaching the bag from the tubing. Manufacturer information indicates that the GEM 500 pumps approximately 300 cubic centimeters per minute and this was verified during the sampling procedure. Prior to sampling MW-15 and MW-16 the polyethylene tubing was purged for 340 and 600 seconds, respectively. After the samples were collected the gas samples were labeled, placed in a shipping container, and transported to Columbia Analytical Services air quality laboratory in Simi Valley, California, using standard chain-of-custody procedures. Each gas sample was analyzed using USEPA method TO-15. The laboratory analytical report is attached.

3.0 REFERENCES

Washington State Department of Ecology (Ecology). 2010. *Early Notice Letter for Groundwater Contamination at the Sudbury Road Landfill, 414 Sudbury Road, Walla Walla, WA 9932*. Letter from Ecology Waste 2 Resources Program to Mr. Craig Sivley, City of Walla Walla Public Works Director. 7 January.

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Landau Associates, Inc. (LAI). 2004. *Remedial Investigation Work Plan, Sudbury Road Landfill, Walla Walla, Washington.* Prepared for the City of Walla Walla. 22 April.

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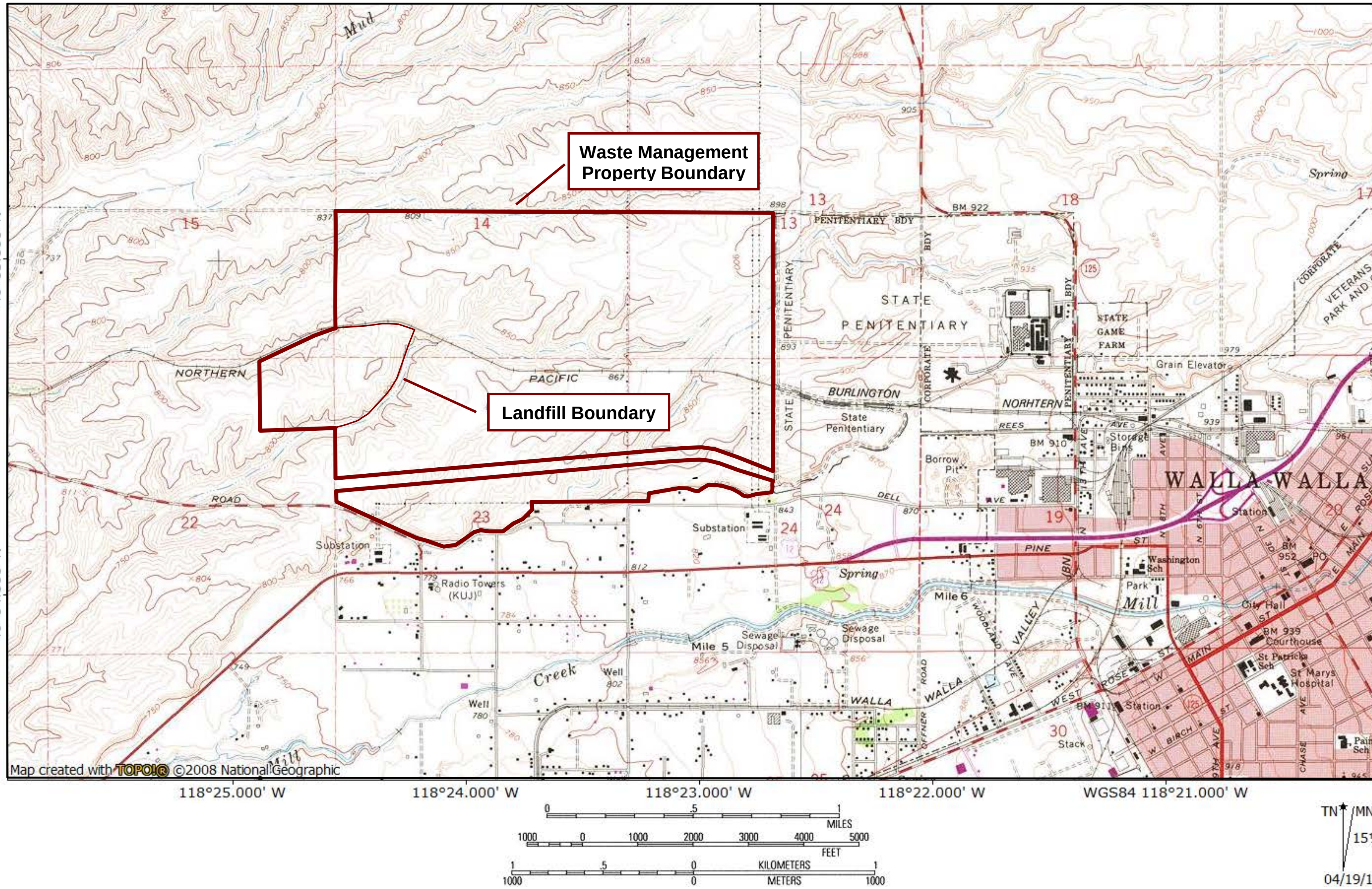
———. 2009. *Landfill Gas Probe Installation Work Plan for the Sudbury Road Landfill Remedial Investigation, Walla Walla, Washington.* Prepared for the Walla Walla Department of Health and Washington State Department of Ecology by Schwyn Environmental Services, LLC. 31 July.

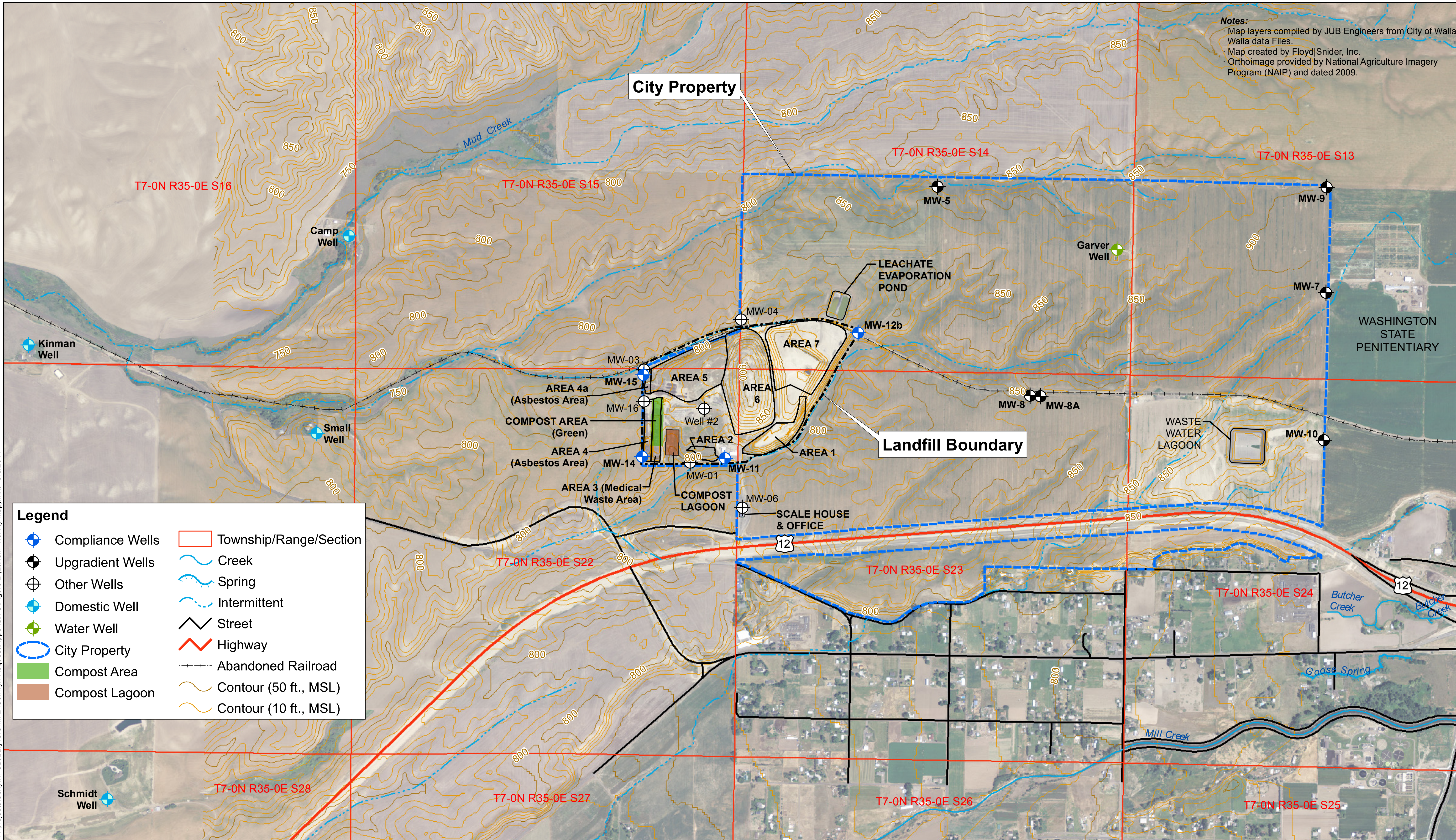
———. 2006. *Sudbury Road Landfill Historical Study Report, Walla Walla, Washington.* Prepared by Schwyn Environmental Services, LLC for the City of Walla Walla Solid Waste Division . 17 January.



Sudbury Road Landfill
Walla Walla, Washington

Site Location

Figure
1



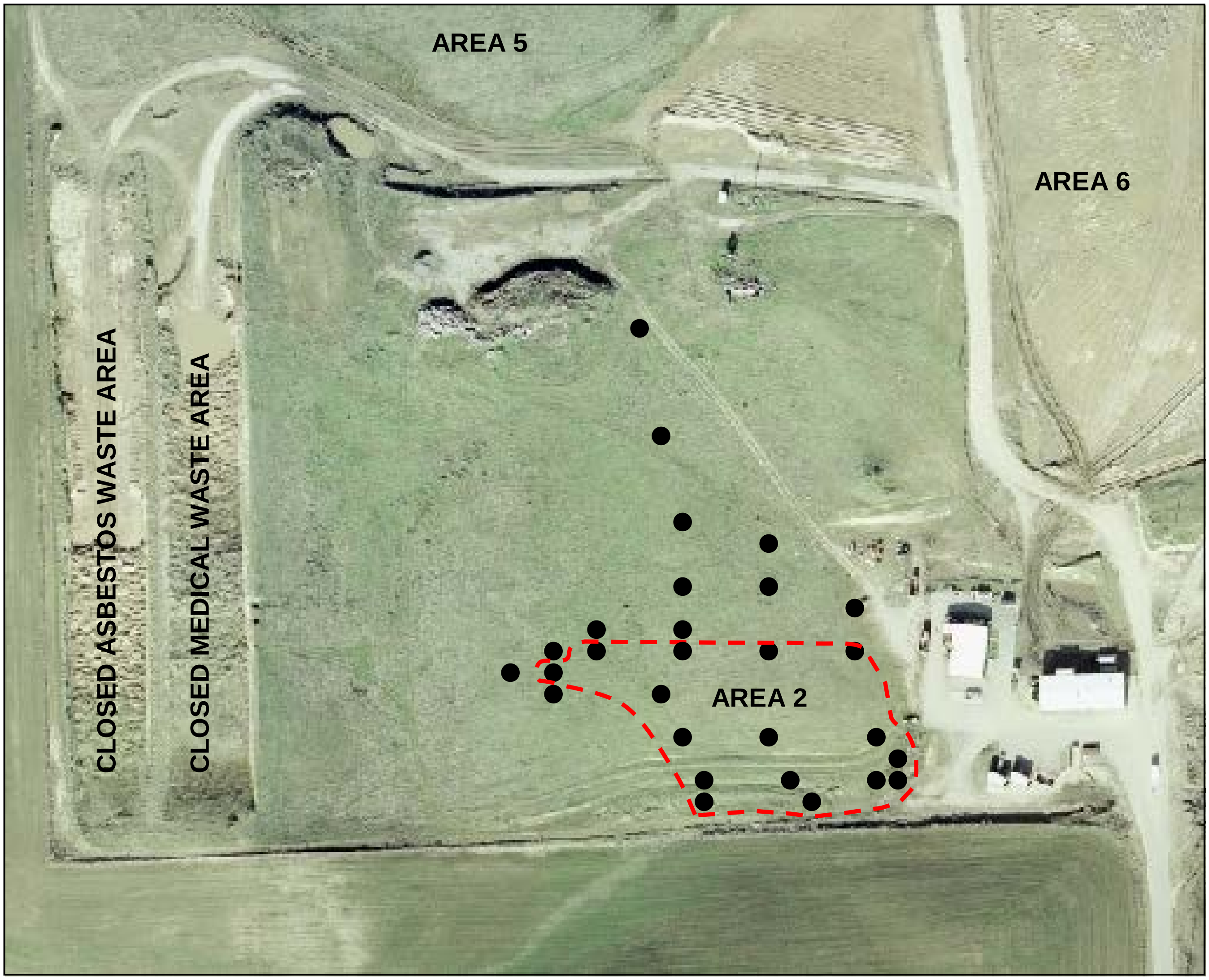
F:\projects\Schwyn-Sudbury\GIS\MXD\Schwyn Request\Appendix C\Figure 2 (Landfill Vicinity Map).mxd 9/6/2011

Schwyn Environmental Services

Independent Remedial Investigation
Sudbury Road Landfill
Walla Walla, Washington

Vicinity Map

Figure 2



Source: City of Walla Walla, March 10, 2003 Aerial Photograph.

North

0 200 400
Approximate Scale in Feet

LEGEND

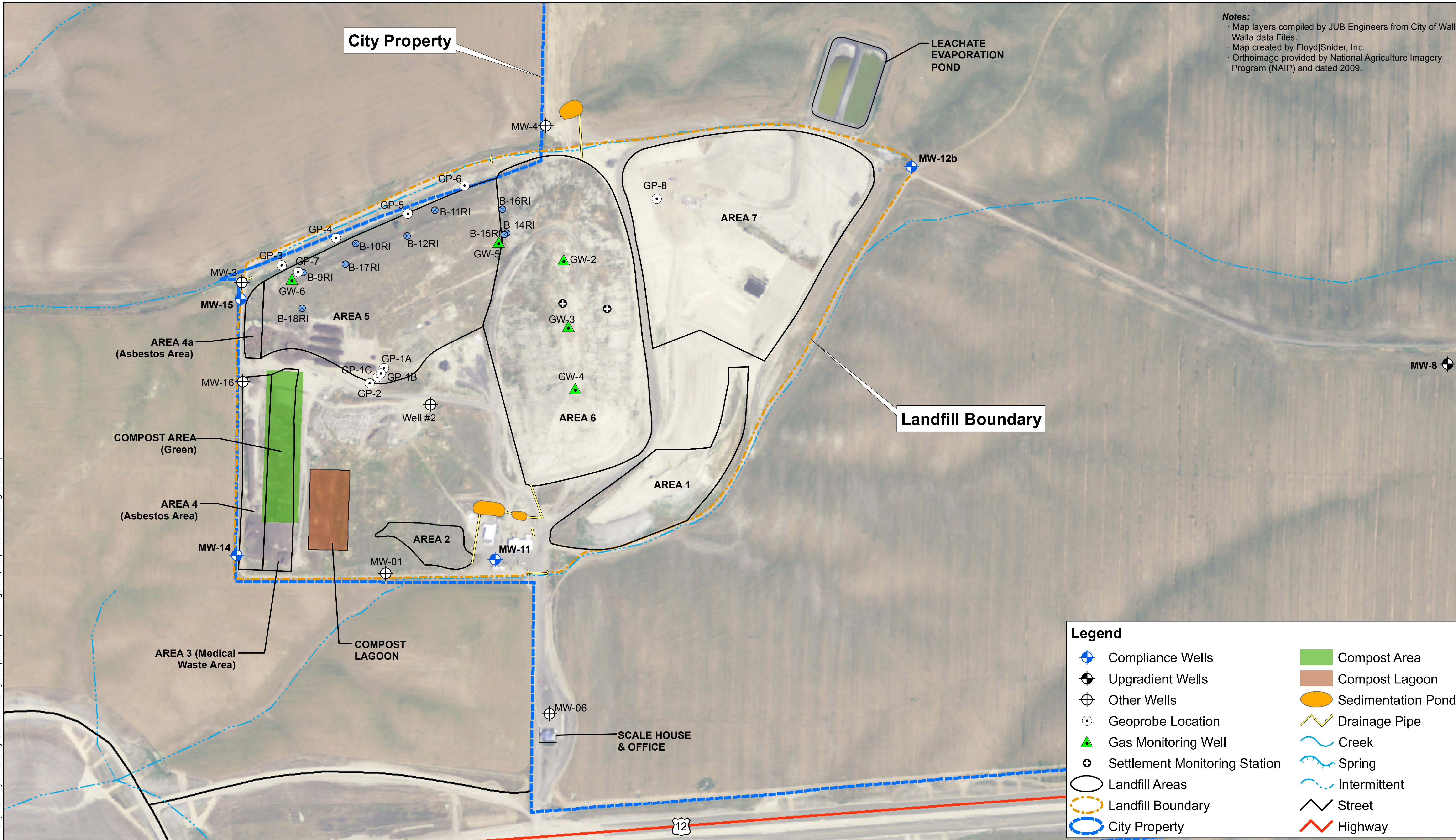
Approximate Extent of MSW

Test Pit Location

Test pit investigation conducted on May 24, 2005

Schwyn Environmental Services

Independent Remedial Investigation Sudbury Road Landfill Walla Walla, Washington	**Area 2** **Waste Delineation**	Figure 3



F:\projects\Schwyn-Sudbury\GIS\MXD\Schwyn Request\Appendix C\Figure 4 (Independent RI Boring Locations).mxd 8/12/2011

Schwyn Environmental Services

0 200 400 800

Scale in Feet

1:4,800

N

Independent Remedial Investigation
Sudbury Road Landfill
Walla Walla, Washington

Independent RI Boring Locations

Figure 4

Exploration Boring Logs

Log of Exploration

Schwyn Environmental Services

Boring ID: GP-1a

Drill Date: 7/5/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 14 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 834 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,296.29
Longitude/Easting: 2,170,203.40

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0–3	ML	ML: brown Silt, trace sand, low plasticity, soft, dry.	Bentonite Chips
core			3–14	MW	MW: Municipal Solid Waste with 1.5 ft thick layers of silt, damp.	
core						
core					@ 14 ft. Refusal in municipal solid waste.	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

Schwyn Environmental Services

Boring ID: GP-1b

Drill Date: 7/5/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 6 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 834 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,266.63
Longitude/Easting: 2, 170, 193.10

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0–3.5	ML	ML: Brown Silt, trace sand, low plasticity, soft, dry.	Bentonite Chips
core			3.5–6	MW	MW: Municipal Solid Waste with silt, damp. @6 ft: Refusal in municipal solid waste.	

Log of Exploration

Boring ID: GP-1c

Drill Date: 7/5/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 7 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 833 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,256.33
Longitude/Easting: 2,170,178.66

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0–3	ML	ML: Brown Silt, trace fine sand, low plasticity, soft, dry.	Bentonite Chips
core			3–7	MW	MW: Municipal Solid Waste with 1.5 ft thick layers of silt, damp. @7 ft: Refusal in municipal solid waste.	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

Schwyn Environmental Services

Boring ID: GP-2

Drill Date: 7/8/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 52 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 831 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,227.90
Longitude/Easting: 2,170,142.79

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0		ML: Light brown Silt, trace sand, low plasticity, soft, dry.	
			1		@ 1 ft: grey brown, laminated, stiff	
core			4		@ 4 ft: brown	
			7		@ 7 ft: damp.	
core			8		@ 8-12 ft: layered damp and dry silts.	
core			12		@12-30 ft: layered sandly silt and clayey silt.	
core			16			
core			20			
core			24		@ 24-27.5 ft: clayey Silt, massive structure, damp.	
			26			Bentonite Chips
core			27.5		@27.5 ft: Silt.	
core			31		@ 31-34 ft: layered (6-inch lenses) clayey silt, silt, and fine sandy silt. Clayey silts damp. Sandy silts dry.	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Schwyn Environmental Services

Boring ID: GP-2

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			33		Brown Silt (continued), damp to dry.	
			34			@ 34 ft: Hole sloughing
			35			
			36			
			37			
Drv Pt			38		@38 ft: Drive solid point due to slit sloughing into hole and filling core barrel.	
			39			
			40			
			41			
			42			
core			43			
			44			
core			45			
			46			
			47			
			48		SM: Silty fine Sand, loose, dry.	
core			49		ML: Brown clayey Silt, blocky structure, firm, damp.	
			50			
			51			
			52			

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Log of Exploration

Schwyn Environmental Services

Boring ID: GP-3

Drill Date: 7/6/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 39 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 787 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,716.05
Longitude/Easting: 2,169,730.66

Remarks: Groundwater sample collected from screened section set 36-39 BGS.

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0		ML: Light brown Silt, trace sand, soft, dry.	
			2		@ 2 ft: grey brown	
core			4			
			7		@ 7-8 ft: trace medium sand, subangular.	
core			8			
core			12		@ 12 ft: damp.	
core			16			
			18		@ 18-20 ft: little medium to coarse sand.	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Boring ID: GP-3

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			20			Bentonite Chips
GP3 21.5-22			21, 22, 23		@ 21 ft: Grey brown clayey Silt, blocky structure, wet. @ 21.5-22 ft: collect soil sample for analysis	
core			24			@ 24 ft: Check water level. Not sufficient quantity for sampling.
			25		SM: Brown silty fine Sand, damp	
core			26, 27		ML: Brown clayey Silt, laminated structure @ 27 -28.5 ft: little fine to medium sand.	
			28, 29, 30		SM: Brown silty Sand with clay, fine to coarse angular sand, trace gravel, damp to wet.	@ 29 ft: Hard
core			31, 32, 33, 34		ML: Brown clayey Silt with sand and silty Sand with clay.	
Wtr. smplr GP-3			35, 36, 37, 38, 39		@ 35 ft: drive water sampler to 39 ft, pull back 3 ft to expose 3 ft of stainless steel screen. Collect groundwater sample.	@ 37 ft: Hard

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

Boring ID: GP-4

Drill Date: 7/6/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 34 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 788 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,841.80
Longitude/Easting: 2,169,959.43

Remarks: Groundwater sample collected from screen section set 30-34 ft. BGS

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0		ML: Grey brown Silt, trace sand, low plasticity, soft, dry.	
core			4		@ 4 ft: brown, trace clay, laminated	
core			8			
core			12		@ 12 ft: reddish brown	
core			16			
			17			Bentonite Chips
GP-4 18-18.5			18		@ 18-18.5 ft soil sample collected.	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Schwyn Environmental Services

Boring ID: GP-4

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			20			
			21			
			22			
			23			
core			24		@ 24-25.5 ft: clayey Silt.	
			25			
			26			
			27			
core			28		@ 27.5 ft: drive water sampler to 34 ft, pull back 4 ft to expose 4 ft of stainless steel screen. Collect groundwater sample.	
			29			
Wtr Smplr			30			
GP-4			31			
			32			
			33			
			34			

Notes:

ft BGS = feet below ground surface

ft BTOC = feet below top of well casing

USCS = Unified Soil Classification System

▼ = denotes groundwater table

Log of Exploration

Boring ID: GP-5

Drill Date: 7/6/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 36 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 790 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278.968.22
Longitude/Easting: 2,170,208.23

Remarks: Groundwater sample collected from screen section set 33-36 ft BGS

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0	ML	ML: Grey brown Silt, trace fine sand and clay, low plasticity, soft, damp. Sandy silts laminated, dry, periodic root tubes.Clayey silts blocky, damp.	
			3		@ 3 ft: brown, dry	
core			4			
core			8			
core			12		@ 12 ft: dark reddish brown, moisture increasing.	
core			16			
			17			Bentonite Chips
			19		@ 19 ft: increasing clay content.	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Boring ID: GP-5

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			20			
			21		@ 21-23 ft: saturated.	
			22			
			23		@ 23 ft: whitish brown clayey silt with calcite cementation, nodules, and thin (2 mm) lenses, very stiff, damp.	
Wtr Sampler			24			No sample collected.
			25		@ 24 ft: drive water sampler to 30 ft, pull back 4 ft to expose 4 ft of stainless steel screen. Dry. Pull back 1 ft to 25 ft. Dry.	
			26			
			27			
			28		Reddish brown clayey silt, blocky structure, damp to wet.	
			29			
core			30			
			31			
Wtr Smplr GP-5			32			
			33		@ 32 ft: drive water sampler to 36 ft, pull back 3 ft to expose 3 ft of stainless steel screen. Collect groundwater sample.	
			34			
			35			
			36			

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Log of Exploration

Schwyn Environmental Services

Boring ID: GP-6

Drill Date: 7/7/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 35 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 791 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 279,108.41
Longitude/Easting: 2,170,513.94

Remarks: Groundwater sample collected from screen section set 32-35 ft. BGS

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0		ML: Light brown Silt, trace clay and fine sand, low plasticity, soft, dry. Sandy silts laminated, dry, periodic root tubes. Clayey silts blocky, damp.	
core			4			
			6		@ 6 ft: damp.	
core			8		@ 8 to 10 ft: little sand, clay increasing with depth.	
			10		@ 10 to 15 ft: little clay, very stiff.	
core			12			
GP-6 15-15.5			15		@ 15 ft: trace clay, laminated, firm, methane odor. @ 15-15.5 ft: collect soil sample for analysis.	
core			16			
			17.5			Bentonite Chips
			19			

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Schwyn Environmental Services

Boring ID: GP-6

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			20			
			21			
			22			
			23			
core			24			
			25		@ 24.5 -27.5 ft: little fine to medium sand, wet.	
			26			
			27		@ 27.5 to 28.5 ft: whitish brown clayey Silt with calcite cementation, nodules, and thin (2 mm) lenses, very stiff, damp.	
core			28			
			29		@ 28.5 to 30 ft: sandy Silt with calcite, wet.	
			30		@ 30 ft: clayey Silt with calcite, damp.	
Wtr Smplr GP-6			31		31 ft: drive water sampler to 35 ft, pull back 3 ft to expose 3 ft of stainless steel screen. Collect groundwater sample.	
			32			
			33			
			34			
			35			

Notes:

ft BGS = feet below ground surface

ft BTOC = feet below top of well casing

USCS = Unified Soil Classification System

= denotes groundwater table

Log of Exploration

Boring ID: GP-7

Drill Date: 7/7/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 17 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 799 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,687.45
Longitude/Easting: 2,169,801.15

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0	ML	ML: Brown Silt, trace fine sand , low plasticity, soft, dry.	Bentonite Chips
core			4			
			6	MW	MW: Municipal Solid Waste with 1.5 ft thick layers of silt, damp.	
core			8			
core			12			
core			16		@ 17 ft: Refusal in municipal solid waste.	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

Schwyn Environmental Services

Boring ID: GP-8

Drill Date: 7/7/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: Geoprobe
Sample Method: 2.125" macro-core
Boring Diameter: 2.125"
Boring Depth (ft BGS): 36.4 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 803 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 279,078.75
Longitude/Easting: 2,171,351.86

Remarks: Groundwater sample collected from screen set 32.4-36.4 ft. BGS

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			0	ML	ML: Brown Silt, trace fine sand, low plasticity, soft, damp. Sandy silts laminated, dry, periodic root tubes. Clayey silts blocky, damp.	
			1			
			2			
			3			
core			4			
			5			
			6			
			7			
core			8			
			9			
			10			
core			11		@ 11 ft: whitish brown, calcite cementation, nodules, and thin lenses (2 mm), very stiff, dry.	
			12			
			13			
			14			
core			15			
			16			
			17			
			18			Bentonite Chips
core			19			

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Schwyn Environmental Services

Boring ID: GP-8

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
core			20–23			
core			23–27		@ 24.5 to 25 ft: wet. Calcitic Silt above and below are damp.	
			27		SM: @ 27 ft: Olive brown silty fine Sand, wet.	
core			28.5		ML: Light olive brown calcitic clayey Silt, blocky structure, very stiff, damp.	
			31		@ 31 ft: Medium brown sandy Silt, wet.	
Wtr Smplr GP-8			34		@ 34 ft: brown sandy Silt with red mottling and coarse basaltic gravel.	
			36		@ 36 ft: Refusal. Total Depth of soil core	
					@ 36 ft: drive water sampler to 36.4 ft, pull back 4 ft to expose 4 ft of stainless steel screen within borehole. Collect groundwater sample.	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Log of Exploration

Boring ID: B-9RI

Drill Date: 8/29/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6-in. dia. TUBEX
Sample Method: Grab/1.5-in SPT
Boring Diameter: 6.5"
Boring Depth (ft BGS): 53 ft.
Groundwater (ft BTOC): 43.2

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 798 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,698.49
Longitude/Easting: 2,169,820.80

Remarks: Installed and sampled temporary well screened from 48-53 ft. Purged 2.5 gal. of groundwater and collected VOC samples. Remove casing and bentonite boring to surface.

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Grab			0	ML	ML: Light brown Silt, trace sand, low plasticity, soft, dry.	Bentonite Chips
Drill Chips			2.5			
			3	MW	MW: Municipal Solid Waste with silt, damp.	
Drill Chips			4.5			
Drill Chips			9.5			
Drill Chips			14.5			
Drill Chips			19.5			
Drill Chips			24.5			
Drill Chips			29.5			

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Schwyn Environmental Services

Boring ID: B-9RI

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
			33			
			34	ML	ML: Olive grey Silt, damp.	
1.5-in SPT B935		8 20 17	35–36		Dark grey Silt with little clay and sand, stiff, landfill gas odor, moist, @35.5 ft up to 1.5 " dia. basalt gravel.	
			37–38			
Drill Chips			39–40		Brown Silt , very damp.	
			41–43			
Drill Chips			44–45		@ 45 ft: brown clayey silt	
			46–48		@ 48-53 ft: collect water sample	
Drill Chips			49–50			
			51			
Drill Chips			52–53	GM	GM: Brownish fine Gravel with sand and silt, wet.	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

Boring ID: B-10RI

Drill Date: 8/30/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6-in. dia. TUBEX
Sample Method: Grab/2.4-in SS
Boring Diameter: 6.5-in
Boring Depth (ft BGS): 35
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 800 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,833.60
Longitude/Easting: 2,170,046.97

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Grab			0	ML	ML: Light brown Silt, trace sand, low plasticity, soft, dry.	
			1			
			2			
			3			
			4			
Drill Chips			5			
			6			
			7			
			8			
			9			
Drill Chips			10			
			11	MW	MW: Municipal Solid Waste with silt, damp.	
			12			
			13			
			14			
Drill Chips			15			
			16			
			17			Bentonite Chips
			18			
			19			

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Boring ID: B-10RI

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Drill Chips			20			
			21			
			22			
			23			
			24			
Drill Chips			25			
			26			
			27			
			28			
			29			
Drill Chips			30			
			31			
			32		ML: Olive grey Silt, damp.	
			33			
2.4-in SS B1034		4 4 6	34		ML: Brown Silt with trace medium rounded sand, some vertical root tubes and stringers of calcite, wet.	
			35			

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

Schwyn Environmental Services

Boring ID: B-11RI

Drill Date: 8/30/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6-in. dia. TUBEX
Sample Method: Grab/2.4" SS
Boring Diameter: 6.5
Boring Depth (ft BGS): 35.5
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 806 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,995.06
Longitude/Easting: 2,170385.77

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Grab			0	ML	ML: Light brown Silt, trace sand, low plasticity, soft, dry.	Bentonite Chips
Drill Chips			4.5			
Drill Chips			9.5			
Drill Chips			14.5		@ 15 ft: grey	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Schwyn Environmental Services

Boring ID: B-11RI

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Drill Chips			20			
			21		MW: Municipal Solid Waste with silt, damp.	
			22			
			23			
			24			
Drill Chips			25			
			26			
			27			
			28			
			29			
Drill Chips			30			
			31			
			32			
			33		SM: Olive grey silty Sand, damp.	
2.4-in SS B1134		9	34		SM: Grey fine to medium Sand with some silt, loose, damp.	
		17 13	35		ML: Brown sandy Silt with trace fine gravel, stiff, blocky structure,	

Notes:

ft BGS = feet below ground surface

ft BTOC = feet below top of well casing

USCS = Unified Soil Classification System

▼ = denotes groundwater table

Log of Exploration

Boring ID: B-12RI

Drill Date: 8/30/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6-in. dia. TUBEX
Sample Method: Grab/2.4-in SS
Boring Diameter: 6.5
Boring Depth (ft BGS): 48.5
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 820 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,876.57
Longitude/Easting: 2,170, 269.11

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Grab			0		ML: Light brown Silt, trace sand, low plasticity, soft, dry.	
Drill Chips			5			
Drill Chips			10			
Drill Chips			15			
			17		MW: Municipal Solid Waste, dry to damp.	
Drill Chips			20			
Drill Chips			25			Bentonite Chips
Drill Chips			30			

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Boring ID: B-12RI

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
			33		MW: Municipal Solid Waste (cont.)	
Drill Chips			34–35			
Drill Chips			39–40			
			41		ML: Brown Silt	
2.4-in SS B1244		7 11 14	43–45		ML: Brown Silt, trace sand and clay, iron mottling, 0.25-in., laminations, stiff, damp.	
			48		Snap casing, boring terminated at 48.5'	

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

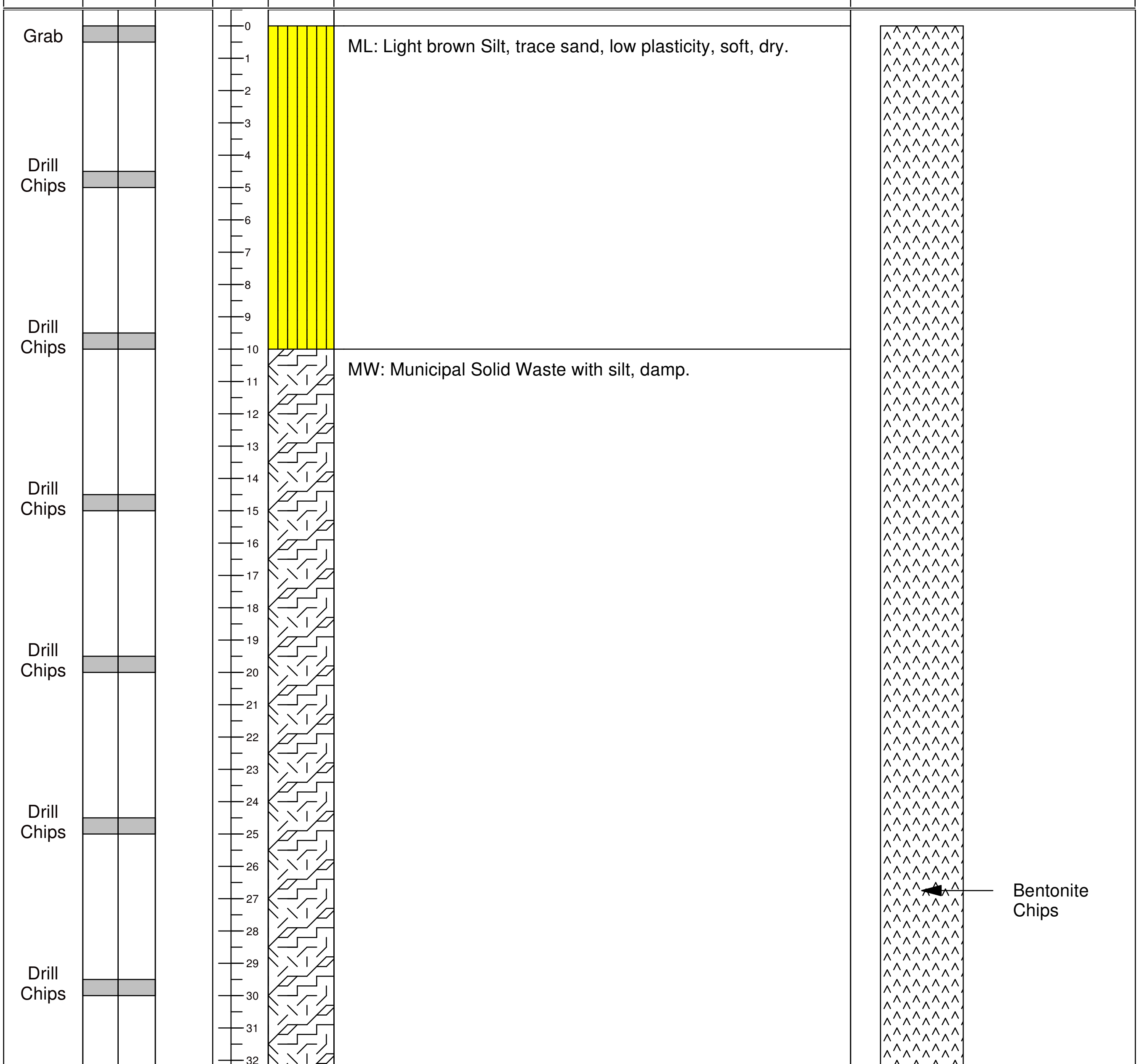
Boring ID: B-14RI

Drill Date: 8/30/2005
Logged By: Craig Schwyn
Drilled By: Environmental West. Exp.
Drill Type: 6-in. diam. TUBEX
Sample Method: Drill Chips
Boring Diameter: 6.5-in
Boring Depth (ft BGS): 53.5
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 840 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,909.90
Longitude/Easting: 2,170,703.74

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Grab			0		ML: Light brown Silt, trace sand, low plasticity, soft, dry.	
Drill Chips			5			
Drill Chips			10		MW: Municipal Solid Waste with silt, damp.	
Drill Chips			15			
Drill Chips			20			
Drill Chips			25			Bentonite Chips
Drill Chips			30			



Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Schwyn Environmental Services

Boring ID: B-14RI

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Drill Chips			33–35		MW: Municipal Solid Waste (cont.)	
Drill Chips			39–40			
Drill Chips			44–45			
Drill Chips			48–50		ML: Brown Silt	

Depth scale: 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Log of Exploration

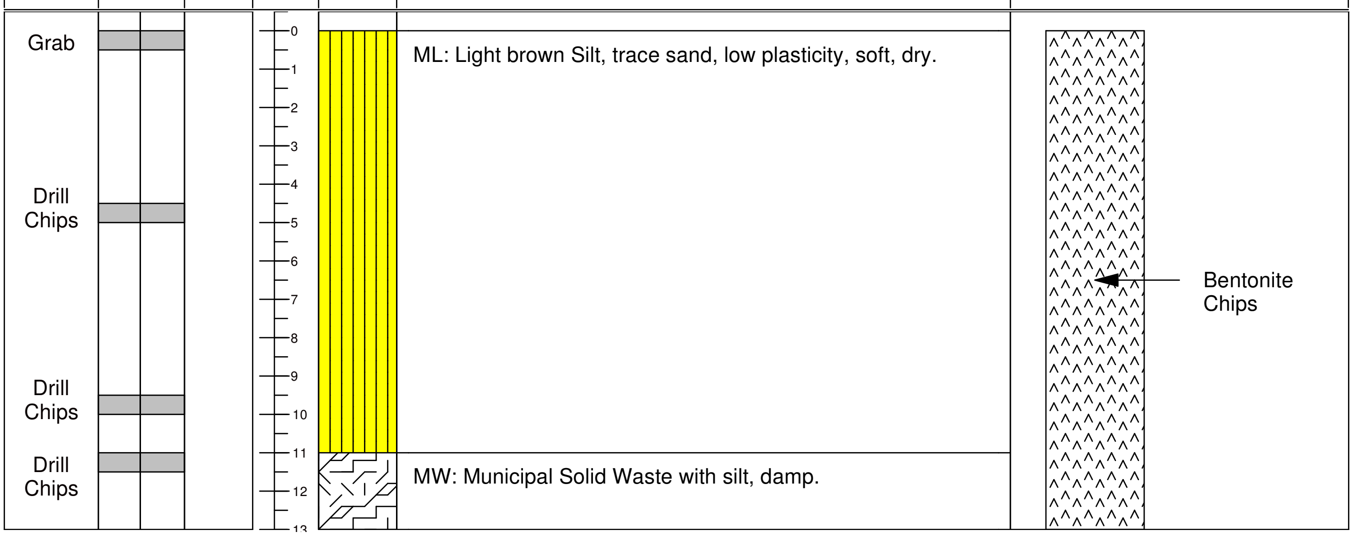
Boring ID: B-15RI

Drill Date: 8/31/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6-in. dia. TUBEX
Sample Method: Drill Chips
Boring Diameter: 6.5-in
Boring Depth (ft BGS): 13 ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 840 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,902.61
Longitude/Easting: 2,170,693.33

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Grab			0		ML: Light brown Silt, trace sand, low plasticity, soft, dry.	
Drill Chips			5			Bentonite Chips
Drill Chips			10			
Drill Chips			11		MW: Municipal Solid Waste with silt, damp.	



Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Log of Exploration

Boring ID: B-16RI

Drill Date: 8/31/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6-in. dia. TUBEX
Sample Method: Drill Chips
Boring Diameter: 6.5-in
Boring Depth (ft BGS): 15 Ft.
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 828 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 279,012.25
Longitude/Easting: 2,170,679.78

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Grab			0–3	ML	ML: Light brown Silt, trace sand, low plasticity, soft, dry.	Bentonite Chips
Drill Chips			3–15	MW	MW: Municipal Solid Waste with silt, damp.	
Drill Chips						
Drill Chips						

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Log of Exploration

Schwyn Environmental Services

Boring ID: B-17RI

Drill Date: 9/1/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6-in. dia. TUBEX
Sample Method: Drill Chips
Boring Diameter: 6.5-in
Boring Depth (ft BGS): 68
Groundwater (ft BTOC): 59.4

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 818 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,742.20
Longitude/Easting: 2,170,004.00

Remarks: Installed and sampled temporary well screened from 63-68 ft.
Purge 16 gal. and collect VOC sample with Grundfos pump. Remove casing and bentonite boring to surface.

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Grab			0	ML	ML: Light brown Silt, trace sand, low plasticity, soft, dry.	
Drill Chips			5			
Drill Chips			10	MW	MW: Municipal Solid Waste with silt, damp.	
Drill Chips			15			
Drill Chips			20			
Drill Chips			25			
Drill Chips			30			

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Boring ID: B-17RI

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description	Well Construction Detail
Drill Chips			35			Bentonite Chips
Drill Chips			40	ML	ML: Grey Silt, low plasticity, damp.	
Drill Chips			45		@ 45 ft: Brown, trace clay, damp	
Drill Chips			50			
Drill Chips			55		@ 54 ft: clayey, moist to wet.	
Drill Chips			60			
			63		@63-68 ft: collect water sample	
Drill Chips			65		@ 64.5 ft: Brown sandy Silt, with clay, moist.	
Drill Chips			66	GM	GM: Brown silty Gravel, wet.	

Depth scale: 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

Schwyn Environmental Services

Boring ID: B-18RI

Drill Date: 9/1/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6-in. dia. TUBEX
Sample Method: 2.4-in SS
Boring Diameter: 6.5-in
Boring Depth (ft BGS): 31.5
Groundwater (ft BTOC):

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road, Walla Walla, WA
Ground Surf Elev. & Datum: 840 ft. MSL (Topo Map)
Casing Elevation:
Coordinate System: NAD 83
Latitude/Northing: 278,543.76
Longitude/Easting: 2,169,823.27

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description
Grab			0	ML	ML: Light brown Silt, trace sand, low plasticity, soft, dry.
Drill Chips			4.5	ML	
			8	MW	MW: Municipal Solid Waste with silt, dry
Drill Chips			9.5	MW	
Drill Chips			14.5	MW	
Drill Chips			19.5	MW	
			21	ML	ML: Brown Silt, low plasticity, damp.
Drill Chips			24.5	ML	
2.4-in SS B1830		7 9 8	30–31.5	ML	Brown Silt, trace clay, laminated, stiff, damp.

Well Construction Detail

Bentonite Chips

Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
▼ = denotes groundwater table

Log of Exploration

Monitoring Well ID: MW-16

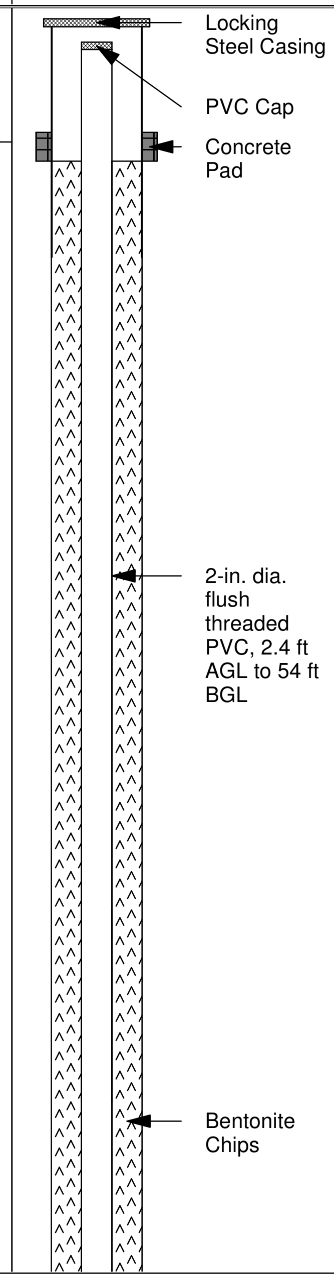
Drill Date: 8/31/2005
Logged By: Craig Schwyn
Drilled By: Environmental West Exp.
Drill Type: 6" Tubex
Sample Method: Grab/2.4" SS
Boring Diameter: 6.5-in
Boring Depth (ft BGS): 69 ft.
Groundwater (ft BTOC): 58.02

Project: Sudbury Road Landfill Remedial Investigation
Client: City of Walla Walla
Site Location: Sudbury Road Landfill
Ground Surf Elev. & Datum: 810.9 ft. MSL
Casing Elevation: 813.39 ft. MSL
Coordinate System: NAD 83
Latitude/Northing: 278,211.43
Longitude/Easting: 2,169,578.97

Remarks:

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description
Grab			0	ML	ML: Brown Silt, trace sand and clay, low plasticity, damp.
Drill Chips			5		
Drill Chips			10		
Drill Chips			15		
Drill Chips			20		
Drill Chips			25		

Well Construction Detail



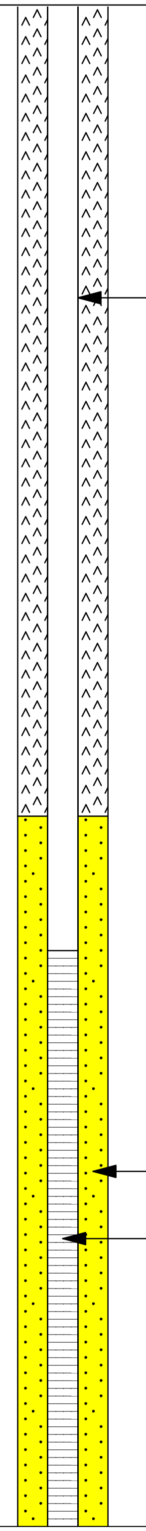
Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Monitoring Well ID: MW-16

SAMPLE TYPE / ID	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	Sample Description
Drill Chips			30		Silt, cont.
Drill Chips			34		
Drill Chips			39		
Drill Chips			44		@45 ft.: moist
2.4-in SS		10 8 8	50		@50 ft.: stiff, wet.
Drill Chips			54		
Drill Chips			59		@ 60 ft.: no free water in casing while drilling
2.4-in SS		39 50/5"	65		GM: Brown silty Gravel with trace sand, 0.75 - 2" sub-rounded basalt gravel dense, wet.

Depth scale: 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69

Well Construction Detail



Notes:
ft BGS = feet below ground surface
ft BTOC = feet below top of well casing
USCS = Unified Soil Classification System
= denotes groundwater table

Laboratory Analytical Reports

From: Dennis Wells [Dwells@ncalabs.com]
Sent: Friday, April 21, 2006 4:32 PM
To: craigs@cet.com
Cc: Kristine Graf
Subject: [Norton AntiSpam] Data Recall S5G0044

DATA RECALL NOTICE

S5G0044 - 01, 02, 04 -Sudbury RI

In a recent audit of PT results for EPA 8260 Volatiles it was discovered that the retention time assignments for two compounds were not correct. This resulted in the misidentification of two compounds, 1,1- Dichloroethane and 1,1-Dichloropropene.
All results reported as 1,1-Dichloroethane should read 1,1-Dichloropropene and all results reported as 1,1-Dichloropropene should read 1,1-Dichloroethane.

Attached is a revised report for work order S5G0044 containing the corrections outlined above.

We apologize for any inconvenience this error may have caused you.

North Creek Analytical, Inc.

Dennis D. Wells
Lab Manager - Spokane

Dennis D. Wells
Regional Operations Manager
Anchorage, Bend, Spokane
North Creek Analytical, Inc., a TestAmerica Co.
Phone - 509-924-9200
Fax - 509-924-9290
Cell - 509-993-1349

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	Reported:
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GP-3	S5G0044-01	Water	07/06/05 10:30	07/08/05 13:58
GP-4	S5G0044-02	Water	07/06/05 12:50	07/08/05 13:58
GP-5	S5G0044-03	Water	07/06/05 02:30	07/08/05 13:58
GP-6	S5G0044-04	Water	07/07/05 09:30	07/08/05 13:58
GP-8	S5G0044-05	Water	07/07/05 10:30	07/08/05 13:58
GP-3-21.5-22	S5G0044-06	Soil	07/06/05 00:00	07/08/05 13:58
GP-4-18-18.5	S5G0044-07	Soil	07/06/05 00:00	07/08/05 13:58
GP-6-15-15.5	S5G0044-08	Soil	07/06/05 00:00	07/08/05 13:58

North Creek Analytical - Spokane

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Dennis D Wells, Laboratory Director

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Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

Total Metals by EPA 200 Series Methods
North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-5 (S5G0044-03) Water Sampled: 07/06/05 02:30 Received: 07/08/05 13:58									
Calcium	**248**	0.0400	mg/l	1	5070132	07/19/05	07/19/05	EPA 200.7	
Potassium	**42.2**	0.500	"	"	"	"	"	"	
Magnesium	**156**	0.0400	"	"	"	"	"	"	
Sodium	**43.7**	0.500	"	"	"	"	"	"	
GP-6 (S5G0044-04) Water Sampled: 07/07/05 09:30 Received: 07/08/05 13:58									
Calcium	**399**	0.0400	mg/l	1	5070132	07/19/05	07/19/05	EPA 200.7	
Potassium	**68.6**	0.500	"	"	"	"	"	"	
Magnesium	**246**	0.0400	"	"	"	"	"	"	
Sodium	**46.9**	0.500	"	"	"	"	"	"	

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425.420.9200 fax 425.420.9210
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Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	Reported:
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

GP-5 (S5G0044-03) Water Sampled: 07/06/05 02:30 Received: 07/08/05 13:58

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	ND	25.0	ug/l	1	5070186	07/20/05	07/20/05	EPA 8260B	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	1.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	**2.58**	1.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	

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Dennis D Wells, Laboratory Director

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-5 (S5G0044-03) Water Sampled: 07/06/05 02:30 Received: 07/08/05 13:58									
Ethylbenzene	ND	1.00	ug/l	1	5070186	07/20/05	07/20/05	EPA 8260B	
Hexachlorobutadiene	ND	1.00	"	"	"	"	"	"	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	1.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	10.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Naphthalene	ND	1.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	0.200	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*88.2*	*62.9-131*			"	"	"	"	
Surrogate: Toluene-d8	*97.2*	*58.7-133*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*88.3*	*60.8-140*			"	"	"	"	

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907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-8 (S5G0044-05) Water Sampled: 07/07/05 10:30 Received: 07/08/05 13:58									
Acetone	ND	25.0	ug/l	1	5070186	07/20/05	07/20/05	EPA 8260B	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	1.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Spokane

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Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-8 (S5G0044-05) Water Sampled: 07/07/05 10:30 Received: 07/08/05 13:58									
Ethylbenzene	ND	1.00	ug/l	1	5070186	07/20/05	07/20/05	EPA 8260B	
Hexachlorobutadiene	ND	1.00	"	"	"	"	"	"	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	1.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	10.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Naphthalene	ND	1.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	0.200	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*89.3*	*62.9-131*			"	"	"	"	
Surrogate: Toluene-d8	*96.2*	*58.7-133*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*86.9*	*60.8-140*			"	"	"	"	

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Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-3-21.5-22 (S5G0044-06) Soil Sampled: 07/06/05 00:00 Received: 07/08/05 13:58									
Acetone	ND	1.00	mg/kg dry	1	5070125	07/18/05	07/20/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-3-21.5-22 (S5G0044-06) Soil Sampled: 07/06/05 00:00 Received: 07/08/05 13:58									
Ethylbenzene	ND	0.100	mg/kg dry	1	5070125	07/18/05	07/20/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	ND	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*82.9*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*94.6*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*90.7*	*52.5-138*			"	"	"	"	

North Creek Analytical - Spokane

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Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Spokane

GP-4-18-18.5 (S5G0044-07) Soil Sampled: 07/06/05 00:00 Received: 07/08/05 13:58

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	ND	1.00	mg/kg dry	1	5070125	07/18/05	07/20/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

North Creek Analytical - Spokane

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Dennis D Wells, Laboratory Director

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Spokane

GP-4-18-18.5 (S5G0044-07) Soil Sampled: 07/06/05 00:00 Received: 07/08/05 13:58

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ethylbenzene	ND	0.100	mg/kg dry	1	5070125	07/18/05	07/20/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	ND	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*81.5*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*85.8*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*78.3*	*52.5-138*			"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
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509.924.9200 fax 509.924.9290
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907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-6-15-15.5 (S5G0044-08) Soil Sampled: 07/06/05 00:00 Received: 07/08/05 13:58									
Acetone	ND	1.00	mg/kg dry	1	5070125	07/18/05	07/20/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

North Creek Analytical - Spokane

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Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-6-15-15.5 (S5G0044-08) Soil Sampled: 07/06/05 00:00 Received: 07/08/05 13:58									
Ethylbenzene	ND	0.100	mg/kg dry	1	5070125	07/18/05	07/20/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.100	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	ND	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*86.9*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*85.5*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*82.5*	*52.5-138*			"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Conventional Chemistry Parameters by APHA/EPA Methods

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-5 (S5G0044-03) Water Sampled: 07/06/05 02:30 Received: 07/08/05 13:58									
Total Dissolved Solids	**878**	2.00	mg/l	1	5070096	07/13/05	07/22/05	EPA 160.1	
GP-6 (S5G0044-04) Water Sampled: 07/07/05 09:30 Received: 07/08/05 13:58									
Total Dissolved Solids	**933**	2.00	mg/l	1	5070096	07/13/05	07/22/05	EPA 160.1	
GP-3-21.5-22 (S5G0044-06) Soil Sampled: 07/06/05 00:00 Received: 07/08/05 13:58									
% Solids	**77.8**	0.0100	% by Weight	1	5070176	07/21/05	07/22/05	Gravimetry	
GP-4-18-18.5 (S5G0044-07) Soil Sampled: 07/06/05 00:00 Received: 07/08/05 13:58									
% Solids	**83.3**	0.0100	% by Weight	1	5070176	07/21/05	07/22/05	Gravimetry	
GP-6-15-15.5 (S5G0044-08) Soil Sampled: 07/06/05 00:00 Received: 07/08/05 13:58									
% Solids	**87.6**	0.0100	% by Weight	1	5070176	07/21/05	07/22/05	Gravimetry	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
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Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	07/27/05 16:39

Anions by EPA Method 300.0

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GP-5 (S5G0044-03) Water Sampled: 07/06/05 02:30 Received: 07/08/05 13:58									
Chloride	**214**	5.00	mg/l	10	5070056	07/08/05	07/12/05	EPA 300.0	
Nitrate-Nitrogen	**12.7**	5.00	"	"	"	"	07/08/05	"	
Sulfate	**52.4**	5.00	"	"	"	"	07/12/05	"	
GP-6 (S5G0044-04) Water Sampled: 07/07/05 09:30 Received: 07/08/05 13:58									
Chloride	**199**	5.00	mg/l	10	5070056	07/08/05	07/12/05	EPA 300.0	
Nitrate-Nitrogen	**12.6**	5.00	"	"	"	"	07/08/05	"	
Sulfate	**38.6**	5.00	"	"	"	"	07/12/05	"	

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425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	07/27/05 16:39

Total Metals by EPA 200 Series Methods - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5070132: Prepared 07/19/05 Using Metals										
Blank (5070132-BLK1)										
Calcium	ND	0.0400	mg/l							
Potassium	ND	0.500	"							
Magnesium	ND	0.0400	"							
Sodium	ND	0.500	"							
LCS (5070132-BS1)										
Calcium	10.6	0.0400	mg/l	10.0		106	70-130			
Potassium	10.5	0.500	"	10.0		105	70-130			
Magnesium	10.9	0.0400	"	10.0		109	70-130			
Sodium	10.6	0.500	"	10.0		106	70-130			
Duplicate (5070132-DUP1)					**Source: S5G0071-01**					
Calcium	53.9	0.0400	mg/l		54.3			0.739	20	
Potassium	251	0.500	"		252			0.398	20	
Magnesium	31.9	0.0400	"		32.1			0.625	20	
Sodium	32.6	0.500	"		33.1			1.52	20	
Matrix Spike (5070132-MS1)					**Source: S5G0071-01**					
Calcium	64.8	0.0400	mg/l	10.0	54.3	105	75-125			
Potassium	262	0.500	"	10.0	252	100	75-125			
Magnesium	42.8	0.0400	"	10.0	32.1	107	75-125			
Sodium	42.3	0.500	"	10.0	33.1	92.0	75-125			
Matrix Spike Dup (5070132-MSD1)					**Source: S5G0071-01**					
Calcium	64.3	0.0400	mg/l	10.0	54.3	100	75-125	0.775	20	
Potassium	261	0.500	"	10.0	252	90.0	75-125	0.382	20	
Magnesium	42.7	0.0400	"	10.0	32.1	106	75-125	0.234	20	
Sodium	42.6	0.500	"	10.0	33.1	95.0	75-125	0.707	20	

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

Dennis D Wells, Laboratory Director

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	Reported:
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Batch 5070125: Prepared 07/18/05 Using GC/MS Volatiles

Blank (5070125-BLK1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Acetone	ND	1.00	mg/kg wet							
Benzene	ND	0.0300	"							
Bromobenzene	ND	0.100	"							
Bromochloromethane	ND	0.100	"							
Bromodichloromethane	ND	0.100	"							
Bromoform	ND	0.100	"							
Bromomethane	ND	0.500	"							
2-Butanone	ND	1.00	"							
n-Butylbenzene	ND	0.100	"							
sec-Butylbenzene	ND	0.100	"							
tert-Butylbenzene	ND	0.100	"							
Carbon disulfide	ND	0.100	"							
Carbon tetrachloride	ND	0.100	"							
Chlorobenzene	ND	0.100	"							
Chloroethane	ND	0.100	"							
Chloroform	ND	0.100	"							
Chloromethane	ND	0.500	"							
2-Chlorotoluene	ND	0.100	"							
4-Chlorotoluene	ND	0.100	"							
Dibromochloromethane	ND	0.100	"							
1,2-Dibromo-3-chloropropane	ND	0.500	"							
1,2-Dibromoethane	ND	0.100	"							
Dibromomethane	ND	0.100	"							
1,2-Dichlorobenzene	ND	0.100	"							
1,3-Dichlorobenzene	ND	0.100	"							
1,4-Dichlorobenzene	ND	0.100	"							
Dichlorodifluoromethane	ND	0.100	"							
1,1-Dichloroethane	ND	0.100	"							
1,2-Dichloroethane (EDC)	ND	0.100	"							
1,1-Dichloroethene	ND	0.100	"							
cis-1,2-Dichloroethene	ND	0.100	"							
trans-1,2-Dichloroethene	ND	0.100	"							
1,2-Dichloropropane	ND	0.100	"							
1,3-Dichloropropane	ND	0.100	"							
2,2-Dichloropropane	ND	0.100	"							

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425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5070125: Prepared 07/18/05 Using GC/MS Volatiles										
Blank (5070125-BLK1)										
1,1-Dichloropropene	ND	0.100	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.100	"							
trans-1,3-Dichloropropene	ND	0.100	"							
Ethylbenzene	ND	0.100	"							
Hexachlorobutadiene	ND	0.100	"							
2-Hexanone	ND	1.00	"							
Isopropylbenzene	ND	0.100	"							
p-Isopropyltoluene	ND	0.100	"							
Methylene chloride	ND	1.00	"							
4-Methyl-2-pentanone	ND	1.00	"							
Methyl tert-butyl ether	ND	0.100	"							
Naphthalene	0.115	0.100	"							
n-Propylbenzene	ND	0.100	"							
Styrene	ND	0.100	"							
1,1,1,2-Tetrachloroethane	ND	0.100	"							
1,1,2,2-Tetrachloroethane	ND	0.100	"							
Tetrachloroethene	ND	0.0300	"							
Toluene	ND	0.100	"							
1,2,3-Trichlorobenzene	ND	0.100	"							
1,2,4-Trichlorobenzene	ND	0.100	"							
1,1,1-Trichloroethane	ND	0.100	"							
1,1,2-Trichloroethane	ND	0.100	"							
Trichloroethene	ND	0.0300	"							
Trichlorofluoromethane	ND	0.100	"							
1,2,3-Trichloropropane	ND	0.100	"							
1,2,4-Trimethylbenzene	ND	0.100	"							
1,3,5-Trimethylbenzene	ND	0.100	"							
Vinyl chloride	ND	0.100	"							
o-Xylene	ND	0.200	"							
m,p-Xylene	ND	0.400	"							
Surrogate: Dibromofluoromethane	*0.799*		*"*	*1.00*		79.9	*44.8-146*			
Surrogate: Toluene-d8	*0.960*		*"*	*1.00*		96.0	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.810*		*"*	*1.00*		81.0	*52.5-138*			

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425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5070125: Prepared 07/18/05 Using GC/MS Volatiles										
LCS (5070125-BS1)										
Benzene	0.552	0.0300	mg/kg wet	0.500		110	72.5-130			
Chlorobenzene	0.542	0.100	"	0.500		108	78.4-120			
1,1-Dichloroethene	0.445	0.100	"	0.500		89.0	50-150			
Toluene	0.508	0.100	"	0.500		102	75.3-120			
Trichloroethene	0.517	0.0300	"	0.500		103	64.5-131			
Surrogate: Dibromofluoromethane	*0.907*		"	*1.00*		*90.7*	*44.8-146*			
Surrogate: Toluene-d8	*0.988*		"	*1.00*		*98.8*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.883*		"	*1.00*		*88.3*	*52.5-138*			
Matrix Spike (5070125-MS1)				**Source: S5G0044-06**						
Benzene	0.525	0.0300	mg/kg dry	0.643	ND	81.6	62-130			
Chlorobenzene	0.584	0.100	"	0.643	ND	90.8	70.3-119			
1,1-Dichloroethene	0.302	0.100	"	0.643	ND	47.0	50-150			Q-01
Toluene	0.521	0.100	"	0.643	ND	81.0	63.8-120			
Trichloroethene	0.507	0.0300	"	0.643	ND	78.8	73.9-122			
Surrogate: Dibromofluoromethane	*0.931*		"	*1.29*		*72.2*	*44.8-146*			
Surrogate: Toluene-d8	*0.985*		"	*1.29*		*76.4*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.943*		"	*1.29*		*73.1*	*52.5-138*			
Matrix Spike Dup (5070125-MSD1)				**Source: S5G0044-06**						
Benzene	0.501	0.0300	mg/kg dry	0.643	ND	77.9	62-130	4.68	25	
Chlorobenzene	0.560	0.100	"	0.643	ND	87.1	70.3-119	4.20	25	
1,1-Dichloroethene	0.334	0.100	"	0.643	ND	51.9	50-150	10.1	25	
Toluene	0.505	0.100	"	0.643	ND	78.5	63.8-120	3.12	25	
Trichloroethene	0.487	0.0300	"	0.643	ND	75.7	73.9-122	4.02	25	
Surrogate: Dibromofluoromethane	*0.909*		"	*1.29*		*70.5*	*44.8-146*			
Surrogate: Toluene-d8	*0.964*		"	*1.29*		*74.7*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*0.926*		"	*1.29*		*71.8*	*52.5-138*			

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Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5070186: Prepared 07/20/05 Using GC/MS Volatiles										
Blank (5070186-BLK1)										
Acetone	ND	25.0	ug/l							
Benzene	ND	1.00	"							
Bromobenzene	ND	1.00	"							
Bromochloromethane	ND	1.00	"							
Bromodichloromethane	ND	1.00	"							
Bromoform	ND	1.00	"							
Bromomethane	ND	5.00	"							
2-Butanone	ND	10.0	"							
n-Butylbenzene	ND	1.00	"							
sec-Butylbenzene	ND	1.00	"							
tert-Butylbenzene	ND	1.00	"							
Carbon disulfide	ND	1.00	"							
Carbon tetrachloride	ND	1.00	"							
Chlorobenzene	ND	1.00	"							
Chloroethane	ND	1.00	"							
Chloroform	ND	1.00	"							
Chloromethane	ND	5.00	"							
2-Chlorotoluene	ND	1.00	"							
4-Chlorotoluene	ND	1.00	"							
Dibromochloromethane	ND	1.00	"							
1,2-Dibromo-3-chloropropane	ND	5.00	"							
1,2-Dibromoethane	ND	1.00	"							
Dibromomethane	ND	1.00	"							
1,2-Dichlorobenzene	ND	1.00	"							
1,3-Dichlorobenzene	ND	1.00	"							
1,4-Dichlorobenzene	ND	1.00	"							
Dichlorodifluoromethane	ND	1.00	"							
1,1-Dichloroethane	ND	1.00	"							
1,2-Dichloroethane (EDC)	ND	1.00	"							
1,1-Dichloroethene	ND	1.00	"							
cis-1,2-Dichloroethene	ND	1.00	"							
trans-1,2-Dichloroethene	ND	1.00	"							
1,2-Dichloropropane	ND	1.00	"							
1,3-Dichloropropane	ND	1.00	"							
2,2-Dichloropropane	ND	1.00	"							

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425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5070186: Prepared 07/20/05 Using GC/MS Volatiles										
Blank (5070186-BLK1)										
1,1-Dichloropropene	ND	1.00	ug/l							
cis-1,3-Dichloropropene	ND	1.00	"							
trans-1,3-Dichloropropene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
Hexachlorobutadiene	ND	1.00	"							
2-Hexanone	ND	10.0	"							
Isopropylbenzene	ND	1.00	"							
p-Isopropyltoluene	ND	1.00	"							
Methylene chloride	ND	5.00	"							
4-Methyl-2-pentanone	ND	10.0	"							
Methyl tert-butyl ether	ND	1.00	"							
Naphthalene	ND	1.00	"							
n-Propylbenzene	ND	1.00	"							
Styrene	ND	1.00	"							
1,1,1,2-Tetrachloroethane	ND	1.00	"							
1,1,2,2-Tetrachloroethane	ND	1.00	"							
Tetrachloroethene	ND	1.00	"							
Toluene	ND	1.00	"							
1,2,3-Trichlorobenzene	ND	1.00	"							
1,2,4-Trichlorobenzene	ND	1.00	"							
1,1,1-Trichloroethane	ND	1.00	"							
1,1,2-Trichloroethane	ND	1.00	"							
Trichloroethene	ND	1.00	"							
Trichlorofluoromethane	ND	1.00	"							
1,2,3-Trichloropropane	ND	1.00	"							
1,2,4-Trimethylbenzene	ND	1.00	"							
1,3,5-Trimethylbenzene	ND	1.00	"							
Vinyl chloride	ND	0.200	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surrogate: Dibromofluoromethane	*7.80*		*"*	*10.0*		78.0	*62.9-131*			
Surrogate: Toluene-d8	*9.63*		*"*	*10.0*		96.3	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*8.25*		*"*	*10.0*		82.5	*60.8-140*			

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425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5070186: Prepared 07/20/05 Using GC/MS Volatiles										
LCS (5070186-BS1)										
Benzene	8.78	1.00	ug/l	10.0		87.8	67.4-116			
Chlorobenzene	8.89	1.00	"	10.0		88.9	68.3-123			
1,1-Dichloroethene	10.5	1.00	"	10.0		105	67-137			
Toluene	8.40	1.00	"	10.0		84.0	68.8-139			
Trichloroethene	8.17	1.00	"	10.0		81.7	68.1-128			
Surrogate: Dibromofluoromethane	*8.96*		*"*	*10.0*		*89.6*	*62.9-131*			
Surrogate: Toluene-d8	*9.75*		*"*	*10.0*		*97.5*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*8.64*		*"*	*10.0*		*86.4*	*60.8-140*			
LCS Dup (5070186-BSD1)										
Benzene	9.43	1.00	ug/l	10.0		94.3	67.4-116	7.14	10	
Chlorobenzene	9.60	1.00	"	10.0		96.0	68.3-123	7.68	11	
1,1-Dichloroethene	11.0	1.00	"	10.0		110	67-137	4.65	14	
Toluene	9.14	1.00	"	10.0		91.4	68.8-139	8.44	12	
Trichloroethene	8.69	1.00	"	10.0		86.9	68.1-128	6.17	10	
Surrogate: Dibromofluoromethane	*9.03*		*"*	*10.0*		*90.3*	*62.9-131*			
Surrogate: Toluene-d8	*9.76*		*"*	*10.0*		*97.6*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*8.84*		*"*	*10.0*		*88.4*	*60.8-140*			

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Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	Reported:
Spokane, WA 99223	Project Manager: Craig Schwyn	07/27/05 16:39

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5070096: Prepared 07/13/05 Using Wet Chem										
Blank (5070096-BLK1)										
Total Dissolved Solids	ND	2.00	mg/l							
Duplicate (5070096-DUP1)					**Source: S5G0044-03**					
Total Dissolved Solids	858	2.00	mg/l		878			2.30	24	

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541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Anions by EPA Method 300.0 - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5070056: Prepared 07/08/05 Using Wet Chem										
Blank (5070056-BLK1)										
Chloride	ND	0.500	mg/l							
Nitrate-Nitrogen	ND	0.500	"							
Sulfate	ND	0.500	"							
LCS (5070056-BS1)										
Chloride	4.83	0.500	mg/l	5.00		96.6	80-120			
Nitrate-Nitrogen	4.57	0.500	"	5.00		91.4	80-120			
Sulfate	4.82	0.500	"	5.00		96.4	80-120			
Duplicate (5070056-DUP1)					**Source: S5G0037-01**					
Chloride	0.690	0.500	mg/l		0.690			0.00	20	
Nitrate-Nitrogen	ND	0.500	"		ND				20	
Sulfate	20.0	0.500	"		20.1			0.499	20	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Notes and Definitions

E	Estimated value. The reported value exceeds the calibration range of the analysis.
Q-01	The spike recovery for this QC sample is outside of NCA established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
phone: (425) 420.9200 fax: (425) 420.9210
Spokane 11922 East 1st Avenue, Spokane Valley, WA 99206-5302
phone: (509) 924.9200 fax: (509) 924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
phone: (503) 906.9200 fax: (503) 906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
phone: (541) 383.9310 fax: 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
phone: (907) 563.9200 fax: (907) 563.9210

Schwyn Environmental Services, LLC	Project Name:	**Sudbury RI**	
4621 S. Custer Ct.	Project Number:	[none]	Report Created:
Spokane, WA 99223	Project Manager:	Craig Schwyn	04/21/06 16:20

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GP-3	S5G0044-01	Water	07/06/05 10:30	07/08/05 13:58
GP-4	S5G0044-02	Water	07/06/05 12:50	07/08/05 13:58
GP-6	S5G0044-04	Water	07/07/05 09:30	07/08/05 13:58

North Creek Analytical - Spokane

Dennis D Wells, Laboratory Director

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North Creek Analytical, Inc.
Environmental Laboratory Network

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
phone: (425) 420.9200 fax: (425) 420.9210
Spokane 11922 East 1st Avenue, Spokane Valley, WA 99206-5302
phone: (509) 924.9200 fax: (509) 924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
phone: (503) 906.9200 fax: (503) 906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
phone: (541) 383.9310 fax: 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
phone: (907) 563.9200 fax: (907) 563.9210

Schwyn Environmental Services, LLC	Project Name:	**Sudbury RI**	
4621 S. Custer Ct.	Project Number:	[none]	Report Created:
Spokane, WA 99223	Project Manager:	Craig Schwyn	04/21/06 16:20

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
S5G0044-01 **Water** **GP-3**	**Sampled: 07/06/05 10:30**									
Acetone	EPA 8260B	ND	-----	25.0	ug/l	1x	5070186	07/20/05	07/20/05 18:34	
Benzene	"	ND	-----	1.00	"	"	"	"	"	
Bromobenzene	"	ND	-----	1.00	"	"	"	"	"	
Bromochloromethane	"	ND	-----	1.00	"	"	"	"	"	
Bromodichloromethane	"	ND	-----	1.00	"	"	"	"	"	
Bromoform	"	ND	-----	1.00	"	"	"	"	"	
Bromomethane	"	ND	-----	5.00	"	"	"	"	"	
2-Butanone	"	ND	-----	10.0	"	"	"	"	"	
n-Butylbenzene	"	ND	-----	1.00	"	"	"	"	"	
sec-Butylbenzene	"	ND	-----	1.00	"	"	"	"	"	
tert-Butylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Carbon disulfide	"	ND	-----	1.00	"	"	"	"	"	
Carbon tetrachloride	"	ND	-----	1.00	"	"	"	"	"	
Chlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
Chloroethane	"	**1.59**	-----	1.00	"	"	"	"	"	
Chloroform	"	ND	-----	1.00	"	"	"	"	"	
Chloromethane	"	ND	-----	5.00	"	"	"	"	"	
2-Chlorotoluene	"	ND	-----	1.00	"	"	"	"	"	
4-Chlorotoluene	"	ND	-----	1.00	"	"	"	"	"	
Dibromochloromethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	"	ND	-----	5.00	"	"	"	"	"	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
Dibromomethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3-Dichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,4-Dichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
Dichlorodifluoromethane	"	**31.0**	-----	1.00	"	"	"	"	"	
1,1-Dichloroethane	"	**12.0**	-----	1.00	"	"	"	"	"	
1,2-Dichloroethane (EDC)	"	ND	-----	1.00	"	"	"	"	"	
1,1-Dichloroethene	"	ND	-----	1.00	"	"	"	"	"	
cis-1,2-Dichloroethene	"	**24.5**	-----	1.00	"	"	"	"	"	
trans-1,2-Dichloroethene	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloropropane	"	ND	-----	1.00	"	"	"	"	"	
1,3-Dichloropropane	"	ND	-----	1.00	"	"	"	"	"	
2,2-Dichloropropane	"	ND	-----	1.00	"	"	"	"	"	
1,1-Dichloropropene	"	ND	-----	1.00	"	"	"	"	"	
cis-1,3-Dichloropropene	"	ND	-----	1.00	"	"	"	"	"	
trans-1,3-Dichloropropene	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Hexachlorobutadiene	"	ND	-----	1.00	"	"	"	"	"	
2-Hexanone	"	ND	-----	10.0	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	1.00	"	"	"	"	"	

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Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
phone: (425) 420.9200 fax: (425) 420.9210
Spokane 11922 East 1st Avenue, Spokane Valley, WA 99206-5302
phone: (509) 924.9200 fax: (509) 924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
phone: (503) 906.9200 fax: (503) 906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
phone: (541) 383.9310 fax: 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
phone: (907) 563.9200 fax: (907) 563.9210

Schwyn Environmental Services, LLC	Project Name:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	Report Created:
Spokane, WA 99223	Project Manager:	Craig Schwyn	04/21/06 16:20

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
S5G0044-01 Water GP-3 Sampled: 07/06/05 10:30										
p-Isopropyltoluene	EPA 8260B	ND	-----	1.00	ug/l	1x	5070186	07/20/05	07/20/05 18:34	
Methylene chloride	"	ND	-----	5.00	"	"	"	"	"	
4-Methyl-2-pentanone	"	ND	-----	10.0	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Naphthalene	"	ND	-----	1.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Styrene	"	ND	-----	1.00	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	"	ND	-----	1.00	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	"	ND	-----	1.00	"	"	"	"	"	
Tetrachloroethene	"	ND	-----	1.00	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
1,2,3-Trichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,2,4-Trichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,1,1-Trichloroethane	"	ND	-----	1.00	"	"	"	"	"	
1,1,2-Trichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Trichloroethene	"	**1.88**	-----	1.00	"	"	"	"	"	
Trichlorofluoromethane	"	**2.08**	-----	1.00	"	"	"	"	"	
1,2,3-Trichloropropane	"	ND	-----	1.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Vinyl chloride	"	**0.603**	-----	0.200	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	ND	-----	2.00	"	"	"	"	"	
Surrogate(s): Dibromofluoromethane		*Recovery: 83.6%*		*Limits: 62.9 - 131 %*		*"*			*"*	
Toluene-d8		*96.9%*		*58.7 - 133 %*		*"*			*"*	
4-bromofluorobenzene		*89.4%*		*60.8 - 140 %*		*"*			*"*	
S5G0044-02 Water GP-4 Sampled: 07/06/05 12:50										
Acetone	EPA 8260B	ND	-----	25.0	ug/l	1x	5070186	07/20/05	07/20/05 19:04	
Benzene	"	ND	-----	1.00	"	"	"	"	"	
Bromobenzene	"	ND	-----	1.00	"	"	"	"	"	
Bromochloromethane	"	ND	-----	1.00	"	"	"	"	"	
Bromodichloromethane	"	ND	-----	1.00	"	"	"	"	"	
Bromoform	"	ND	-----	1.00	"	"	"	"	"	
Bromomethane	"	ND	-----	5.00	"	"	"	"	"	
2-Butanone	"	ND	-----	10.0	"	"	"	"	"	
n-Butylbenzene	"	ND	-----	1.00	"	"	"	"	"	
sec-Butylbenzene	"	ND	-----	1.00	"	"	"	"	"	
tert-Butylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Carbon disulfide	"	ND	-----	1.00	"	"	"	"	"	
Carbon tetrachloride	"	ND	-----	1.00	"	"	"	"	"	
Chlorobenzene	"	ND	-----	1.00	"	"	"	"	"	

North Creek Analytical - Spokane

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Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
phone: (425) 420.9200 fax: (425) 420.9210
Spokane 11922 East 1st Avenue, Spokane Valley, WA 99206-5302
phone: (509) 924.9200 fax: (509) 924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
phone: (503) 906.9200 fax: (503) 906.9210
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phone: (541) 383.9310 fax: 541.382.7588
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phone: (907) 563.9200 fax: (907) 563.9210

Schwyn Environmental Services, LLC	Project Name:	**Sudbury RI**	
4621 S. Custer Ct.	Project Number:	[none]	Report Created:
Spokane, WA 99223	Project Manager:	Craig Schwyn	04/21/06 16:20

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
S5G0044-02 Water GP-4 Sampled: 07/06/05 12:50										
Chloroethane	"	**2.43**	-----	1.00	"	"	"	"	"	
Chloroform	"	ND	-----	1.00	"	"	"	"	"	
Chloromethane	"	ND	-----	5.00	"	"	"	"	"	
2-Chlorotoluene	"	ND	-----	1.00	"	"	"	"	"	
4-Chlorotoluene	"	ND	-----	1.00	"	"	"	"	"	
Dibromochloromethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	"	ND	-----	5.00	"	"	"	"	"	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
Dibromomethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3-Dichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,4-Dichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
Dichlorodifluoromethane	"	**9.57**	-----	1.00	"	"	"	"	"	
1,1-Dichloroethane	"	**19.0**	-----	1.00	"	"	"	"	"	
1,2-Dichloroethane (EDC)	"	**4.51**	-----	1.00	"	"	"	"	"	
1,1-Dichloroethene	"	ND	-----	1.00	"	"	"	"	"	
cis-1,2-Dichloroethene	"	**62.8**	-----	1.00	"	"	"	"	"	**E**
trans-1,2-Dichloroethene	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloropropane	"	**6.20**	-----	1.00	"	"	"	"	"	
1,3-Dichloropropane	"	ND	-----	1.00	"	"	"	"	"	
2,2-Dichloropropane	"	ND	-----	1.00	"	"	"	"	"	
1,1-Dichloropropene	"	ND	-----	1.00	"	"	"	"	"	
cis-1,3-Dichloropropene	"	ND	-----	1.00	"	"	"	"	"	
trans-1,3-Dichloropropene	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Hexachlorobutadiene	"	ND	-----	1.00	"	"	"	"	"	
2-Hexanone	"	ND	-----	10.0	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	1.00	"	"	"	"	"	
p-Isopropyltoluene	"	ND	-----	1.00	"	"	"	"	"	
Methylene chloride	"	ND	-----	5.00	"	"	"	"	"	
4-Methyl-2-pentanone	"	ND	-----	10.0	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Naphthalene	"	ND	-----	1.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Styrene	"	ND	-----	1.00	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	"	ND	-----	1.00	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	"	ND	-----	1.00	"	"	"	"	"	
Tetrachloroethene	"	**6.21**	-----	1.00	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
1,2,3-Trichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,2,4-Trichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,1,1-Trichloroethane	"	ND	-----	1.00	"	"	"	"	"	

North Creek Analytical - Spokane

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Spokane 11922 East 1st Avenue, Spokane Valley, WA 99206-5302 phone: (509) 924.9200 fax: (509) 924.9290
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Schwyn Environmental Services, LLC	Project Name: **Sudbury RI**	
4621 S. Custer Ct.	Project Number: [none]	Report Created:
Spokane, WA 99223	Project Manager: Craig Schwyn	04/21/06 16:20

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
S5G0044-02 Water GP-4 Sampled: 07/06/05 12:50										
1,1,2-Trichloroethane	EPA 8260B	ND	-----	1.00	ug/l	1x	5070186	07/20/05	07/20/05 19:04	
Trichloroethene	"	**9.97**	-----	1.00	"	"	"	"	"	
Trichlorofluoromethane	"	ND	-----	1.00	"	"	"	"	"	
1,2,3-Trichloropropane	"	ND	-----	1.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Vinyl chloride	"	**3.76**	-----	0.200	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	ND	-----	2.00	"	"	"	"	"	
Surrogate(s): Dibromofluoromethane		*Recovery: 84.0%*		*Limits: 62.9 - 131 %*		*"*			*"*	
Toluene-d8		*97.6%*		*58.7 - 133 %*		*"*			*"*	
4-bromofluorobenzene		*89.4%*		*60.8 - 140 %*		*"*			*"*	
S5G0044-04 Water GP-6 Sampled: 07/07/05 09:30										
Acetone	EPA 8260B	ND	-----	25.0	ug/l	1x	5070186	07/20/05	07/20/05 20:02	
Benzene	"	ND	-----	1.00	"	"	"	"	"	
Bromobenzene	"	ND	-----	1.00	"	"	"	"	"	
Bromochloromethane	"	ND	-----	1.00	"	"	"	"	"	
Bromodichloromethane	"	ND	-----	1.00	"	"	"	"	"	
Bromoform	"	ND	-----	1.00	"	"	"	"	"	
Bromomethane	"	ND	-----	5.00	"	"	"	"	"	
2-Butanone	"	ND	-----	10.0	"	"	"	"	"	
n-Butylbenzene	"	ND	-----	1.00	"	"	"	"	"	
sec-Butylbenzene	"	ND	-----	1.00	"	"	"	"	"	
tert-Butylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Carbon disulfide	"	ND	-----	1.00	"	"	"	"	"	
Carbon tetrachloride	"	ND	-----	1.00	"	"	"	"	"	
Chlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
Chloroethane	"	ND	-----	1.00	"	"	"	"	"	
Chloroform	"	ND	-----	1.00	"	"	"	"	"	
Chloromethane	"	ND	-----	5.00	"	"	"	"	"	
2-Chlorotoluene	"	ND	-----	1.00	"	"	"	"	"	
4-Chlorotoluene	"	ND	-----	1.00	"	"	"	"	"	
Dibromochloromethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	"	ND	-----	5.00	"	"	"	"	"	
1,2-Dibromoethane	"	ND	-----	1.00	"	"	"	"	"	
Dibromomethane	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3-Dichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,4-Dichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
Dichlorodifluoromethane	"	**3.10**	-----	1.00	"	"	"	"	"	

North Creek Analytical - Spokane

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Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
phone: (425) 420.9200 fax: (425) 420.9210
Spokane 11922 East 1st Avenue, Spokane Valley, WA 99206-5302
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phone: (503) 906.9200 fax: (503) 906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
phone: (541) 383.9310 fax: 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
phone: (907) 563.9200 fax: (907) 563.9210

Schwyn Environmental Services, LLC	Project Name:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	Report Created:
Spokane, WA 99223	Project Manager:	Craig Schwyn	04/21/06 16:20

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
S5G0044-04 Water GP-6	Sampled: 07/07/05 09:30									
1,1-Dichloroethane	EPA 8260B	**1.47**	-----	1.00	ug/l	1x	5070186	07/20/05	07/20/05 20:02	
1,2-Dichloroethane (EDC)	"	ND	-----	1.00	"	"	"	"	"	
1,1-Dichloroethene	"	ND	-----	1.00	"	"	"	"	"	
cis-1,2-Dichloroethene	"	ND	-----	1.00	"	"	"	"	"	
trans-1,2-Dichloroethene	"	ND	-----	1.00	"	"	"	"	"	
1,2-Dichloropropane	"	ND	-----	1.00	"	"	"	"	"	
1,3-Dichloropropane	"	ND	-----	1.00	"	"	"	"	"	
2,2-Dichloropropane	"	ND	-----	1.00	"	"	"	"	"	
1,1-Dichloropropene	"	ND	-----	1.00	"	"	"	"	"	
cis-1,3-Dichloropropene	"	ND	-----	1.00	"	"	"	"	"	
trans-1,3-Dichloropropene	"	ND	-----	1.00	"	"	"	"	"	
Ethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Hexachlorobutadiene	"	ND	-----	1.00	"	"	"	"	"	
2-Hexanone	"	ND	-----	10.0	"	"	"	"	"	
Isopropylbenzene	"	ND	-----	1.00	"	"	"	"	"	
p-Isopropyltoluene	"	ND	-----	1.00	"	"	"	"	"	
Methylene chloride	"	ND	-----	5.00	"	"	"	"	"	
4-Methyl-2-pentanone	"	ND	-----	10.0	"	"	"	"	"	
Methyl tert-butyl ether	"	ND	-----	1.00	"	"	"	"	"	
Naphthalene	"	ND	-----	1.00	"	"	"	"	"	
n-Propylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Styrene	"	ND	-----	1.00	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	"	ND	-----	1.00	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	"	ND	-----	1.00	"	"	"	"	"	
Tetrachloroethene	"	ND	-----	1.00	"	"	"	"	"	
Toluene	"	ND	-----	1.00	"	"	"	"	"	
1,2,3-Trichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,2,4-Trichlorobenzene	"	ND	-----	1.00	"	"	"	"	"	
1,1,1-Trichloroethane	"	ND	-----	1.00	"	"	"	"	"	
1,1,2-Trichloroethane	"	ND	-----	1.00	"	"	"	"	"	
Trichloroethene	"	ND	-----	1.00	"	"	"	"	"	
Trichlorofluoromethane	"	ND	-----	1.00	"	"	"	"	"	
1,2,3-Trichloropropane	"	ND	-----	1.00	"	"	"	"	"	
1,2,4-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
1,3,5-Trimethylbenzene	"	ND	-----	1.00	"	"	"	"	"	
Vinyl chloride	"	ND	-----	0.200	"	"	"	"	"	
o-Xylene	"	ND	-----	1.00	"	"	"	"	"	
m,p-Xylene	"	ND	-----	2.00	"	"	"	"	"	
Surrogate(s): Dibromofluoromethane		*Recovery: 88.5%*		*Limits: 62.9 - 131 %*		*"*			*"*	
Toluene-d8		*97.9%*		*58.7 - 133 %*		*"*			*"*	
4-bromofluorobenzene		*88.4%*		*60.8 - 140 %*		*"*			*"*	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
phone: (425) 420.9200 fax: (425) 420.9210
Spokane 11922 East 1st Avenue, Spokane Valley, WA 99206-5302
phone: (509) 924.9200 fax: (509) 924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
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phone: (907) 563.9200 fax: (907) 563.9210

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes

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Notes and Definitions

Report Specific Notes:

E - Estimated value. The reported value exceeds the calibration range of the analysis.

Laboratory Reporting Conventions:

DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.

ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).

NR / NA - Not Reported / Not Available

dry - Sample results reported on a dry weight basis. Reporting Limits have been corrected for %Solids.

wet - Sample results and reporting limits reported on a wet weight basis (as received).

RPD - Relative Percent Difference. (RPDs calculated using Results, not Percent Recoveries).

MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.

MDL* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated results.

Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.

Reporting limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.

nca

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E 1st Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
20332 Empire Ave, Ste F1, Bend, OR 97701-5712 541-383-9310 FAX 382-7588
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: SSG0644

NCA CLIENT: Schwyn Enviro Services

REPORT TO: Craig Schwyn
ADDRESS:

PHONE: 448 0346 FAX: 448 9238

INVOICE TO: Craig Schwyn

P.O. NUMBER:

PROJECT NAME: Sudbury RI

PROJECT NUMBER:

SAMPLED BY: Craig Schwyn

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1 — 10 circled

Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1

OTHER Specify:

*Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE / REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	VOC	Ca, Na Chloride	TDS	Mg, K	Sulfate	Nitrate	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	GP-3	7/6/05 10:30	X	X					W	2		-01
2	GP-~~3~~4	7/6/05 12:30	X						W	2	check Air bubble in one	-02
3	GP-5	7/6/05 2:30	X	X	X	X	X	X	W			-03
4	GP-6	7/7/05 9:30	X	X	X	X	X	X	W		HCl removed	-04
5	GP-8	7/7/05 3:30	X						W		from VOCs	-05
6												~~-06~~
7	GP-3-21.5-22	7/6/05	X						S			-06
8	GP-4-18-18.5	7/6/05	X						S			-07
9	GP-6-15-15.5	7/7/05	X						S			-08
10												

RELEASED BY: [signature] DATE: 7/8/05
PRINT NAME: Craig Schwyn FIRM: SES TIME: 13:06

RECEIVED BY: [signature] DATE: 7/8/05
PRINT NAME: Amanda Vernon FIRM: NCA-S TIME: 13:06

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:
took 1 5035 soil sampler (plunger)

TEMP: 9.4

PAGE 1 OF 1

COC REV 09/04

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425.420.9200 fax 425.420.9210
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509.924.9200 fax 509.924.9290
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907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC
4621 S. Custer Ct.
Spokane, WA 99223

Project: Sudbury RI
Project Number: [none]
Project Manager: Craig Schwyn

Reported: 09/15/05 13:18

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-9RI-35'	S5H0238-01	Soil	08/29/05 11:30	08/31/05 11:00
B-9RI	S5H0238-02	Water	08/29/05 18:00	08/31/05 11:00
B-10RI-34'	S5H0238-03	Soil	08/30/05 08:30	08/31/05 11:00
B-11RI-34'	S5H0238-04	Soil	08/30/05 13:15	08/31/05 11:00

North Creek Analytical - Spokane

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

Dennis D Wells, Laboratory Director

Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-9RI-35' (S5H0238-01) Soil Sampled: 08/29/05 11:30 Received: 08/31/05 11:00									**I-02**
Acetone	ND	1.00	mg/kg wet	1	5090090	09/13/05	09/13/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-9RI-35' (S5H0238-01) Soil Sampled: 08/29/05 11:30 Received: 08/31/05 11:00									**I-02**
Ethylbenzene	ND	0.100	mg/kg wet	1	5090090	09/13/05	09/13/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.200	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	ND	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*104*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*98.7*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*104*	*52.5-138*			"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
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Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-9RI (S5H0238-02) Water Sampled: 08/29/05 18:00 Received: 08/31/05 11:00									**I-02**
Acetone	ND	25.0	ug/l	1	5090093	09/13/05	09/13/05	EPA 8260B	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	1.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	

Dennis D Wells, Laboratory Director

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Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-9RI (S5H0238-02) Water Sampled: 08/29/05 18:00 Received: 08/31/05 11:00									**I-02**
Ethylbenzene	ND	1.00	ug/l	1	5090093	09/13/05	09/13/05	EPA 8260B	
Hexachlorobutadiene	ND	1.00	"	"	"	"	"	"	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	1.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	10.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	0.200	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*101*	*62.9-131*			*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8	*101*	*58.7-133*			*"*	*"*	*"*	*"*	
Surrogate: 4-bromofluorobenzene	*103*	*60.8-140*			*"*	*"*	*"*	*"*	

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425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Spokane

B-10RI-34' (S5H0238-03) Soil Sampled: 08/30/05 08:30 Received: 08/31/05 11:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	ND	0.901	mg/kg wet	1	5090090	09/13/05	09/13/05	EPA 8260B	
Benzene	ND	0.0270	"	"	"	"	"	"	
Bromobenzene	ND	0.0901	"	"	"	"	"	"	
Bromochloromethane	ND	0.0901	"	"	"	"	"	"	
Bromodichloromethane	ND	0.0901	"	"	"	"	"	"	
Bromoform	ND	0.0901	"	"	"	"	"	"	
Bromomethane	ND	0.450	"	"	"	"	"	"	
2-Butanone	ND	0.901	"	"	"	"	"	"	
n-Butylbenzene	ND	0.0901	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.0901	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.0901	"	"	"	"	"	"	
Carbon disulfide	ND	0.0901	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.0901	"	"	"	"	"	"	
Chlorobenzene	ND	0.0901	"	"	"	"	"	"	
Chloroethane	ND	0.0901	"	"	"	"	"	"	
Chloroform	ND	0.0901	"	"	"	"	"	"	
Chloromethane	ND	0.450	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.0901	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.0901	"	"	"	"	"	"	
Dibromochloromethane	ND	0.0901	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.450	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.0901	"	"	"	"	"	"	
Dibromomethane	ND	0.0901	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.0901	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.0901	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.0901	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.0901	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.0901	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.0901	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.0901	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.0901	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.0901	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.0901	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.0901	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.0901	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.0901	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.0901	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.0901	"	"	"	"	"	"	

Dennis D Wells, Laboratory Director

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-10RI-34' (S5H0238-03) Soil Sampled: 08/30/05 08:30 Received: 08/31/05 11:00									
Ethylbenzene	ND	0.0901	mg/kg wet	1	5090090	09/13/05	09/13/05	EPA 8260B	
Hexachlorobutadiene	ND	0.0901	"	"	"	"	"	"	
2-Hexanone	ND	0.901	"	"	"	"	"	"	
Isopropylbenzene	ND	0.0901	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.0901	"	"	"	"	"	"	
Methylene chloride	ND	0.901	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	0.901	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.0901	"	"	"	"	"	"	
Naphthalene	ND	0.180	"	"	"	"	"	"	
n-Propylbenzene	ND	0.0901	"	"	"	"	"	"	
Styrene	ND	0.0901	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.0901	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.0901	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0270	"	"	"	"	"	"	
Toluene	ND	0.0901	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.0901	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.0901	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.0901	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.0901	"	"	"	"	"	"	
Trichloroethene	ND	0.0270	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.0901	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.0901	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.0901	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.0901	"	"	"	"	"	"	
Vinyl chloride	ND	0.0901	"	"	"	"	"	"	
o-Xylene	ND	0.180	"	"	"	"	"	"	
m,p-Xylene	ND	0.360	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*101*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*101*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*104*	*52.5-138*			"	"	"	"	

Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-11RI-34' (S5H0238-04) Soil Sampled: 08/30/05 13:15 Received: 08/31/05 11:00									
Acetone	ND	1.00	mg/kg wet	1	5090090	09/13/05	09/13/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-11RI-34' (S5H0238-04) Soil Sampled: 08/30/05 13:15 Received: 08/31/05 11:00									
Ethylbenzene	ND	0.100	mg/kg wet	1	5090090	09/13/05	09/13/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.200	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	ND	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*87.5*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*98.4*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*106*	*52.5-138*			"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
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541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	Reported:
Spokane, WA 99223	Project Manager: Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B - Quality Control
North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090090: Prepared 09/13/05 Using GC/MS Volatiles										
Blank (5090090-BLK1)										
Acetone	ND	1.00	mg/kg wet							
Benzene	ND	0.0300	"							
Bromobenzene	ND	0.100	"							
Bromochloromethane	ND	0.100	"							
Bromodichloromethane	ND	0.100	"							
Bromoform	ND	0.100	"							
Bromomethane	ND	0.500	"							
2-Butanone	ND	1.00	"							
n-Butylbenzene	ND	0.100	"							
sec-Butylbenzene	ND	0.100	"							
tert-Butylbenzene	ND	0.100	"							
Carbon disulfide	ND	0.100	"							
Carbon tetrachloride	ND	0.100	"							
Chlorobenzene	ND	0.100	"							
Chloroethane	ND	0.100	"							
Chloroform	ND	0.100	"							
Chloromethane	ND	0.500	"							
2-Chlorotoluene	ND	0.100	"							
4-Chlorotoluene	ND	0.100	"							
Dibromochloromethane	ND	0.100	"							
1,2-Dibromo-3-chloropropane	ND	0.500	"							
1,2-Dibromoethane	ND	0.100	"							
Dibromomethane	ND	0.100	"							
1,2-Dichlorobenzene	ND	0.100	"							
1,3-Dichlorobenzene	ND	0.100	"							
1,4-Dichlorobenzene	ND	0.100	"							
Dichlorodifluoromethane	ND	0.100	"							
1,1-Dichloroethane	ND	0.100	"							
1,2-Dichloroethane (EDC)	ND	0.100	"							
1,1-Dichloroethene	ND	0.100	"							
cis-1,2-Dichloroethene	ND	0.100	"							
trans-1,2-Dichloroethene	ND	0.100	"							
1,2-Dichloropropane	ND	0.100	"							
1,3-Dichloropropane	ND	0.100	"							

North Creek Analytical - Spokane

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

Dennis D Wells, Laboratory Director

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Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B - Quality Control
North Creek Analytical - Spokane

Batch 5090090: Prepared 09/13/05 Using GC/MS Volatiles

Blank (5090090-BLK1)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
2,2-Dichloropropane	ND	0.100	mg/kg wet							
1,1-Dichloropropene	ND	0.100	"							
cis-1,3-Dichloropropene	ND	0.100	"							
trans-1,3-Dichloropropene	ND	0.100	"							
Ethylbenzene	ND	0.100	"							
Hexachlorobutadiene	ND	0.100	"							
2-Hexanone	ND	1.00	"							
Isopropylbenzene	ND	0.100	"							
p-Isopropyltoluene	ND	0.100	"							
Methylene chloride	ND	1.00	"							
4-Methyl-2-pentanone	ND	1.00	"							
Methyl tert-butyl ether	ND	0.100	"							
Naphthalene	ND	0.200	"							
n-Propylbenzene	ND	0.100	"							
Styrene	ND	0.100	"							
1,1,1,2-Tetrachloroethane	ND	0.100	"							
1,1,2,2-Tetrachloroethane	ND	0.100	"							
Tetrachloroethene	ND	0.0300	"							
Toluene	ND	0.100	"							
1,2,3-Trichlorobenzene	ND	0.100	"							
1,2,4-Trichlorobenzene	ND	0.100	"							
1,1,1-Trichloroethane	ND	0.100	"							
1,1,2-Trichloroethane	ND	0.100	"							
Trichloroethene	ND	0.0300	"							
Trichlorofluoromethane	ND	0.100	"							
1,2,3-Trichloropropane	ND	0.100	"							
1,2,4-Trimethylbenzene	ND	0.100	"							
1,3,5-Trimethylbenzene	ND	0.100	"							
Vinyl chloride	ND	0.100	"							
o-Xylene	ND	0.200	"							
m,p-Xylene	ND	0.400	"							
Surrogate: Dibromofluoromethane	*878*		"	*1000*		*87.8*	*44.8-146*			
Surrogate: Toluene-d8	*1010*		"	*1000*		*101*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1090*		"	*1000*		*109*	*52.5-138*			

Dennis D Wells, Laboratory Director

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090090: Prepared 09/13/05 Using GC/MS Volatiles										
LCS (5090090-BS1)										
Benzene	0.868	0.0300	mg/kg wet	1.00		86.8	72.5-130			
Chlorobenzene	0.936	0.100	"	1.00		93.6	78.4-120			
1,1-Dichloroethene	0.958	0.100	"	1.00		95.8	50-150			
Toluene	0.870	0.100	"	1.00		87.0	75.3-120			
Trichloroethene	0.901	0.0300	"	1.00		90.1	64.5-131			
Surrogate: Dibromofluoromethane	*960*		"	*1000*		*96.0*	*44.8-146*			
Surrogate: Toluene-d8	*987*		"	*1000*		*98.7*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1040*		"	*1000*		*104*	*52.5-138*			
LCS Dup (5090090-BSD1)										
Benzene	0.897	0.0300	mg/kg wet	1.00		89.7	72.5-130	3.29	25	
Chlorobenzene	0.992	0.100	"	1.00		99.2	78.4-120	5.81	25	
1,1-Dichloroethene	1.03	0.100	"	1.00		103	50-150	7.24	25	
Toluene	0.939	0.100	"	1.00		93.9	75.3-120	7.63	25	
Trichloroethene	0.954	0.0300	"	1.00		95.4	64.5-131	5.71	25	
Surrogate: Dibromofluoromethane	*974*		"	*1000*		*97.4*	*44.8-146*			
Surrogate: Toluene-d8	*990*		"	*1000*		*99.0*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1050*		"	*1000*		*105*	*52.5-138*			
Batch 5090093: Prepared 09/13/05 Using GC/MS Volatiles										
Blank (5090093-BLK1)										
Acetone	ND	25.0	ug/l							
Benzene	ND	1.00	"							
Bromobenzene	ND	1.00	"							
Bromochloromethane	ND	1.00	"							
Bromodichloromethane	ND	1.00	"							
Bromoform	ND	1.00	"							
Bromomethane	ND	5.00	"							
2-Butanone	ND	10.0	"							
n-Butylbenzene	ND	1.00	"							
sec-Butylbenzene	ND	1.00	"							
tert-Butylbenzene	ND	1.00	"							
Carbon disulfide	ND	1.00	"							
Carbon tetrachloride	ND	1.00	"							
Chlorobenzene	ND	1.00	"							

North Creek Analytical - Spokane

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

Dennis D Wells, Laboratory Director

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090093: Prepared 09/13/05 Using GC/MS Volatiles										
Blank (5090093-BLK1)										
Chloroethane	ND	1.00	ug/l							
Chloroform	ND	1.00	"							
Chloromethane	ND	5.00	"							
2-Chlorotoluene	ND	1.00	"							
4-Chlorotoluene	ND	1.00	"							
Dibromochloromethane	ND	1.00	"							
1,2-Dibromo-3-chloropropane	ND	5.00	"							
1,2-Dibromoethane	ND	1.00	"							
Dibromomethane	ND	1.00	"							
1,2-Dichlorobenzene	ND	1.00	"							
1,3-Dichlorobenzene	ND	1.00	"							
1,4-Dichlorobenzene	ND	1.00	"							
Dichlorodifluoromethane	ND	1.00	"							
1,1-Dichloroethane	ND	1.00	"							
1,2-Dichloroethane (EDC)	ND	1.00	"							
1,1-Dichloroethene	ND	1.00	"							
cis-1,2-Dichloroethene	ND	1.00	"							
trans-1,2-Dichloroethene	ND	1.00	"							
1,2-Dichloropropane	ND	1.00	"							
1,3-Dichloropropane	ND	1.00	"							
2,2-Dichloropropane	ND	1.00	"							
1,1-Dichloropropene	ND	1.00	"							
cis-1,3-Dichloropropene	ND	1.00	"							
trans-1,3-Dichloropropene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
Hexachlorobutadiene	ND	1.00	"							
2-Hexanone	ND	10.0	"							
Isopropylbenzene	ND	1.00	"							
p-Isopropyltoluene	ND	1.00	"							
Methylene chloride	ND	5.00	"							
4-Methyl-2-pentanone	ND	10.0	"							
Methyl tert-butyl ether	ND	1.00	"							
Naphthalene	ND	2.00	"							
n-Propylbenzene	ND	1.00	"							
Styrene	ND	1.00	"							

Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090093: Prepared 09/13/05 Using GC/MS Volatiles										
Blank (5090093-BLK1)										
1,1,1,2-Tetrachloroethane	ND	1.00	ug/l							
1,1,2,2-Tetrachloroethane	ND	1.00	"							
Tetrachloroethene	ND	1.00	"							
Toluene	ND	1.00	"							
1,2,3-Trichlorobenzene	ND	1.00	"							
1,2,4-Trichlorobenzene	ND	1.00	"							
1,1,1-Trichloroethane	ND	1.00	"							
1,1,2-Trichloroethane	ND	1.00	"							
Trichloroethene	ND	1.00	"							
Trichlorofluoromethane	ND	1.00	"							
1,2,3-Trichloropropane	ND	1.00	"							
1,2,4-Trimethylbenzene	ND	1.00	"							
1,3,5-Trimethylbenzene	ND	1.00	"							
Vinyl chloride	ND	0.200	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surrogate: Dibromofluoromethane	*8.75*		*"*	*10.0*		*87.5*	*62.9-131*			
Surrogate: Toluene-d8	*10.4*		*"*	*10.0*		*104*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*10.9*		*"*	*10.0*		*109*	*60.8-140*			
LCS (5090093-BS1)										
Benzene	9.79	1.00	ug/l	10.0		97.9	67.4-116			
Chlorobenzene	10.8	1.00	"	10.0		108	68.3-123			
1,1-Dichloroethene	11.6	1.00	"	10.0		116	67-137			
Toluene	10.5	1.00	"	10.0		105	68.8-139			
Trichloroethene	10.5	1.00	"	10.0		105	68.1-128			
Surrogate: Dibromofluoromethane	*10.3*		*"*	*10.0*		*103*	*62.9-131*			
Surrogate: Toluene-d8	*10.3*		*"*	*10.0*		*103*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*10.8*		*"*	*10.0*		*108*	*60.8-140*			

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Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
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907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: Sudbury RI	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/15/05 13:18

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090093: Prepared 09/13/05 Using GC/MS Volatiles										
Matrix Spike (5090093-MS1)					**Source: S5I0014-01**					
Benzene	9.68	1.00	ug/l	10.0	ND	96.8	59.7-129			
Chlorobenzene	10.4	1.00	"	10.0	ND	104	75.8-121			
1,1-Dichloroethene	11.2	1.00	"	10.0	ND	112	63.8-137			
Toluene	10.1	1.00	"	10.0	ND	101	84.5-127			
Trichloroethene	9.83	1.00	"	10.0	ND	98.3	75.5-129			
Surrogate: Dibromofluoromethane	*9.33*		*"*	*10.0*		*93.3*	*62.9-131*			
Surrogate: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*10.5*		*"*	*10.0*		*105*	*60.8-140*			
Matrix Spike Dup (5090093-MSD1)					**Source: S5I0014-01**					
Benzene	9.53	1.00	ug/l	10.0	ND	95.3	59.7-129	1.56	10	
Chlorobenzene	10.4	1.00	"	10.0	ND	104	75.8-121	0.00	11	
1,1-Dichloroethene	11.2	1.00	"	10.0	ND	112	63.8-137	0.00	14	
Toluene	9.95	1.00	"	10.0	ND	99.5	84.5-127	1.50	12	
Trichloroethene	9.83	1.00	"	10.0	ND	98.3	75.5-129	0.00	10	
Surrogate: Dibromofluoromethane	*9.21*		*"*	*10.0*		*92.1*	*62.9-131*			
Surrogate: Toluene-d8	*10.2*		*"*	*10.0*		*102*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*10.7*		*"*	*10.0*		*107*	*60.8-140*			

Schwyn Environmental Services, LLC	Project:	Sudbury RI	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/15/05 13:18

Notes and Definitions

I-02	Sample was analyzed outside of the EPA recommended holding time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

nca

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E 1st Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
20332 Empire Ave, Ste F1, Bend, OR 97701-5712 541-383-9310 FAX 382-7588
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: 55H0238

NCA CLIENT: Schwyn Environmental Services

REPORT TO: Craig Schwyn
ADDRESS:

PHONE: 509 448 3187 FAX: 448 9238

INVOICE TO: Craig Schwyn

P.O. NUMBER:

PROJECT NAME: Sudbury Rd Landfill RI

PROJECT NUMBER:

SAMPLED BY: Craig Schwyn

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1

OTHER Specify:

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	VOC 8260													MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	B-9RI-35'	8/29/05	X													S	1		
2	B-9RI	8/29/05	X													W	1		
3	B-10RI-34'	8/30/05																	
4	B-11RI-34'	8/30/05	X													S	1		
5																			
6																			
7																			
8																			
9																			
10																			

RELEASED BY: Craig Schwyn (signature) DATE: 8/30/05	PRINT NAME: Craig Schwyn FIRM: SES TIME: 1:30	RECEIVED BY: Fed EX DATE:	PRINT NAME: FIRM: TIME:
RELEASED BY: DATE:	PRINT NAME: FIRM: TIME:	RECEIVED BY: (signature) DATE: 8/31/05	PRINT NAME: (signature) FIRM: NCA TIME: 1100

ADDITIONAL REMARKS:

TEMP: 3.6°C

PAGE 1 OF 1

COC REV 09/04

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	None provided	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/28/05 17:03

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-16	S5I0014-01	Water	09/01/05 15:00	09/02/05 13:45
B-17RI	S5I0014-02	Water	09/01/05 14:00	09/02/05 13:45
B12-RI-44	S5I0014-03	Soil	08/30/05 16:30	09/02/05 13:45

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425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
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541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
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Schwyn Environmental Services, LLC	Project:	None provided	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/28/05 17:03

Total Metals by EPA 200 Series Methods

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-16 (S5I0014-01) Water Sampled: 09/01/05 15:00 Received: 09/02/05 13:45									
Calcium	**213**	0.0400	mg/l	1	5090094	09/13/05	09/28/05	EPA 200.7	
Sodium	**21.8**	0.500	"	"	"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Schwyn Environmental Services, LLC	Project:	None provided	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-16 (S5I0014-01) Water Sampled: 09/01/05 15:00 Received: 09/02/05 13:45									
Acetone	ND	25.0	ug/l	1	5090093	09/13/05	09/13/05	EPA 8260B	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	1.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	

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Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	None provided	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-16 (S5I0014-01) Water Sampled: 09/01/05 15:00 Received: 09/02/05 13:45									
Ethylbenzene	ND	1.00	ug/l	1	5090093	09/13/05	09/13/05	EPA 8260B	
Hexachlorobutadiene	ND	1.00	"	"	"	"	"	"	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	1.00	"	"	"	"	"	"	
p-Isopropyltoluene	**1.61**	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	10.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	0.200	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*106*	*62.9-131*			"	"	"	"	
Surrogate: Toluene-d8	*99.1*	*58.7-133*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*104*	*60.8-140*			"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
B-17RI (S5I0014-02) Water Sampled: 09/01/05 14:00 Received: 09/02/05 13:45									
Acetone	ND	25.0	ug/l	1	5090093	09/13/05	09/13/05	EPA 8260B	
Benzene	ND	1.00	"	"	"	"	"	"	
Bromobenzene	ND	1.00	"	"	"	"	"	"	
Bromochloromethane	ND	1.00	"	"	"	"	"	"	
Bromodichloromethane	ND	1.00	"	"	"	"	"	"	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
2-Butanone	ND	10.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.00	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.00	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.00	"	"	"	"	"	"	
Carbon disulfide	ND	1.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	5.00	"	"	"	"	"	"	
1,2-Dibromoethane	ND	1.00	"	"	"	"	"	"	
Dibromomethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.00	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	

North Creek Analytical - Spokane

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

Dennis D Wells, Laboratory Director

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Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

B-17RI (S5I0014-02) Water Sampled: 09/01/05 14:00 Received: 09/02/05 13:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ethylbenzene	ND	1.00	ug/l	1	5090093	09/13/05	09/13/05	EPA 8260B	
Hexachlorobutadiene	ND	1.00	"	"	"	"	"	"	
2-Hexanone	ND	10.0	"	"	"	"	"	"	
Isopropylbenzene	ND	1.00	"	"	"	"	"	"	
p-Isopropyltoluene	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	10.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.00	"	"	"	"	"	"	
Naphthalene	ND	2.00	"	"	"	"	"	"	
n-Propylbenzene	ND	1.00	"	"	"	"	"	"	
Styrene	ND	1.00	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
Toluene	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	ND	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.00	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	0.200	"	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*103*	*62.9-131*			*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8	*98.2*	*58.7-133*			*"*	*"*	*"*	*"*	
Surrogate: 4-bromofluorobenzene	*109*	*60.8-140*			*"*	*"*	*"*	*"*	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	None provided	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

B12-RI-44 (S5I0014-03) Soil Sampled: 08/30/05 16:30 Received: 09/02/05 13:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acetone	ND	1.00	mg/kg wet	1	5090090	09/13/05	09/13/05	EPA 8260B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Bromobenzene	ND	0.100	"	"	"	"	"	"	
Bromochloromethane	ND	0.100	"	"	"	"	"	"	
Bromodichloromethane	ND	0.100	"	"	"	"	"	"	
Bromoform	ND	0.100	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
2-Butanone	ND	1.00	"	"	"	"	"	"	
n-Butylbenzene	ND	0.100	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.100	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.100	"	"	"	"	"	"	
Carbon disulfide	ND	0.100	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.100	"	"	"	"	"	"	
Chlorobenzene	ND	0.100	"	"	"	"	"	"	
Chloroethane	ND	0.100	"	"	"	"	"	"	
Chloroform	ND	0.100	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
2-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
4-Chlorotoluene	ND	0.100	"	"	"	"	"	"	
Dibromochloromethane	ND	0.100	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane	ND	0.100	"	"	"	"	"	"	
Dibromomethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.100	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.100	"	"	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	0.100	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.100	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.100	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.100	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.100	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.100	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.100	"	"	"	"	"	"	

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425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B

North Creek Analytical - Spokane

B12-RI-44 (S5I0014-03) Soil Sampled: 08/30/05 16:30 Received: 09/02/05 13:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Ethylbenzene	ND	0.100	mg/kg wet	1	5090090	09/13/05	09/13/05	EPA 8260B	
Hexachlorobutadiene	ND	0.100	"	"	"	"	"	"	
2-Hexanone	ND	1.00	"	"	"	"	"	"	
Isopropylbenzene	ND	0.100	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.100	"	"	"	"	"	"	
Methylene chloride	ND	1.00	"	"	"	"	"	"	
4-Methyl-2-pentanone	ND	1.00	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.100	"	"	"	"	"	"	
Naphthalene	ND	0.200	"	"	"	"	"	"	
n-Propylbenzene	ND	0.100	"	"	"	"	"	"	
Styrene	ND	0.100	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.100	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.100	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.100	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.100	"	"	"	"	"	"	
Trichloroethene	ND	0.0300	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.100	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.100	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.100	"	"	"	"	"	"	
Vinyl chloride	ND	0.100	"	"	"	"	"	"	
o-Xylene	ND	0.200	"	"	"	"	"	"	
m,p-Xylene	ND	0.400	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane	*97.0*	*44.8-146*			"	"	"	"	
Surrogate: Toluene-d8	*103*	*62.3-143*			"	"	"	"	
Surrogate: 4-bromofluorobenzene	*105*	*52.5-138*			"	"	"	"	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Conventional Chemistry Parameters by APHA/EPA Methods

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-16 (S5I0014-01) Water Sampled: 09/01/05 15:00 Received: 09/02/05 13:45									
Total Alkalinity	**541**	2.00	mg/l	1	5090010	09/02/05	09/13/05	EPA 310.1	

North Creek Analytical - Spokane

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Dennis D Wells, Laboratory Director

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425.420.9200 fax 425.420.9210
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509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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541.383.9310 fax 541.382.7588
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907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	None provided	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/28/05 17:03

Anions by EPA Method 300.0

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-16 (S5I0014-01) Water Sampled: 09/01/05 15:00 Received: 09/02/05 13:45									
Chloride	**185**	5.00	mg/l	10	5090009	09/02/05	09/02/05	EPA 300.0	
Nitrate-Nitrogen	**11.6**	5.00	"	"	"	"	09/02/05	"	
Sulfate	**45.1**	5.00	"	"	5090015	09/02/05	09/06/05	"	

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Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
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541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Total Metals by EPA 200 Series Methods

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-16 (S5I0014-01) Water Sampled: 09/01/05 15:00 Received: 09/02/05 13:45									
Potassium	**17.2**	2.00	mg/l	1	5I15039	09/15/05	09/19/05	EPA 200.7	

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
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907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	Reported:
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Total Metals by EPA 200 Series Methods - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090094: Prepared 09/13/05 Using Metals										
Blank (5090094-BLK1)										
Calcium	ND	0.0400	mg/l							
Sodium	ND	0.500	"							
LCS (5090094-BS1)										
Calcium	9.34	0.0400	mg/l	10.0		93.4	70-130			
Sodium	9.45	0.500	"	10.0		94.5	70-130			
Duplicate (5090094-DUP1)					**Source: S5I0069-04**					
Calcium	0.430	0.0400	mg/l		0.424			1.41	20	
Sodium	11.5	0.500	"		11.2			2.64	20	
Matrix Spike (5090094-MS1)					**Source: S5I0069-04**					
Calcium	9.83	0.0400	mg/l	10.0	0.424	94.1	75-125			
Sodium	19.9	0.500	"	10.0	11.2	87.0	75-125			
Matrix Spike Dup (5090094-MSD1)					**Source: S5I0069-04**					
Calcium	9.99	0.0400	mg/l	10.0	0.424	95.7	75-125	1.61	20	
Sodium	20.4	0.500	"	10.0	11.2	92.0	75-125	2.48	20	

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Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B - Quality Control
North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090090: Prepared 09/13/05 Using GC/MS Volatiles										
Blank (5090090-BLK1)										
Acetone	ND	1.00	mg/kg wet							
Benzene	ND	0.0300	"							
Bromobenzene	ND	0.100	"							
Bromochloromethane	ND	0.100	"							
Bromodichloromethane	ND	0.100	"							
Bromoform	ND	0.100	"							
Bromomethane	ND	0.500	"							
2-Butanone	ND	1.00	"							
n-Butylbenzene	ND	0.100	"							
sec-Butylbenzene	ND	0.100	"							
tert-Butylbenzene	ND	0.100	"							
Carbon disulfide	ND	0.100	"							
Carbon tetrachloride	ND	0.100	"							
Chlorobenzene	ND	0.100	"							
Chloroethane	ND	0.100	"							
Chloroform	ND	0.100	"							
Chloromethane	ND	0.500	"							
2-Chlorotoluene	ND	0.100	"							
4-Chlorotoluene	ND	0.100	"							
Dibromochloromethane	ND	0.100	"							
1,2-Dibromo-3-chloropropane	ND	0.500	"							
1,2-Dibromoethane	ND	0.100	"							
Dibromomethane	ND	0.100	"							
1,2-Dichlorobenzene	ND	0.100	"							
1,3-Dichlorobenzene	ND	0.100	"							
1,4-Dichlorobenzene	ND	0.100	"							
Dichlorodifluoromethane	ND	0.100	"							
1,1-Dichloroethane	ND	0.100	"							
1,2-Dichloroethane (EDC)	ND	0.100	"							
1,1-Dichloroethene	ND	0.100	"							
cis-1,2-Dichloroethene	ND	0.100	"							
trans-1,2-Dichloroethene	ND	0.100	"							
1,2-Dichloropropane	ND	0.100	"							
1,3-Dichloropropane	ND	0.100	"							
2,2-Dichloropropane	ND	0.100	"							

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	None provided	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090090: Prepared 09/13/05 Using GC/MS Volatiles										
Blank (5090090-BLK1)										
1,1-Dichloropropene	ND	0.100	mg/kg wet							
cis-1,3-Dichloropropene	ND	0.100	"							
trans-1,3-Dichloropropene	ND	0.100	"							
Ethylbenzene	ND	0.100	"							
Hexachlorobutadiene	ND	0.100	"							
2-Hexanone	ND	1.00	"							
Isopropylbenzene	ND	0.100	"							
p-Isopropyltoluene	ND	0.100	"							
Methylene chloride	ND	1.00	"							
4-Methyl-2-pentanone	ND	1.00	"							
Methyl tert-butyl ether	ND	0.100	"							
Naphthalene	ND	0.200	"							
n-Propylbenzene	ND	0.100	"							
Styrene	ND	0.100	"							
1,1,1,2-Tetrachloroethane	ND	0.100	"							
1,1,2,2-Tetrachloroethane	ND	0.100	"							
Tetrachloroethene	ND	0.0300	"							
Toluene	ND	0.100	"							
1,2,3-Trichlorobenzene	ND	0.100	"							
1,2,4-Trichlorobenzene	ND	0.100	"							
1,1,1-Trichloroethane	ND	0.100	"							
1,1,2-Trichloroethane	ND	0.100	"							
Trichloroethene	ND	0.0300	"							
Trichlorofluoromethane	ND	0.100	"							
1,2,3-Trichloropropane	ND	0.100	"							
1,2,4-Trimethylbenzene	ND	0.100	"							
1,3,5-Trimethylbenzene	ND	0.100	"							
Vinyl chloride	ND	0.100	"							
o-Xylene	ND	0.200	"							
m,p-Xylene	ND	0.400	"							
Surrogate: Dibromofluoromethane	*878*		*"*	*1000*		*87.8*	*44.8-146*			
Surrogate: Toluene-d8	*1010*		*"*	*1000*		*101*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1090*		*"*	*1000*		*109*	*52.5-138*			

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
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Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B - Quality Control
North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090090: Prepared 09/13/05 Using GC/MS Volatiles										
LCS (5090090-BS1)										
Benzene	0.868	0.0300	mg/kg wet	1.00		86.8	72.5-130			
Chlorobenzene	0.936	0.100	"	1.00		93.6	78.4-120			
1,1-Dichloroethene	0.958	0.100	"	1.00		95.8	50-150			
Toluene	0.870	0.100	"	1.00		87.0	75.3-120			
Trichloroethene	0.901	0.0300	"	1.00		90.1	64.5-131			
Surrogate: Dibromofluoromethane	*960*		"	*1000*		*96.0*	*44.8-146*			
Surrogate: Toluene-d8	*987*		"	*1000*		*98.7*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1040*		"	*1000*		*104*	*52.5-138*			
LCS Dup (5090090-BSD1)										
Benzene	0.897	0.0300	mg/kg wet	1.00		89.7	72.5-130	3.29	25	
Chlorobenzene	0.992	0.100	"	1.00		99.2	78.4-120	5.81	25	
1,1-Dichloroethene	1.03	0.100	"	1.00		103	50-150	7.24	25	
Toluene	0.939	0.100	"	1.00		93.9	75.3-120	7.63	25	
Trichloroethene	0.954	0.0300	"	1.00		95.4	64.5-131	5.71	25	
Surrogate: Dibromofluoromethane	*974*		"	*1000*		*97.4*	*44.8-146*			
Surrogate: Toluene-d8	*990*		"	*1000*		*99.0*	*62.3-143*			
Surrogate: 4-bromofluorobenzene	*1050*		"	*1000*		*105*	*52.5-138*			
Batch 5090093: Prepared 09/13/05 Using GC/MS Volatiles										
Blank (5090093-BLK1)										
Acetone	ND	25.0	ug/l							
Benzene	ND	1.00	"							
Bromobenzene	ND	1.00	"							
Bromochloromethane	ND	1.00	"							
Bromodichloromethane	ND	1.00	"							
Bromoform	ND	1.00	"							
Bromomethane	ND	5.00	"							
2-Butanone	ND	10.0	"							
n-Butylbenzene	ND	1.00	"							
sec-Butylbenzene	ND	1.00	"							
tert-Butylbenzene	ND	1.00	"							
Carbon disulfide	ND	1.00	"							
Carbon tetrachloride	ND	1.00	"							
Chlorobenzene	ND	1.00	"							

Schwyn Environmental Services, LLC	Project:	None provided	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090093: Prepared 09/13/05 Using GC/MS Volatiles										
Blank (5090093-BLK1)										
Chloroethane	ND	1.00	ug/l							
Chloroform	ND	1.00	"							
Chloromethane	ND	5.00	"							
2-Chlorotoluene	ND	1.00	"							
4-Chlorotoluene	ND	1.00	"							
Dibromochloromethane	ND	1.00	"							
1,2-Dibromo-3-chloropropane	ND	5.00	"							
1,2-Dibromoethane	ND	1.00	"							
Dibromomethane	ND	1.00	"							
1,2-Dichlorobenzene	ND	1.00	"							
1,3-Dichlorobenzene	ND	1.00	"							
1,4-Dichlorobenzene	ND	1.00	"							
Dichlorodifluoromethane	ND	1.00	"							
1,1-Dichloroethane	ND	1.00	"							
1,2-Dichloroethane (EDC)	ND	1.00	"							
1,1-Dichloroethene	ND	1.00	"							
cis-1,2-Dichloroethene	ND	1.00	"							
trans-1,2-Dichloroethene	ND	1.00	"							
1,2-Dichloropropane	ND	1.00	"							
1,3-Dichloropropane	ND	1.00	"							
2,2-Dichloropropane	ND	1.00	"							
1,1-Dichloropropene	ND	1.00	"							
cis-1,3-Dichloropropene	ND	1.00	"							
trans-1,3-Dichloropropene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
Hexachlorobutadiene	ND	1.00	"							
2-Hexanone	ND	10.0	"							
Isopropylbenzene	ND	1.00	"							
p-Isopropyltoluene	ND	1.00	"							
Methylene chloride	ND	5.00	"							
4-Methyl-2-pentanone	ND	10.0	"							
Methyl tert-butyl ether	ND	1.00	"							
Naphthalene	ND	2.00	"							
n-Propylbenzene	ND	1.00	"							
Styrene	ND	1.00	"							

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
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509.924.9200 fax 509.924.9290
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Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B - Quality Control
North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090093: Prepared 09/13/05 Using GC/MS Volatiles										
Blank (5090093-BLK1)										
1,1,1,2-Tetrachloroethane	ND	1.00	ug/l							
1,1,2,2-Tetrachloroethane	ND	1.00	"							
Tetrachloroethene	ND	1.00	"							
Toluene	ND	1.00	"							
1,2,3-Trichlorobenzene	ND	1.00	"							
1,2,4-Trichlorobenzene	ND	1.00	"							
1,1,1-Trichloroethane	ND	1.00	"							
1,1,2-Trichloroethane	ND	1.00	"							
Trichloroethene	ND	1.00	"							
Trichlorofluoromethane	ND	1.00	"							
1,2,3-Trichloropropane	ND	1.00	"							
1,2,4-Trimethylbenzene	ND	1.00	"							
1,3,5-Trimethylbenzene	ND	1.00	"							
Vinyl chloride	ND	0.200	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surrogate: Dibromofluoromethane	*8.75*		*"*	*10.0*		*87.5*	*62.9-131*			
Surrogate: Toluene-d8	*10.4*		*"*	*10.0*		*104*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*10.9*		*"*	*10.0*		*109*	*60.8-140*			
LCS (5090093-BS1)										
Benzene	9.79	1.00	ug/l	10.0		97.9	67.4-116			
Chlorobenzene	10.8	1.00	"	10.0		108	68.3-123			
1,1-Dichloroethene	11.6	1.00	"	10.0		116	67-137			
Toluene	10.5	1.00	"	10.0		105	68.8-139			
Trichloroethene	10.5	1.00	"	10.0		105	68.1-128			
Surrogate: Dibromofluoromethane	*10.3*		*"*	*10.0*		*103*	*62.9-131*			
Surrogate: Toluene-d8	*10.3*		*"*	*10.0*		*103*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*10.8*		*"*	*10.0*		*108*	*60.8-140*			

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project:	None provided	
4621 S. Custer Ct.	Project Number:	[none]	**Reported:**
Spokane, WA 99223	Project Manager:	Craig Schwyn	09/28/05 17:03

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090093: Prepared 09/13/05 Using GC/MS Volatiles										
Matrix Spike (5090093-MS1)					**Source: S5I0014-01**					
Benzene	9.68	1.00	ug/l	10.0	ND	96.8	59.7-129			
Chlorobenzene	10.4	1.00	"	10.0	ND	104	75.8-121			
1,1-Dichloroethene	11.2	1.00	"	10.0	ND	112	63.8-137			
Toluene	10.1	1.00	"	10.0	ND	101	84.5-127			
Trichloroethene	9.83	1.00	"	10.0	ND	98.3	75.5-129			
Surrogate: Dibromofluoromethane	*9.33*		*"*	*10.0*		*93.3*	*62.9-131*			
Surrogate: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*10.5*		*"*	*10.0*		*105*	*60.8-140*			
Matrix Spike Dup (5090093-MSD1)					**Source: S5I0014-01**					
Benzene	9.53	1.00	ug/l	10.0	ND	95.3	59.7-129	1.56	10	
Chlorobenzene	10.4	1.00	"	10.0	ND	104	75.8-121	0.00	11	
1,1-Dichloroethene	11.2	1.00	"	10.0	ND	112	63.8-137	0.00	14	
Toluene	9.95	1.00	"	10.0	ND	99.5	84.5-127	1.50	12	
Trichloroethene	9.83	1.00	"	10.0	ND	98.3	75.5-129	0.00	10	
Surrogate: Dibromofluoromethane	*9.21*		*"*	*10.0*		*92.1*	*62.9-131*			
Surrogate: Toluene-d8	*10.2*		*"*	*10.0*		*102*	*58.7-133*			
Surrogate: 4-bromofluorobenzene	*10.7*		*"*	*10.0*		*107*	*60.8-140*			

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane 11922 E. 1st Avenue, Spokane Valley, WA 99206-5302
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
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907.563.9200 fax 907.563.9210

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090010: Prepared 09/02/05 Using Wet Chem										
Blank (5090010-BLK1)										
Total Alkalinity	ND	2.00	mg/l							
LCS (5090010-BS1)										
Total Alkalinity	9.83	2.00	mg/l	10.0		98.3	80-120			
Duplicate (5090010-DUP1)					**Source: S5I0006-01**					
Total Alkalinity	155	2.00	mg/l		144			7.36	20	

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Anions by EPA Method 300.0 - Quality Control

North Creek Analytical - Spokane

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5090009: Prepared 09/02/05 Using Wet Chem										
Blank (5090009-BLK1)										
Chloride	ND	0.500	mg/l							
Nitrate-Nitrogen	ND	0.500	"							
LCS (5090009-BS1)										
Chloride	4.87	0.500	mg/l	5.00		97.4	80-120			
Nitrate-Nitrogen	4.77	0.500	"	5.00		95.4	80-120			
Duplicate (5090009-DUP1)					**Source: S5I0006-01**					
Chloride	1.17	0.500	mg/l		1.13			3.48	20	
Nitrate-Nitrogen	0.560	0.500	"		0.560			0.00	20	
Batch 5090015: Prepared 09/02/05 Using Wet Chem										
Blank (5090015-BLK1)										
Sulfate	ND	0.500	mg/l							
LCS (5090015-BS1)										
Sulfate	4.90	0.500	mg/l	5.00		98.0	80-120			
Duplicate (5090015-DUP1)					**Source: S5I0006-01**					
Sulfate	5.33	0.500	mg/l		5.23			1.89	20	

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Total Metals by EPA 200 Series Methods - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5I15039: Prepared 09/15/05 Using EPA 200 Series										
Blank (5I15039-BLK1)										
Potassium	ND	2.00	mg/l							
LCS (5I15039-BS1)										
Potassium	10.2	2.00	mg/l	10.0		102	85-115			
LCS Dup (5I15039-BSD1)										
Potassium	10.4	2.00	mg/l	10.0		104	85-115	1.94	20	
Duplicate (5I15039-DUP1)					**Source: B5I0287-01**					
Potassium	6.14	2.00	mg/l		6.29			2.41	20	
Matrix Spike (5I15039-MS1)					**Source: B5I0287-01**					
Potassium	16.0	2.00	mg/l	10.0	6.29	97.1	80-120			

Schwyn Environmental Services, LLC	Project: None provided	
4621 S. Custer Ct.	Project Number: [none]	**Reported:**
Spokane, WA 99223	Project Manager: Craig Schwyn	09/28/05 17:03

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E 1st Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
20332 Empire Ave, Ste F1, Bend, OR 97701-5712 541-383-9310 FAX 382-7588
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: 55I0014

NCA CLIENT: Schwyn Enviro Services

REPORT TO: Craig Schwyn
ADDRESS:

PHONE: 448 3187 FAX:

INVOICE TO: Craig Schwyn

P.O. NUMBER:

PROJECT NAME:

PROJECT NUMBER:

SAMPLED BY:

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1

OTHER Specify:

* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE / REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	VOC	Ca, Mg, K, Na	Alk, SO4, Cl	NO3										MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	MW-16	9/1/05 1500	X	X	X	X										W	4		
2	B12-RI-44	8/30/05 16:30	X													S	1		
3	B ~~#~~7RI	~~8~~ 9/1/05 1400	X													W	2		
4																			
5																			
6																			
7																			
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RELEASED BY: [signature] DATE: 9/2/05
PRINT NAME: Craig Schwyn FIRM: Schwyn Enviro TIME: 12:05

RECEIVED BY: [signature] DATE: 9/2/05
PRINT NAME: [illegible] FIRM: NCA TIME: 1205

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP: 17.3

PAGE 1 OF 1

2655 Park Center Drive, Suite A Simi Valley, California 93065 (805) 526-7161 (805) 526-7270 fax

Columbia Analytical Services INC.
An Employee - Owned Company

August 28, 2006

Mr. Craig Schwyn
Schwyn Environmental Services
4621 S. Custer Court
Spokane, WA 99223

RE: P2602168
Sudbury Rd Landfill

Dear Mr. Schwyn:

Enclosed are the results of the sample(s) submitted to our laboratory on August 10, 2006.
For your reference, these analyses have been assigned our service request number P2602168.

All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply only to the samples analyzed. Columbia Analytical Services is not responsible for use of less than the complete report. Your report contains 12 pages.

Columbia Analytical Services is certified by the California Department of Health Services, Certificate No. 2380; Arizona Department of Health Services, Certificate No. AZ0550; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661. Please contact me for specific method(s) and analyte(s) corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Kelly M. Horiuchi

Kelly Horiuchi
Project Manager

2655 Park Center Drive, Suite A   Simi Valley, California 93065   (805) 526-7161   (805) 526-7270 fax

Columbia Analytical Services INC.
An Employee - Owned Company

LABORATORY REPORT

Client:	SCHWYN ENVIRONMENTAL SERVICES	Date of Report:	08/28/06
Address:	4621 S. Custer Court	Date Received:	08/10/06
	Spokane, WA 99223	CAS Project No:	P2602168
Contact:	Mr. Craig Schwyn	Purchase Order:	Verbal

Client Project ID: Sudbury Rd Landfill

Two (2) Tedlar Bag Samples labeled: "MW-15" "MW-16"

The samples were received at the laboratory under chain of custody on August 10, 2006. The samples were received intact. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time that they were received at the laboratory.

Volatile Organic Compound Analysis

The samples were analyzed by combined gas chromatography/mass spectrometry (GC/MS) for selected volatile organic compounds. The analyses were performed according to the methodology outlined in EPA Method TO-15. However, the method was modified to include the use of Tedlar bags. The analyses were performed by gas chromatography/mass spectrometry, utilizing a direct cryogenic trapping technique. The analytical system used was comprised of a Hewlett Packard Model 5972 GC/MS/DS interfaced to a Tekmar AutoCan Elite whole air inlet system/cryogenic concentrator. A 100% Dimethylpolysiloxane capillary column (RT_x-1, Restek Corporation, Bellefonte, PA) was used to achieve chromatographic separation.

The results of analyses are given on the attached data sheets. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

Reviewed and Approved:

Chaney Bolster
Analytical Chemist
Air Quality Laboratory

Reviewed and Approved:

Chris Parnell
GCMS-VOA Team Leader
Air Quality Laboratory

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Page 1 of 2

Client: **Schwyn Environmental Services**
Client Sample ID: **MW-15**
Client Project ID: **Sudbury Rd Landfill**

CAS Project ID: P2602168
CAS Sample ID: P2602168-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/11/06
Volume(s) Analyzed: 0.15 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	**650**	6.7	**130**	1.3	M
74-87-3	Chloromethane	ND	6.7	ND	3.2	
75-01-4	Vinyl Chloride	**220**	6.7	**87**	2.6	
-83-9	Bromomethane	ND	6.7	ND	1.7	
75-00-3	Chloroethane	**36**	6.7	**14**	2.5	
67-64-1	Acetone	**45**	33	**19**	14	M
75-69-4	Trichlorofluoromethane	ND	6.7	ND	1.2	
75-35-4	1,1-Dichloroethene	**8.8**	6.7	**2.2**	1.7	
75-09-2	Methylene chloride	**55**	6.7	**16**	1.9	
76-13-1	Trichlorotrifluoroethane	ND	6.7	ND	0.87	
75-15-0	Carbon Disulfide	**20**	6.7	**6.5**	2.1	
156-60-5	trans-1,2-Dichloroethene	ND	6.7	ND	1.7	
75-34-3	1,1-Dichloroethane	**99**	6.7	**24**	1.6	
1634-04-4	Methyl tert-Butyl Ether	ND	6.7	ND	1.8	
108-05-4	Vinyl Acetate	ND	6.7	ND	1.9	
78-93-3	2-Butanone (MEK)	ND	6.7	ND	2.3	
156-59-2	cis-1,2-Dichloroethene	**65**	6.7	**16**	1.7	
67-66-3	Chloroform	ND	6.7	ND	1.4	
107-06-2	1,2-Dichloroethane	ND	6.7	ND	1.6	
71-55-6	1,1,1-Trichloroethane	ND	6.7	ND	1.2	
71-43-2	Benzene	ND	6.7	ND	2.1	
56-23-5	Carbon Tetrachloride	ND	6.7	ND	1.1	

ND = Compound was analyzed for, but not detected above the**laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
= Matrix interference; results may be biased high.

Verified By: Rb Date: 8/24/06

Client: **Schwyn Environmental Services**
Client Sample ID: **MW-15**
Client Project ID: **Sudbury Rd Landfill**

CAS Project ID: P2602168
CAS Sample ID: P2602168-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/11/06
Volume(s) Analyzed: 0.15 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
78-87-5	1,2-Dichloropropane	**12**	6.7	**2.5**	1.4	
75-27-4	Bromodichloromethane	ND	6.7	ND	1.0	
79-01-6	Trichloroethene	**190**	6.7	**36**	1.2	
10061-01-5	cis-1,3-Dichloropropene	ND	6.7	ND	1.5	
108-10-1	4-Methyl-2-pentanone	ND	6.7	ND	1.6	
10061-02-6	trans-1,3-Dichloropropene	ND	6.7	ND	1.5	
79-00-5	1,1,2-Trichloroethane	ND	6.7	ND	1.2	
108-88-3	Toluene	**28**	6.7	**7.4**	1.8	
591-78-6	2-Hexanone	ND	6.7	ND	1.6	
124-48-1	Dibromochloromethane	ND	6.7	ND	0.78	
106-93-4	1,2-Dibromoethane	ND	6.7	ND	0.87	
127-18-4	Tetrachloroethene	**550**	6.7	**82**	0.98	
108-90-7	Chlorobenzene	ND	6.7	ND	1.4	
100-41-4	Ethylbenzene	ND	6.7	ND	1.5	
179601-23-1	*m,p*-Xylenes	**24**	6.7	**5.4**	1.5	
75-25-2	Bromoform	ND	6.7	ND	0.65	
100-42-5	Styrene	**12**	6.7	**2.7**	1.6	
95-47-6	o-Xylene	**8.0**	6.7	**1.9**	1.5	**M**
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.7	ND	0.97	
541-73-1	1,3-Dichlorobenzene	ND	6.7	ND	1.1	
106-46-7	1,4-Dichlorobenzene	ND	6.7	ND	1.1	
95-50-1	1,2-Dichlorobenzene	ND	6.7	ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By: Ru Date: 8/24/06

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Schwyn Environmental Services**
Client Sample ID: **MW-16**
Client Project ID: **Sudbury Rd Landfill**

CAS Project ID: P2602168
CAS Sample ID: P2602168-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	**150**	5.0	**29**	1.0	
74-87-3	Chloromethane	ND	5.0	ND	2.4	
75-01-4	Vinyl Chloride	ND	5.0	ND	2.0	
[illegible]-83-9	Bromomethane	ND	5.0	ND	1.3	
75-00-3	Chloroethane	ND	5.0	ND	1.9	
67-64-1	Acetone	**37**	25	**16**	11	
75-69-4	Trichlorofluoromethane	**16**	5.0	**2.9**	0.89	
75-35-4	1,1-Dichloroethene	ND	5.0	ND	1.3	
75-09-2	Methylene chloride	**46**	5.0	**13**	1.4	
76-13-1	Trichlorotrifluoroethane	ND	5.0	ND	0.65	
75-15-0	Carbon Disulfide	**15**	5.0	**4.7**	1.6	
156-60-5	trans-1,2-Dichloroethene	ND	5.0	ND	1.3	
75-34-3	1,1-Dichloroethane	ND	5.0	ND	1.2	
1634-04-4	Methyl tert-Butyl Ether	ND	5.0	ND	1.4	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	5.0	ND	1.7	
156-59-2	cis-1,2-Dichloroethene	ND	5.0	ND	1.3	
67-66-3	Chloroform	ND	5.0	ND	1.0	
107-06-2	1,2-Dichloroethane	ND	5.0	ND	1.2	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ND	0.92	
71-43-2	Benzene	ND	5.0	ND	1.6	
56-23-5	Carbon Tetrachloride	ND	5.0	ND	0.80	

ND = Compound was analyzed for, but not detected above the**laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Rc Date: 8/24/06

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Schwyn Environmental Services**
Client Sample ID: **MW-16**
Client Project ID: **Sudbury Rd Landfill**

CAS Project ID: P2602168
CAS Sample ID: P2602168-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 8/9/06
Date Received: 8/10/06
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 0.20 Liter(s)

D.F. = 1.00

CAS #	Compound	Result $\mu g/m^3$	MRL $\mu g/m^3$	Result ppbV	MRL ppbV	Data Qualifier
78-87-5	1,2-Dichloropropane	ND	5.0	ND	1.1	
75-27-4	Bromodichloromethane	ND	5.0	ND	0.75	
79-01-6	Trichloroethene	**20**	5.0	**3.8**	0.93	
061-01-5	cis-1,3-Dichloropropene	ND	5.0	ND	1.1	
108-10-1	4-Methyl-2-pentanone	ND	5.0	ND	1.2	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ND	1.1	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ND	0.92	
108-88-3	Toluene	**23**	5.0	**6.0**	1.3	
591-78-6	2-Hexanone	ND	5.0	ND	1.2	
124-48-1	Dibromochloromethane	ND	5.0	ND	0.59	
106-93-4	1,2-Dibromoethane	ND	5.0	ND	0.65	
127-18-4	Tetrachloroethene	ND	5.0	ND	0.74	
108-90-7	Chlorobenzene	ND	5.0	ND	1.1	
100-41-4	Ethylbenzene	**6.5**	5.0	**1.5**	1.2	
179601-23-1	*m,p*-Xylenes	**23**	5.0	**5.4**	1.2	
75-25-2	Bromoform	ND	5.0	ND	0.48	
100-42-5	Styrene	**14**	5.0	**3.4**	1.2	
95-47-6	o-Xylene	**6.1**	5.0	**1.4**	1.2	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ND	0.73	
541-73-1	1,3-Dichlorobenzene	ND	5.0	ND	0.83	
106-46-7	1,4-Dichlorobenzene	ND	5.0	ND	0.83	
95-50-1	1,2-Dichlorobenzene	ND	5.0	ND	0.83	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Rc Date: 8/24/06

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Schwyn Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Sudbury Rd Landfill**

CAS Project ID: P2602168
CAS Sample ID: P060810-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	1.0	ND	0.20	
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	

ND = Compound was analyzed for, but not detected above the**laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Rcr Date: 8/24/06

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Schwyn Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Sudbury Rd Landfill**

CAS Project ID: P2602168
CAS Sample ID: P060810-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 8/10/06
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	**Result** µg/m³	MRL µg/m³	**Result** ppbV	MRL ppbV	Data Qualifier
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p*-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RL Date: 8/24/06

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Schwyn Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Sudbury Rd Landfill**

CAS Project ID: P2602168
CAS Sample ID: P060811-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 8/11/06
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	1.0	ND	0.20	
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit**.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Rc Date: 8/24/06

Client: **Schwyn Environmental Services**
Client Sample ID: **Method Blank**
Client Project ID: **Sudbury Rd Landfill**

CAS Project ID: P2602168
CAS Sample ID: P060811-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Bolster
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 8/11/06
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p*-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: RG Date: 8/24/06

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

'ient: Schwyn Environmental Services Work order: P2602168

roject: Sudbury Rd Landfill

Sample(s) received on: 8/10/06 Date opened: 8/10/06 by: MZ

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client or as required by the method/SOP.

		Yes	No	N/A
1	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
2	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature NA °C			
	Blank Temperature NA °C			
9	Is pH (acid) **preservation** necessary, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** (acid) preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Required pH (as received, if required)	pH (as received, if required)	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2602168-001			NA	
P2602168-002			NA	

Explain any discrepancies: (include lab sample ID numbers):

11

Columbia Analytical Services INC
An Employee - Owned Company

Air Quality Laboratory
2665 Park Center Drive, Suite D
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Chain of Custody Record & Analytical Service Request

Requested Turnaround Time by Close of Business Day (Surcharges) Please Circle:
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (15%) 10 Day-Standard

CAS Project No. P2602168

CAS Contact:

Reporting Information (Company Name & Address): Schwyn Environmental Services, 4621 S. Custer Ct, Spokane WA
Attention: Craig Schwyn

P.O. # / Billing Information: Same

Project Name: Sudbury Rd Landfill

Project Number:

Phone: 509 448 3187 Fax: 448 9238

Email Address for Result Reporting: Craig S@cet.com

Sampler (Print & Sign): Craig Schwyn

Client Sample ID	Date Collected	Time Collected	Lab Sample No.	Sample Type (Air/Liquid/Solid/Tube)	Canister ID (Bar Code#)	Flow Controller (Bar Code #)	Sample Volume	Analysis Method and/or Analytes: VOCs				Comments e.g. Preservative or specific instructions
MW-15	8/9/06	1:00		Air	0127		1L					
MW-16	8/9/06	1:30		Air	0118		1L					

Report Tier Levels - please select
Tier I - (default if not specified) ✓
Tier II (QC forms) ______
Tier III (QC, Raw Data, Spectra) 10% Surcharge ______
Other ______
EDD required Yes / No
Type: ______

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Craig Schwyn	8/9/06	5:30	Fed Ex		
FedEx			[signature]	8/10/06	0945

Cooler / Blank Temperature ______ °C

Landfill Gas Well Installation Report

Schwyn Environmental Services

Area 5 Landfill Gas Well Installation and Sampling Report
Sudbury Road Landfill
Walla Walla, Washington

January 22, 2010

Prepared for:

City of Walla Walla
Solid Waste Division

Prepared by:

Schwyn Environmental Services

4621 South Custer
Spokane, WA 99223
(509) 448-3187

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TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

This gas well installation report was prepared to document the installation and sampling of two landfill gas wells within Area 5 of the City of Walla Walla (City) Washington Sudbury Road Landfill. The work was conducted by Schwyn Environmental Services, LLC (Schwyn) as part of the ongoing remedial investigation (RI). HWA GeoSciences, Inc. (HWA) and Shannon & Wilson, Inc. (S&W) were also involved in the gas probe installation and testing, respectively, as part of the Area 6 closure design investigation. The RI activities were conducted in general accordance with the Criteria for Municipal Solid Waste Landfills (chapter 173-351 WAC, Ecology 1993), and the Washington State Model Toxics Control Act (MTCA) regulations (chapter 173-340 WAC, Ecology 2007).

1.1 BACKGROUND

The Sudbury Road Landfill is a municipal solid waste (MSW) landfill operated by the City consistent with chapter 173-351 WAC. The landfill encompasses approximately 125 acres and is located on the western side of a 909.38 acre City-owned property (Figures 1 and 2). The City installed a groundwater monitoring system in 1976 and has monitored groundwater quality hydraulically upgradient and downgradient of the landfill since 1977. A number of monitoring system changes have occurred since inception. In 2001, monitoring well MW-15 was installed to replace MW-3 which is screened deeper into the aquifer. Numerous volatile organic compounds (VOCs) and inorganic constituents were detected at statistically elevated levels in groundwater samples collected from MW-15. An assessment monitoring program was initiated in September 2002 in accordance with WAC 173-351-440, and the results suggested that some of the VOC and inorganic constituents detected in the MW-15 samples were indicators of landfill impact to groundwater. Subsequent steps required by the solid waste regulation are described in WAC 173-351-440(6), which states that, when constituents are detected above background levels and the groundwater protection standard, the owner must initiate an assessment, selection, and implementation of corrective measures as required by the MTCA: In 2005, the City initiated an RI to address these requirements and to characterize the contamination for the purpose of developing and evaluating cleanup action alternatives. In January 2010, the Washington State Department of Ecology (Ecology) submitted an Early Notice Letter to the City (Ecology 2010) indicating that Ecology was aware that a release of hazardous substances had occurred at the Sudbury Road Landfill. The Early Notice Letter also indicated that the site would be added to the database of known or suspected contaminated sites, with further remedial actions to be taken in accordance with the MTCA.

In July 2009, J-U-B Engineers (JUB) was contracted by the City to design the closure for Area 6; including landfill gas extraction and cover systems. JUB teamed with HWA for geotechnical services, S&W for landfill gas extraction system design, and Schwyn for hydrogeologic and remedial investigation coordination activities. JUB is taking into consideration that landfill gas extraction and stormwater designs for the Area 6 closure have the potential to impact Area 5. Therefore, JUB requested that the Area 5 landfill gas monitoring probes that were described in the RI Work Plan (LAI 2004) be installed at this time to complement JUB's closure design.

1.2 SCOPE OF WORK

Two landfill gas wells were installed and sampled in the Area 5 waste to accommodate Area 6 closure engineering, gather additional information for the ongoing RI, and provide future landfill gas monitoring points. The work was conducted consistent with the Landfill Gas Probe Work Plan submitted to the Walla Walla County Health Department (WWCHD) and Ecology on July 31, 2009 (Schwyn 2009).

The following scope items were performed during this study:

- Two borings were drilled within the Area 5 municipal solid waste (MSW) to evaluate and record the soil/MSW lithology and stratigraphy,
- Soil samples were collected from each boring and analyzed for lithologic properties.
- Gas wells were installed in each boring;
- Landfill gas samples were collected for laboratory analysis; and
- Preparation of this report documenting the methods and findings of the work.

2.0 GAS PROBE INSTALLATION AND SAMPLING METHODS

2.1 DRILLING PROCEDURES

Gas wells GW-5 and GW-6 were installed on August 6 and 7, 2009 under the observation of Schwyn and HWA. GW-5 was installed along the east side of Area 5 adjacent to Area 6 and GW-6 was installed at the northwest corner of Area 5 (Figure 2). The wells were drilled by Environmental West Exploration of Spokane, Washington, in accordance with the Washington State Minimum Standards for Construction and Maintenance of Wells, chapter 173-160 WAC.

The borings were advanced using sonic drilling methods to total depths that ranged from 37 ft (GW-6) to 47 ft (GW-5) below ground level. The Sonic drilling method employs the use of high-frequency, resonant energy to first advance a 10 foot-long, 4.25-inch diameter core barrel into the subsurface formation. A larger diameter drill casing (6.625-inch outside diameter) is then used to over-drill the core barrel and case the formation. The casing prevents formation collapse and allows the core barrel to be removed to the surface for sample removal. At surface, the material contents from within the core barrel were extruded into long, clear plastic bags, providing a continuous section of the penetrated formation. The sample liner was sliced open for lithologic evaluation of the core by the geologist. Soils were classified according to the Uniform Soil Classification System (USCS), and lithologic descriptions of the soil and MSW were recorded on a field log. The exploration logs are provided in Appendix A.

Each boring was advanced through the MSW into the underlying native soil. Non-Standard-Penetration Test (NSPT) samples were collected from the native soil at the bottom of the boring using a 3.25-inch outside diameter split-spoon sampler with brass liners. Each sample was driven 18 to 24 inches into the undisturbed soil with a 300-pound automatic hammer. The number of blows required for each 6-inches of penetration was recorded. One sample from each boring was submitted to HWA for laboratory analysis of particle size and hydraulic conductivity. Particle size distribution was determined in general accordance with ASTM D422, using the wet sieve and hydrometer method. The hydraulic conductivity of each sample was measured in general accordance with ASTM D 5084 (Flexi-wall Triaxial Chamber Method). The soil laboratory testing report is provided in Appendix B.

2.2 WELL CONSTRUCTION

Gas wells were installed in each boring using flush-threaded ½-inch diameter, Schedule 80 PVC casing with a 5-ft long screen section. The bottom of the well screen was set approximately seven ft above the base of the MSW observed in each boring and consisted of 0.030-in machine slotted PVC capped with a flush threaded end cap. The PVC casing in each well extended approximately 2.5 ft above surface and was completed with a laboratory stop cock. A two foot bentonite seal was placed in the bottom of each boring. Washed pea gravel was placed above the bentonite seal in the annular space around the screen and extended approximately 7 feet above the top of the screen. Bentonite chips were placed from the top of the gravel pack to within 1 foot of ground surface. The PVC casing was protected with a concrete surface pad, above ground locking steel vault, and three steel bollards. The location and elevation of the concrete pad and top of steel casing of each gas well was surveyed and .reported by JUB. Gas well construction details are recorded on the exploration logs and illustrated on Figures A1 and A2 provided in Appendix A.

2.3 LANDFILL GAS MONITORING

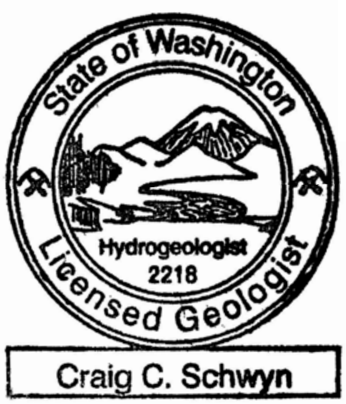
On August 12, 2009, landfill gas monitoring was conducted by an S&W representative with assistance by Schwyn. Samples were collected from GW-5 and GW-6 to assess the potential impact for vapor phase interchange of VOCs from landfill gas to groundwater. Prior to sample collection, three casing volumes of air were purged from each well using a pneumatic pump. A laboratory-calibrated rotometer was placed in line during the purge to measure the flow rate and track the purging process. After purging each well the concentration of methane, carbon dioxide and oxygen were measured with a calibrated Landtec GA-90 landfill gas sampling meter.

Landfill gas samples were then collected in laboratory prepared, pre-evacuated 6-liter stainless steel summa canisters. The summa canisters were attached to the wellhead using flexible tubing supplied by the laboratory, which was purged of ambient air during the well purging process. The summa canisters were opened to allow sample collection, then closed when full, labeled, and delivered under chain of custody to Columbia Analytical Services for total gaseous non-methane organics (TGNMO) as hexane by the U.S. Environmental Protection Agency (EPA) Method 25C, and VOCs by EPA method TO-15. The field measurements, TGNMO, and VOC results are summarized on Table 1. The laboratory report from Columbia Analytical Services, is provided in Appendix C. The gas monitoring data and S&W monitoring report are also provided in Appendix C.

3.0 REPORT USE AND LIMITATIONS

This report has been prepared for the exclusive use of the City of Walla Walla, Washington and J-U-B Engineers, Inc., for specific application to the Sudbury Road Landfill remedial investigation. The services were performed consistent with generally accepted professional consulting principals and practices within the limitations of scope, schedule, and budget. Findings, opinions, and recommendations contained in the report apply to conditions existing when the services were performed and are intended only for the client, and the purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to the performance of these services. We do not warrant the accuracy or information supplied by others or the use of segregated portions of this report. Schwyn warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

SCHWYN ENVIRONMENTAL SERVICES, LLC



Craig C. Schwyn

Craig C. Schwyn, L.HG.
Principal Hydrogeologist

4.0 REFERENCES

Ecology. 2010. *Early Notice Letter for groundwater contamination at the Sudbury Road Landfill, 414 Sudbury Road, Walla Walla, WA 9932*. Letter from the Washington State Department of Ecology Waste 2 Resources Program to Mr. Craig Sivley, City of Walla Walla Public Works Director. January 7.

Ecology. 2007. *Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC*. Compiled by the Washington State Department of Ecology Toxics Cleanup Program. Publication No. 94-06. Revised November 2007.

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Ecology. 1990. *Chapter 173-200 WAC, Water Quality Standards for Ground Waters of the State of Washington*. Washington State Department of Ecology. December.

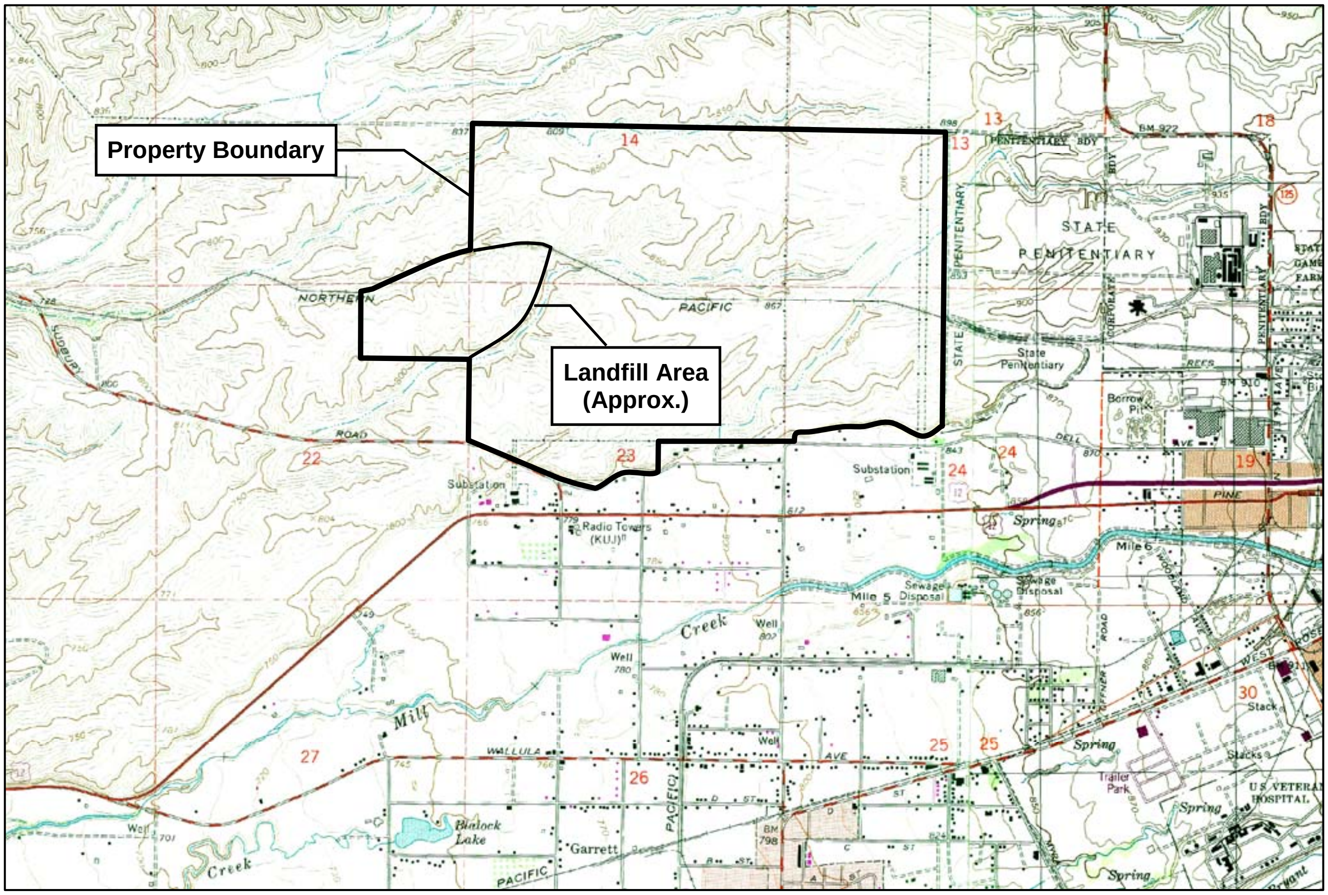
LAI. 2004. *Remedial Investigation Work Plan, Sudbury Road Landfill, Walla Walla, Washington.* Prepared for the City of Walla Walla. Landau Associates, Inc. April 22.

Schwyn. 2009. *Landfill Gas Probe Installation Work Plan for the Sudbury Road Landfill Remedial Investigation, Walla Walla, Washington.* Prepared for the Walla Walla Department of Health and Washington State Department of Ecology by Schwyn Environmental Services, LLC. July 31.

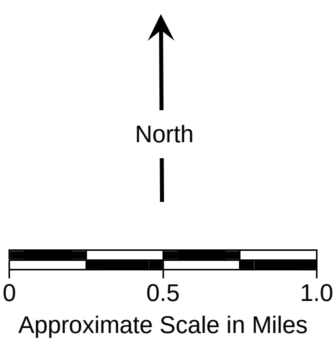
TABLE 1
AREA 5 LANDFILL GAS SAMPLE DATA
City of Walla Walla Sudbury Road Landfill

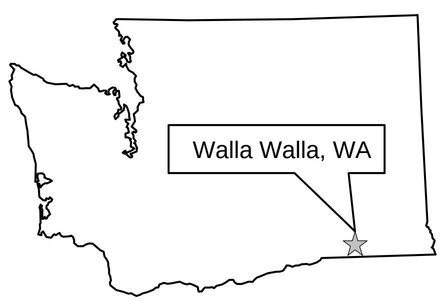
Sample Location	GW-5		GW-6	
Field Measurements (concentration)	**(Percent)**		**(Percent)**	
Methane	61.40		53.60	
Carbon Dioxide	39.60		35.00	
Oxygen	0.20		0.00	
EPA Method 25 C Analyte (concentration)	**(ppmV)**		**(ppmV)**	
Total Gaseous Nonmethane Organics as Hexane	150		70	
EPA TO-15 Analyte (concentration)	**(μg/m³)**	**(ppbV)**	**(μg/m³)**	**(ppbV)**
Propene	430 U	250 U	13,000	7,600
Dichlorodifluoromethane (CFC 12)	430 U	88 U	7,900	1,600
Chloromethane	430 U	210 U	150	74
1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	430 U	62 U	1,600	230
Vinyl Chloride	430 U	170 U	2,200	870
Chloroethane	430 U	160 U	970	370
Ethanol	10,000	5,300	6,600	3,500
Trichlorofluoromethane	430 U	77 U	160	29
2-Propanol (Isopropyl Alcohol)	5,100	2,100	1,300	530
1,1-Dichloroethene	430 U	110 U	220	55
Methylene Chloride	1,100	310	2,300	670
trans-1,2-Dichloroethene	430 U	110 U	260	67
1,1-Dichloroethane	430 U	110 U	470	120
2-Butanone (MEK)	3,000	1,000	990	330
cis-1,2-Dichloroethene	11,000	2,700	19,000	4,700
Ethyl Acetate	870 U	240 U	1,200	350
n-Hexane	1,900	530	5,800	1,700
Tetrahydrofuran (THF)	790	270	580	200
Benzene	940	290	1,700	540
Cyclohexane	1,600	450	5,300	1,500
Trichloroethene	2,000	380	3,200	600
n-Heptane	8,800	2,100	14,000	3,500
4-Methyl-2-pentanone	920	230	1,100	260
Toluene	52,000	14,000	26,000	6,900
n-Butyl Acetate	430 U	91 U	390	82
n-Octane	7,200	1,500	8,000	1,700
Tetrachloroethene	4,000	590	9,900	1,500
Ethylbenzene	6,400	1,500	3,900	910
m,p-Xylenes	15,000	3,500	8,200	1,900
Styrene	430 U	100 U	230	55
o-Xylene	3,300	760	2,400	550
n-Nonane	4,700	890	4,900	940
Cumene	430 U	88 U	250	50
alpha-Pinene	8,300	1,500	8,400	1,500
n-Propylbenzene	430 U	88 U	200	41
4-Ethyltoluene	430 U	88 U	220	44
1,3,5-Trimethylbenzene	450	92	230	47
1,2,4-Trimethylbenzene	970	200	420	86
d-Limonene	2,300	420	8,300	1,500

<u>Notes:</u>
Samples collected by Schwyn and Shannon & Wilson, Inc. on August 12, 2009.
Field measurements taken with Landtec GA-90. Measurments in percent by volume.
Gas samples collected using a 6 liter Summa Canister.
Samples analyzed by Columbia Analytical Services by EPA Methods 25C and TO-15.
U = Compound was analyzed for, but not detected above the laboratory reporting limit.
Only detected analytes in one or more of the samples are reported on table.



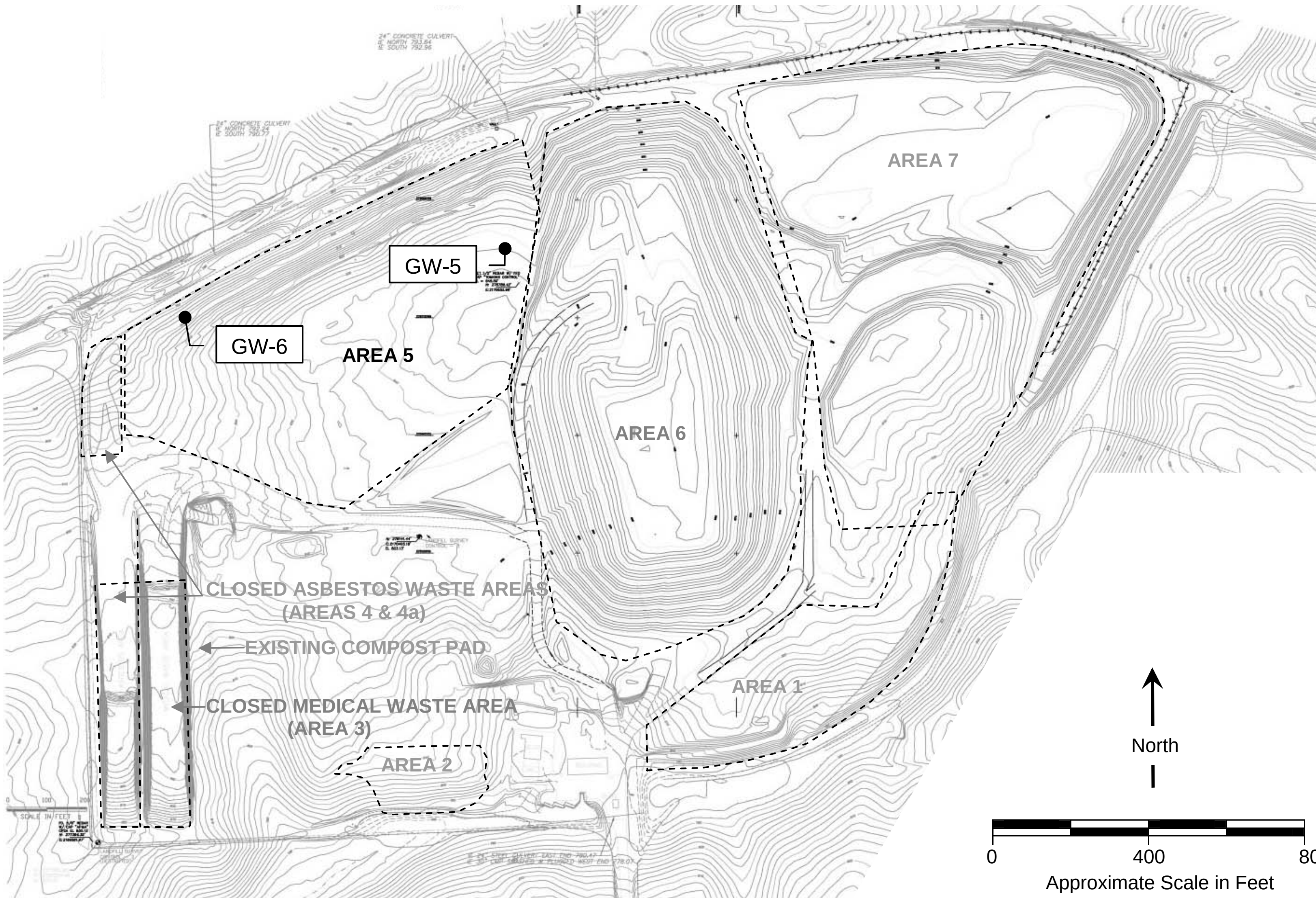
Source: USGS 7.5' Topographic Quad, Walla Walla, WA-OR, 1998, &
College Place WASH.-OREG., Photorevised 1978.





Schwyn Environmental Services

Sudbury Road Landfill Walla Walla, Washington	**Site Location**	Figure 1



Schwyn Environmental Services

Sudbury Road Landfill
Walla Walla, Washington

Area 5 Gas Probe Locations

Figure
2

APPENDIX A

Boring Logs & Well Construction Details

Schwyn Environmental Services

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COURSE GRAINED SOILS More than 50% retained on No. 200 sieve	**GRAVEL** More than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND More than 50% of coarse fraction retained on No. 4 sieve	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% passes No. 200 sieve	**SILT AND CLAY** liquid limit less than 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY liquid limit more than 50	INORGANIC	MH	HIGH-PLASTICITY SILT, ELASTIC SILT
			CH	HIGH-PLASTICITY CLAY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

Notes:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488.
2. Where laboratory index testing has been conducted, soil classification is based on ASTM D2487.
3. USCS group symbols correspond to the symbols used by the Unified Soil Classification System and ASTM Classification methods.

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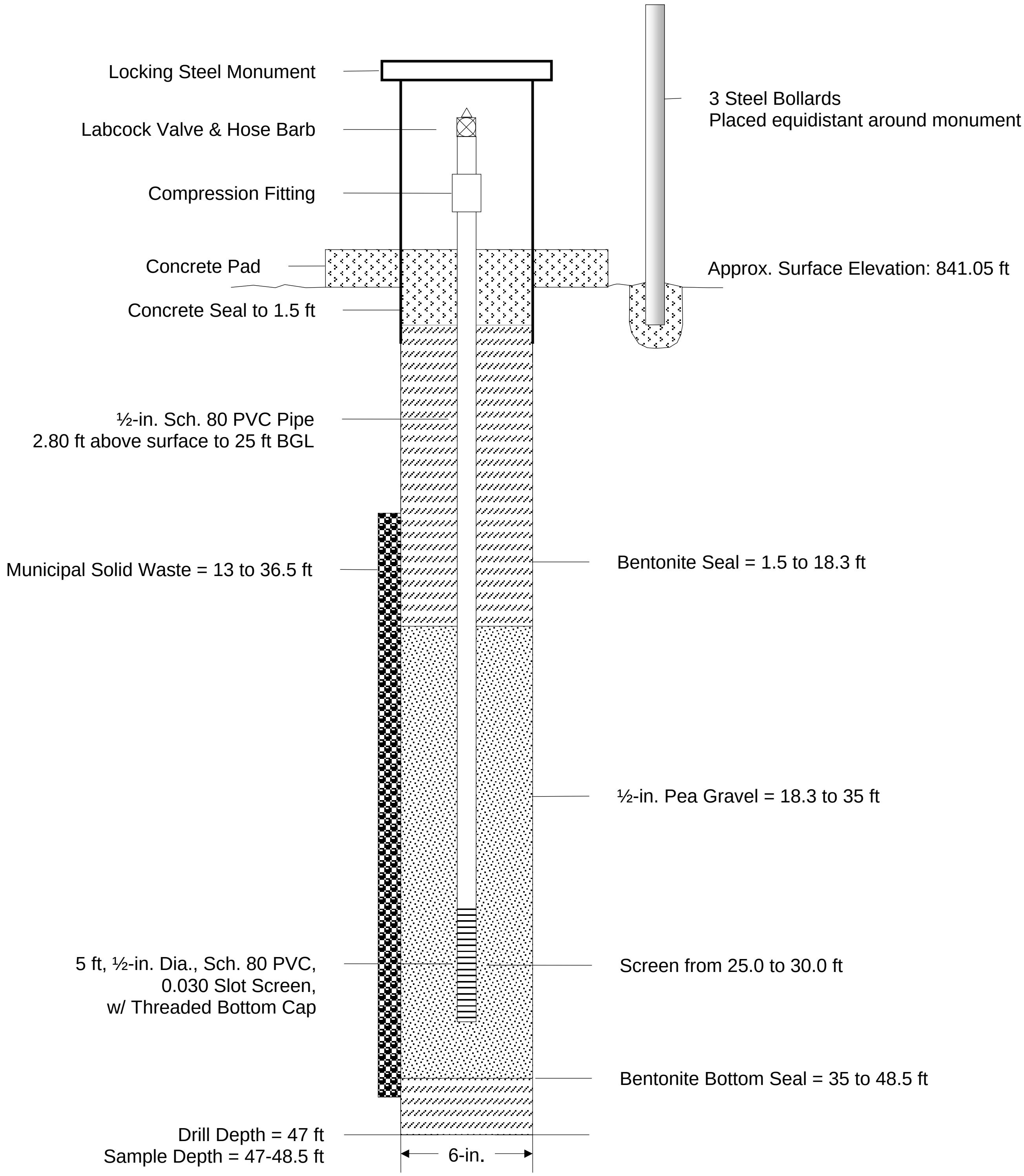
Soil Classification and Key



Not To Scale

Schwyn Environmental Services

GW-5
Landfill Gas Probe Detail

Figure A1

Log of Exploration

Exploration No. **GW-5**

Sheet 1 of 3

Start Date: 8/6/2009 Finish Date: 8/6/2009 Weather Conditions: Warm, Windy Geologist: Craig Schwyn Drilling Method: 6-in dia. Sonic Sample Method: 4-in. dia. Core Operator: Enviro. West Exp.	**Landfill Gas Well Completion** Surface Elevation: 841.05 ft MSL Total Boring Depth (BGL): 48.5 ft Total Casing Depth (BTOC): 32.80 ft Completion: Locking steel above ground monument with concrete surface pad Seal (BGL): Bentonite chips, 2 to 18.3 ft and 35 to 48.5 ft Gravel pack (BGL): 5/8-minus rounded gravel, 18.3 to 35 ft Casing: 1/2-in. dia. flush threaded Sch. 80 PVC, +2.80 to 25 ft BGL Screen (BGL): 0.03-in. slot Sch. 80 PVC, 25 to 30 ft BGL, with bottom cap

Project: Walla Walla Sudbury Road Landfill Onsite RI

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
	0 / 7		4-in Core	1	**ML**	Grayish brown **Silt**, trace sand, low plasticity, soft, dry. 2 ft recovery, saturated with drilling water	
				2			
				3			
				4			
				5			
				6			
	7 / 17		4-in Core	7			
				8			
				9			
				10			
				11			
				12			
				13		**Municipal Solid Waste**. Medium dense MSW consisting of fabric, wood, paper, & yard waste, with 6" thick layers of silt interspersed.	
				14			
				15			
				16			
	17 / 27		4-in Core	17		@ 17 to 20 ft: engine parts, metal, wire, and soil.	
				18			
				19			

Total Depth: 48.5 ft. Continued [X]

Log of Exploration

Exploration No. **GW-5**

Sheet 2 of 3

Project: Walla Walla Sudbury Road Landfill Onsite RI

Start Date: 8/6/2009
Finish Date: 8/7/2009
Geologist: Craig Schwyn
Drilling Method: 6-in dia. Sonic
Sample Method: 4-in. dia. Core

Surface Elevation: 841.05 ft MSL

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
				20		**Municipal Solid Waste** (cont.) @ 20 to 22 ft: gray silt, moist, compact.	
				21			
				22		@ 22 to 27 ft: black, wood, tires, and decomposed MSW.	
				23			
				24			
				25			
				26			
	27 / 37		4-in Core	27		@ 27 to 30 ft: black, paper, wood, and decomposed MSW.	
				28			
				29			
				30		@ 30 to 31 ft: silt.	
				31		@ 31 to 36 ft: glass, rock, and paper.	
				32			
				33			
				34			
				35		@ 35.5 to 36.5 ft: disturbed silt.	
				36	ML	Grayish brown Silt, with little clay and fine sand, stiff, low plasticity, moist. Some bedding structure observed in the silt with medium to coarse sand.	
	37 / 47		4-in Core	37			
				38			
				39			

Total Depth: 48.5 ft.

Continued [X]

Project: Walla Walla Sudbury Road Landfill Onsite RI

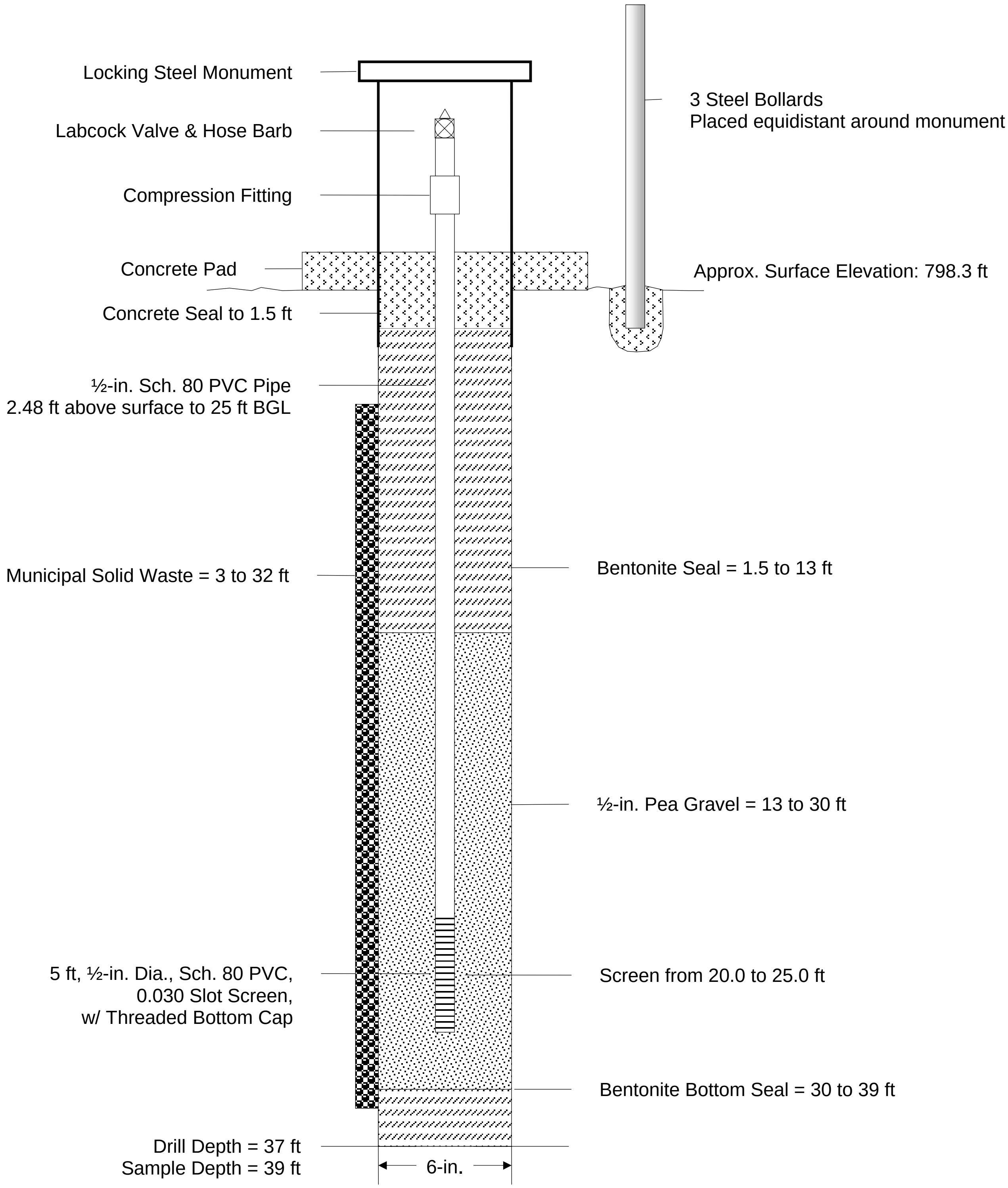
Start Date: 8/6/2009
Finish Date: 8/7/2009
Geologist: Craig Schwyn
Drilling Method: 6-in dia. Sonic
Sample Method: 4-in. dia. Core

Surface Elevation: 841.05 ft MSL

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
				40	ML	**Grey brown Silt,** with little clay and sand, stiff, low plasticity, moist.	
				41			
				42		@ 42 ft: Light brown	
				43			
				44			
				45			
				46			
S-1a	47	23	3-in	47		Light brown Silt with medium to coarse subangular basaltic sand,	
S-1b	48.5	33	SS			interspersed with layers of brown, very dense, silt; moist.	
S-1c		51		48	SM	Grades to very fine Sand with silt and medium to coarse sand.	

Boring drilled to 47 feet and sampled to 48.5 feet.
Gas well constructed in boring to 30 ft BGL.

Notes:
1. Lithologic descriptions and stratigraphic contacts are based on field interpretations and are approximate.
2. Refer to "Soil Classification and Key" figure for explanation of graphics and symbols.
3. BGL = below ground level
4. AGL = above ground level
5. TOC = top of casing
6. BTOC = below top of casing
7. SS = Split Spoon Sampler (2.42 -in. I.D.)
8. SPT = Standard Penetration Test Sampler (1.5 -in. I.D.)



Not To Scale

Schwyn Environmental Services

GW-6
Landfill Gas Probe Detail

Figure A2

Schwyn Environmental Services

Log of Exploration

Exploration No. **GW-6**

Sheet 1 of 2

Start Date: 8/6/2009 Finish Date: 8/7/2009 Weather Conditions: Warm, Windy Geologist: Craig Schwyn Drilling Method: 6-in dia. Sonic Sample Method: 4-in. dia. Core Operator: Enviro. West Exp.	**Landfill Gas Well Completion** Surface Elevation: 798.25 ft MSL Total Boring Depth (BGL): 39 ft Total Casing Depth (BTOC): 27.48 ft Completion: Locking steel above ground monument with concrete surface pad Seal (BGL): Bentonite chips, 1.5 to 13 ft and 30 to 39 ft Gravel pack (BGL): 5/8-minus rounded gravel, 13 to 30 ft Casing: 1/2-in. dia. flush threaded Sch. 80 PVC, +2.48 to 20 ft BGL Screen (BGL): 0.03-in. slot Sch. 80 PVC, 20 to 25 ft BGL, with bottom cap

Project: Walla Walla Sudbury Road Landfill Onsite RI

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
	0 / 7		4-in Core	1	**ML**	Grayish brown **Silt**, trace sand, low plasticity, soft, dry. (Landfill Cover)	
				2			
				3			
				4		**Municipal Solid Waste** @ about 3 to 5 ft. Medium dense MSW consisting of wood, yard waste, with 6" thick layers of silt interspersed. Plug of paper @ 7 ft is dated 8/10/1980	
				5			
				6			
	7 / 17		4-in Core	7		@ 7 to 11 ft: 4 ft recovery Silt, paper, glass, and kitchen rubbish.	
				8			
				9			
				10			
				11			
				12			
				13			
				14			
				15			
				16			
	17 / 27		4-in Core	17		@ 17 to 27 ft: tires, paper, cardboard, carpet pads, wood, MSW interspersed with layers of silt. Material with sales prediction date of 1979.	Rapid drilling
				18			
				19			

Total Depth: 39 ft.

Continued [X]

Log of Exploration

Exploration No. **GW-6**

Project: Walla Walla Sudbury Road Landfill Onsite RI

Start Date: 8/6/2009
Finish Date: 8/7/2009
Geologist: Craig Schwyn
Drilling Method: 6-in dia. Sonic
Sample Method: 4-in. dia. Core

Surface Elevation: 798.25 ft MSL

Sample Number	Sample Interval Top / Bot	Blow Counts / 6-in.	Sampler Type	Depth (feet)	USCS Symbol	Sample Description	Comments Drilling Action
				20–26		**Municipal Solid Waste** (cont.)	
	27 / 37		4-in Core	27–31		@ 27 to 32 ft: black, paper, wood, metal, and decomposed MSW. Newspaper dated October 1979.	
				32–35	ML	Olive brown **Silt**, with trace clay and little fine sand, dense low plasticity, very moist.	
S-1a S-1b S-1c S-1d	37 / 39	7 9 12 15	3-in SS	36–38		@ 36 to 37 ft: Olive brown Silt, with little clay and fine to medium grained sand lenses up to 1/2-in. thick, firm, very moist. @ 37 to 39 ft: Olive Silt, with trace clay and some fine to medium grained sand, mottled, low plasticity, wet.	

Boring drilled to 37 feet and sampled to 39 feet.
Gas well constructed in boring to 25 ft BGL.

Notes:
1. Lithologic descriptions and stratigraphic contacts are based on field interpretations and are approximate.
2. Refer to "Soil Classification and Key" figure for explanation of graphics and symbols.
3. BGL = below ground level
4. AGL = above ground level
5. TOC = top of casing
6. BTOC = below top of casing
7. SS = Split Spoon Sampler (2.42 -in. I.D.)
8. SPT = Standard Penetration Test Sampler (1.5 -in. I.D.)

APPENDIX B

Soil Laboratory Testing Report

HWA GEOSCIENCES INC.
Geotechnical & Pavement Engineering • Hydrogeology • Geoenvironmental • Inspection & Testing

September 3, 2009
HWA Project No. 2009-000, Task 19

Schwyn Environmental Services
4621 South Custer Court
Spokane, Washington 99223

Attention: Mr. Craig Schwyn, L.G.

Subject: **SOIL LABORATORY TESTING REPORT**
Gas Well Soil Samples
Area 5: Sudbury Road Landfill
Walla Walla, Washington

Dear Mr. Schwyn:

As requested, HWA GeoSciences Inc. (HWA) performed laboratory testing for the above referenced project. Herein we present the results of our laboratory analyses summarized on figures 1 through 3, which are attached. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE INFORMATION: Two relatively undisturbed soil samples related to your project were delivered to our laboratory on August 18, 2009 by HWA GeoSciences Inc. personnel. The samples were delivered in two sealed 3" diameter brass tubes and were designated as GW-5, S-1b, 47.5-48 feet and GW-6, S-1a, 37-37.5 feet. These samples were obtained from the native soils immediately underlying refuse at these locations.

Based on manual-visual methods, the soils descriptions for the samples are as follows:

GW-5, S-1b, 47.5-48'	Dense, yellowish brown, SILT with fine sand (ML)
GW-6,-S-1a, 37-37.5'	Dense, yellowish brown, SILT (ML)

PARTICLE SIZE ANALYSIS OF SOILS: The particle size distribution of each sample was determined in general accordance with ASTM D422, using the wet sieve and hydrometer method. The results are summarized on the attached Particle Size Analysis report depicted on Figure 1, which also provides information regarding the classification of the sample and the moisture content at the time of testing.

HYDRAULIC CONDUCTIVITY OF SOIL (FLEXI-WALL TRIAXIAL CHAMBER METHOD): The hydraulic conductivity (also commonly referred to as coefficient of permeability) of both samples was measured in general accordance with method ASTM D 5084. Each sample was removed from its brass tube, trimmed, and weighed prior to placement within a flexible membrane within a triaxial pressure chamber. An

19730 - 64th Avenue W.
Suite 200
Lynnwood, WA 98036.5957

Tel: 425.774.0106
Fax: 425.774.2714
www.hwageo.com

effective confining pressure of 25 psi was applied to simulate overburden pressure conditions. Saturation was induced by subjecting the test specimens to flow gradient ranging from about 13-18 generated by a back-pressure differential of 3 psi and testing was conducted until inflow was approximately equal to outflow and the hydraulic conductivity was essential steady. The test results are presented in detail on Figures 2 and 3.

CLOSURE: Experience has shown that test values on soil and other natural materials vary with each representative sample. This report should not be duplicated except in its entirety.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

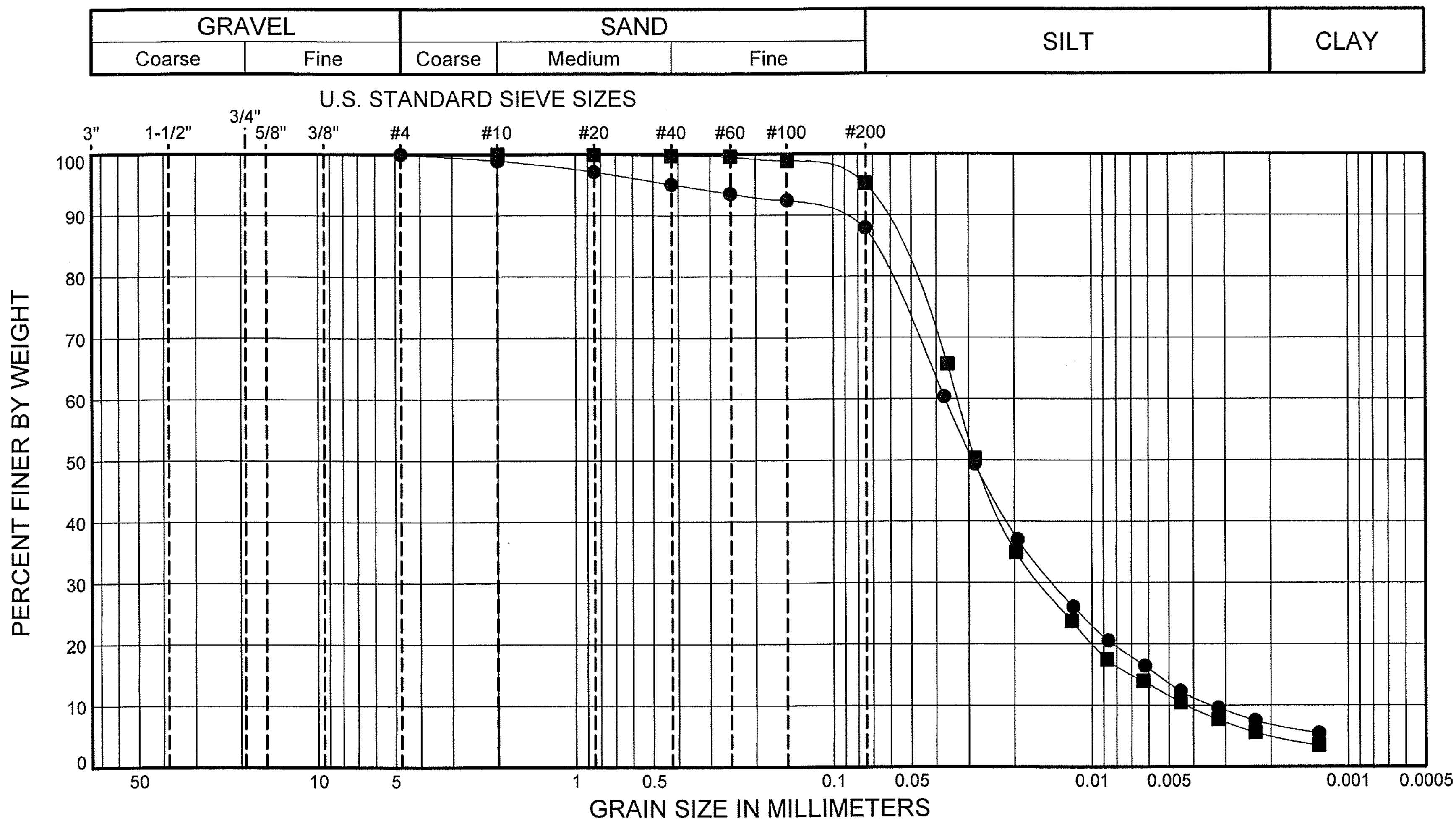
Sincerely,

HWA GEOSCIENCES INC.

Steven E. Greene, L.G., L.E.G.	George Minassian, P.E., Ph.D.
Vice-President	Geotechnical Engineer

Attachments

Figure 1 Particle Size Analysis
Figures 2-3 Hydraulic Conductivity Test Reports



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	GW-5	S-1b	47.5 - 48.0	(ML) Yellowish brown, SILT with fine sand.	11	NP	NP	NP	0.0	12.0	88.0
■	GW-6	S-1a	37.0 - 37.5	(ML) Yellowish brown, SILT	27	NP	NP	NP	0.0	4.8	95.2

HWA GEOSCIENCES INC.

Area 5
Sudbury Road Landfill
Walla Walla, Washington

PARTICLE-SIZE ANALYSIS OF SOILS METHOD ASTM D422

PROJECT NO.: 2009-000,T19 FIGURE: 1

Hydraulic Conductivity (a.k.a. Permeability) Test Report

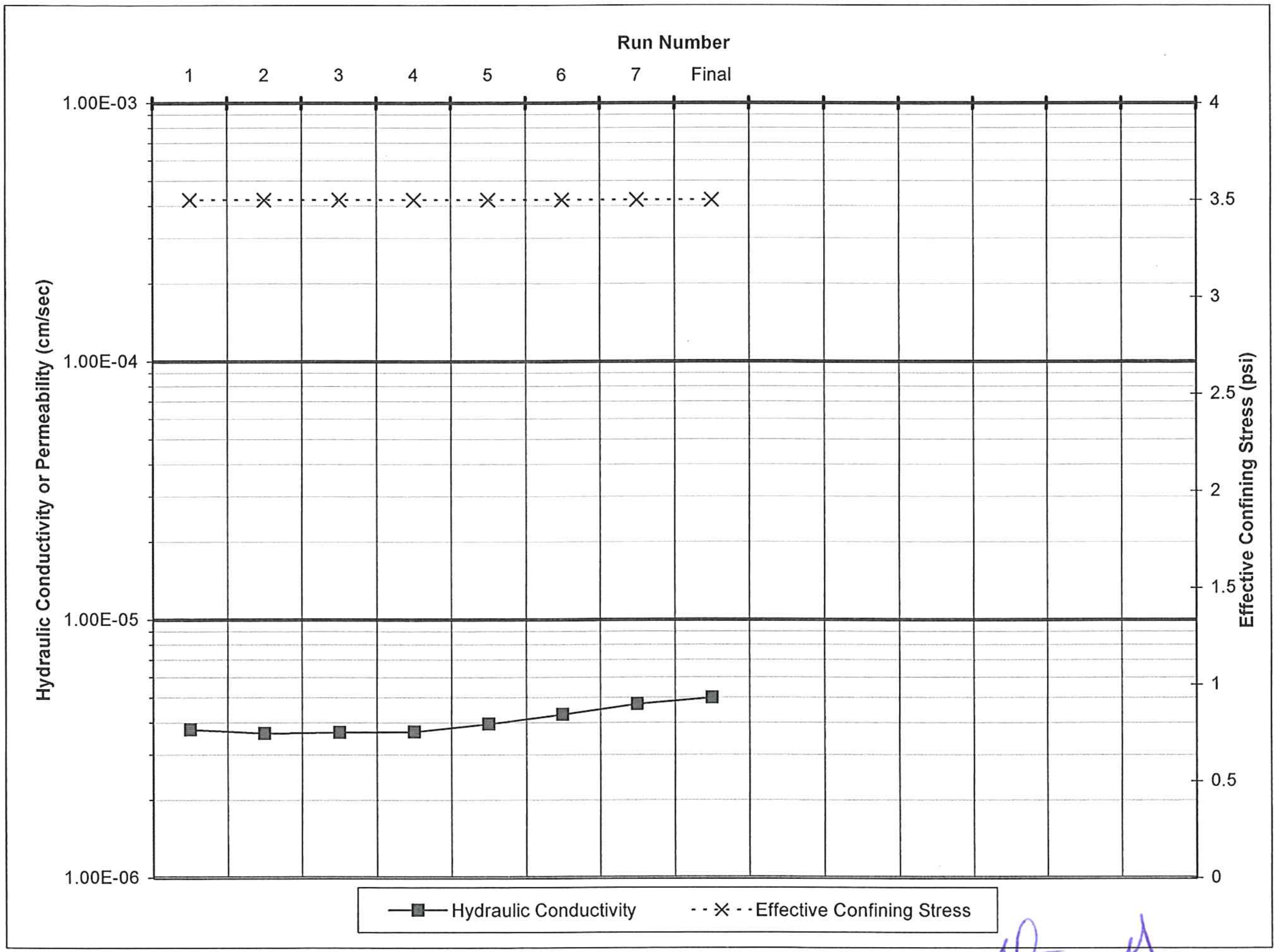
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	Sudbury Road LF-Area 5	Assumed Specific Gravity	2.68		
Client	Schwyn Environmental Services	Initial Sample Area (cm2)	41.85	Final Sample Area (cm2)	41.85
Project number	2009000 Task 18	Initial Sample Length (cm)	12.76	Final Sample Length (cm)	12.76
Date	08/19/2009	Initial Sample Volume (cc)	534.1	Final Sample Volume (cc)	534.1
Technician	ejb	Initial moisture (%)	10.5	Final moisture (%)	21.4
Sample point	GW-5	Initial wet unit wt. (pcf)	116.0	Final wet unit weight (pcf)	129.1
Sample number	S-1b	Initial dry unit wt. (pcf)	105.0	Final dry unit weight (pcf)	106.4
Sample depth	47.5-48	Initial void ratio	0.593	Final void ratio	0.572
Sample description	Light yellowish brown, SILT with fine sand. (ML)	Initial porosity	0.372	Final porosity	0.364
		Initial saturation (%)	47.4	Final saturation (%)	100.2

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)
1	3.8E-06	n.a.		1.03	3.5
2	3.6E-06	n.a.		1.04	3.5
3	3.7E-06	n.a.		0.98	3.5
4	3.7E-06	3.7E-06	2.0%	0.98	3.5
5	3.9E-06	3.7E-06	5.9%	0.95	3.5
6	4.3E-06	3.9E-06	10.2%	0.94	3.5
7	4.7E-06	4.2E-06	13.2%	0.97	3.5
Final	5.0E-06	$\boxed{\textbf{4.5E-06}}$	11.9%	0.96	3.5

Other Information
Maximum Gradient
18.0
Minimum Gradient
14.0
Max. Back Pressure (psi)
25.0
Min. Back Pressure (psi)
25.0



Checked by:

FIGURE: 2

Hydraulic Conductivity (a.k.a. Permeability) Test Report

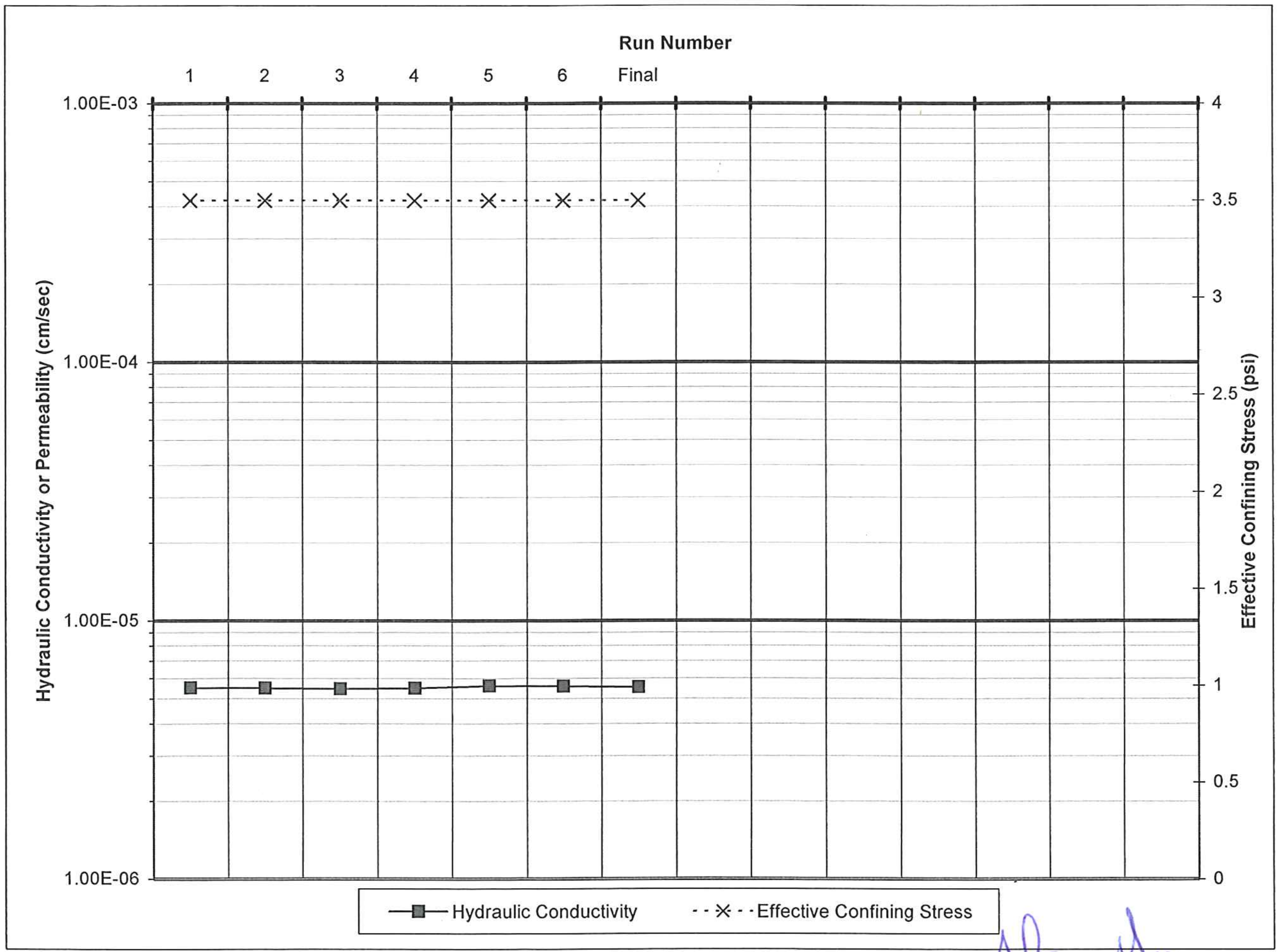
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	Sudbury Road LF-Area 5	Assumed Specific Gravity	2.65		
Client	Schwyn Environmental Services	Initial Sample Area (cm2)	41.88	Final Sample Area (cm2)	41.88
Project number	2009000 Task 18	Initial Sample Length (cm)	12.83	Final Sample Length (cm)	12.83
Date	08/19/2009	Initial Sample Volume (cc)	537.2	Final Sample Volume (cc)	537.2
Technician	ejb	Initial moisture (%)	26.9	Final moisture (%)	24.6
Sample point	GW-6	Initial wet unit wt. (pcf)	123.9	Final wet unit weight (pcf)	123.0
Sample number	S-1a	Initial dry unit wt. (pcf)	97.7	Final dry unit weight (pcf)	98.7
Sample depth	37-37.5	Initial void ratio	0.693	Final void ratio	0.675
Sample description	Light yellowish brown, SILT (ML).	Initial porosity	0.409	Final porosity	0.403
		Initial saturation (%)	102.9	Final saturation (%)	96.5

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)
1	5.5E-06	n.a.		1.00	3.5
2	5.5E-06	n.a.		1.00	3.5
3	5.5E-06	n.a.		1.01	3.5
4	5.5E-06	5.5E-06	0.4%	1.01	3.5
5	5.6E-06	5.5E-06	1.5%	0.99	3.5
6	5.6E-06	5.5E-06	1.3%	1.00	3.5
Final	5.5E-06	**5.5E-06**	1.0%	1.01	3.5

Other Information
Maximum Gradient
17.8
Minimum Gradient
12.8
Max. Back Pressure (psi)
25.0
Min. Back Pressure (psi)
25.0



Checked by:

FIGURE: 3

APPENDIX C

Landfill Gas Monitoring & Analytical Reports

Schwyn Environmental Services

January 14, 2010

Mr. Alex Fazarri
JUB Engineers, Inc.
2810 Clearwater Avenue, Suite 201
Kennewick, WA 99336

RE: SUDBURY ROAD LANDFILL, FIELD STUDIES – GAS SAMPLING AT AREAS 5 AND 6, WALLA WALLA, WASHINGTON

Dear Mr. Fazarri:

Shannon & Wilson visited the Sudbury Road Landfill in Walla Walla, Washington, on August 12, 2009, to collect field data to assist in the design of a gas collection and control system (GCCS) for the landfill. Shannon & Wilson personnel collected gas samples from recently installed gas wells for laboratory analysis, monitored gas extracted from these wells for typical landfill gas constituents, and measured differential pressure exerted at the wellheads by gas generation within the refuse. This letter summarizes the monitoring and sampling procedures, and presents the monitoring results and the results of chemical analyses.

GAS WELLS

Between August 5 and 10, 2009, HWA Geosciences advanced five borings at the landfill using sonic drilling methods. The borings were advanced to investigate physical properties of the waste including density, moisture content, total depth of refuse, and cover soil thickness. Gas wells were installed into each of these five borings consisting of ½-inch-diameter straight and slotted casing. Three gas wells were installed at Area 6 (GW-2, GW-3, and GW-4) and two installed into Area 5 (GW-5 and GW-6). The slotted intervals (screened intervals) are 5-foot sections of perforated piping encapsulated by 15 to 20 feet of pea gravel. Outside of the screened interval gravel-pack, the boring annulus around the casing was sealed using hydrated bentonite chips. The gas wells were completed above ground with lockable steel pipe monuments. Additional details of the well installation and exploration performed by HWA Geosciences can be found in the Final Geotechnical Data Report – Area 6 Closure Project prepared by HWA Geosciences for JUB Engineers, dated October 23, 2009.

GAS MONITORING

A Shannon & Wilson representative visited the site on August 12, 2009, to perform gas monitoring in support of the GCCS design. The field study was designed to provide background data for comparison to modeling results, which are used in the GCCS design and associated permit applications.

The gas monitoring process typically begins by purging gas from the well to reduce impacts to the monitoring or sampling results caused by stagnant air residing in the casing or gravel-pack. The Washington State Department of Ecology and the U.S. Army Corps of Engineers recommend purging one to two well volumes of gas prior to monitoring or sampling[1,2]. Because the sampling event was scheduled soon after well installation, three well volumes of gas were purged from the wells using a pneumatic pump prior to reading gas concentrations or collecting gas samples. A laboratory-calibrated rotometer was placed in line during the purge to measure the flow rate and track the purging process. Total purge volumes are presented in Table 1. During the purging process, site personnel observed that gas could not be drawn from GW-4, likely due to an obstruction in the piping. Because repeated efforts failed, subsequent gas monitoring and sample collection were not performed at this well.

After the purging process, gas removed from the well is presumed to represent conditions within the refuse. The concentration of methane, carbon dioxide, and oxygen were measured using a calibrated portable measuring device (Landtec GA-90). The measured gas concentrations are presented in Table 1. The average concentration of landfill gas constituents were as follows:

- Area 6
  - Methane – 57.3 percent
  - Carbon Dioxide – 43.9 percent
  - Oxygen – 0.1 percent

---

[1] Parametrix, Inc., 1987, Solid waste landfill design manual: Olympia, Wash., Washington State Department of Ecology, Report no. 87-13.

[2] U.S. Army Corps of Engineers, 2008, Engineering and design: landfill off-gas collection and treatment systems: Washington, D.C., Corps of Engineers Engineer Manual EM 1110-1-4016, available: http://140.194.76.129/publications/eng-manuals/.

- Area 5
  - Methane – 57.5 percent
  - Carbon Dioxide – 37.3 percent
  - Oxygen – 0.1 percent

GAS SAMPLING

After the gas purge described in the previous section, samples of landfill gas were collected for laboratory analysis. The samples were collected into certified-clean and laboratory pre-evacuated stainless steel summa canisters. The supplied canisters are under vacuum so when opened, they draw a gas sample in until pressure equilibrium is achieved. The canisters were attached to the wellhead using flexible tubing supplied by the laboratory, which was purged of ambient air during the well purging process. The canisters were opened to allow sample collection, then closed when full, labeled, and delivered under chain of custody to Columbia Analytical Services for total gaseous non-methane organics as hexane by the U.S. Environmental Protection Agency (EPA) Method 25C, and volatile organic compounds by EPA method TO-15. The laboratory report from Columbia Analytical Services, which summarizes the results and laboratory quality assurance and control measures is provided an enclosure this letter. The average non-methane organic compound concentration in Area 6 was 270 parts per million by volume.

PRESSURE MONITORING

During biodegradation of the buried refuse, landfill gas is produced, which increases the subsurface pressure within the landfill cell. Throughout the day, normal fluctuations in atmospheric pressure cause changes in the pressure measured within the landfill, although with a delayed response. Shannon & Wilson field personnel performed five measurements throughout the day in order to evaluate an appropriate average differential pressure. The differential pressure is useful in verifying gas production estimates generated by modeling. The pressure differential measurements are presented in Table 2. The average pressure exerted above atmospheric in Area 6 was 2.8 inches of water. The average pressure above atmospheric in Area 5 was 0.3 inch of water.

LIMITATIONS

All work has been performed in accordance with generally accepted professional consulting principles and practices. We make no warranty, either express or implied. This report is solely for the use and information of the City of Walla Walla and its representatives. Any reliance on this report by a third party is at such party's sole risk.

Opinions, findings, and recommendations presented in this letter apply to conditions existing at the time our services were performed and are intended only for the City of Walla Walla and the purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to the performance of these services. We do not warrant the accuracy of information supplied by others or the use of segregated portions of this report. Shannon & Wilson, Inc. has prepared the enclosed "Important Information About Your Geotechnical/Environmental Report" to assist you and others in understanding the use and limitations of this information.

We appreciate the opportunity to be of service to you.

Sincerely,

SHANNON & WILSON, INC.

Jeremy Davis, P.E., C.H.M.M.
Senior Environmental Engineer

JMD:SWG/jmd

Enc: Table 1 – Gas Monitoring
Table 2 – Pressure Monitoring
Laboratory Analytical Report (Columbia Analytical Services)
Important Information About Your Geotechnical/Environmental Report

TABLE 1
GAS MONITORING

Probe ID	Casing Length (feet)	1 Volume (liters)	3 Volumes (liters)	Flow Rate (LPM)	Start Purge (time)	End Purge (time)	Purge Time (minutes)	Total Purged (liters)	CH_4 (%)	CO_2 (%)	O_2 (%)	Flow (LPM)
GW-5	33	1.3	3.8	0.50	13:30	13:38	8	4.00	61.40	39.60	0.20	<0.2
GW-6	28	1.1	3.2	0.50	13:44	13:52	8	4.00	53.60	35.00	0.00	<0.2
GW-2	98	3.8	11.3	0.60	11:12	11:31	19	11.40	55.60	44.00	0.10	1.60
GW-3	97	3.7	11.2	0.60	11:43	12:02	19	11.40	59.00	43.70	0.00	2.10
GW-4*	93	3.6	10.8	-	12:26	13:10	44	-	-	-	-	-

Notes:

* Probe obstruction - purging was attempted unsuccessfully, sampling was not performed.

LPM = liters per minute

TABLE 2
PRESSURE MONITORING

Probe ID	Screened Interval	Refuse Interval	Differential Pressure		Differential Pressure		Differential Pressure		Differential Pressure		Differential Pressure	
	(feet)	(feet)	(time)	(in. WC)	(time)	(in. WC)	(time)	(in. WC)	(time)	(in. WC)	(time)	(in. WC)
GW-5	25-30	13-36.5	8:20	0.25	10:12	0.07	13:28	0.49	14:49	0.63	15:50	0.66
GW-6	20-25	3-32.0	8:14	-0.02	10:26	-0.17	13:43	0.21	14:45	0.30	15:45	0.33
GW-2	90-95	2-103	9:10	1.99	10:45	1.83	11:12	1.89	14:20	2.48	15:32	2.61
GW-3	89-94	1.5-101	9:03	3.39	10:48	3.02	11:43	3.13	14:15	3.58	15:25	3.77
GW-4*	84.5-89.5	3-96.5	-	-	-	-	-	-	-	-	-	-

Notes:

* Probe obstruction - purging was attempted unsuccessfully, sampling was not performed.

in. WC = pressure in units of inches of water column

Attachment to and part of Report 21-1-12295-001

Date: January 14, 2010
To: Mr. Alex Fazarri
JUB Engineers, Inc.

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

Columbia Analytical Services INC 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

September 2, 2009

Jeremy Davis
Shannon & Wilson, Incorporated
400 N 34th Street
Seattle, WA 98103

RE: Walla Walla-Sudbury Landfill / 21-1-12295-001

Dear Jeremy:

Enclosed are the results of the samples submitted to our laboratory on August 18, 2009. For your reference, these analyses have been assigned our service request number P0902831.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein. Your report contains 19 pages.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; Department of the Navy (NFESC); Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-08-TX. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Sue Anderson

Sue Anderson
Project Manager

Client: Shannon & Wilson, Incorporated CAS Project No: P0902831
Project: Walla Walla-Sudbury Landfill / 21-1-12295-001

CASE NARRATIVE

The samples were received intact under chain of custody on August 18, 2009 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Total Gaseous Non-Methane Organics as Hexane Analysis

The samples were analyzed for total gaseous non-methane organics as hexane according to EPA Method 25C. The analyses included a triplicate sample injection analyzed by gas chromatography using flame ionization detection/total combustion analysis.

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

Client: Shannon & Wilson, Incorporated

Folder: P0902831

Project: Walla Walla-Sudbury Landfill 21-1-12295-001

Detailed Sample Information

CAS Sample ID	Client Sample ID	Container Type	Pi1 (Hg)	Pi1 (psig)	Pf1	Pi2 (Hg)	Pi2 (psig)	Pf2	Cont ID	Order #	FC ID	Bottle Order #
P0902831-001.01	GW-5	6.0 L-Summa Canister Source	-1.4	-0.7	3.5				SC00109	**14246**		
P0902831-002.01	GW-6	6.0 L-Summa Canister Source	-1.5	-0.7	3.5				SC00033	**14247**		
P0902831-003.01	SC00006	6.0 L-Summa Canister Source	-17.0	-8.3					SC00006	**14246**		

Miscellaneous Items - received

Air - Chain of Custody Record & Analytical Service Request

Columbia Analytical Services™

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. P0902831

Company Name & Address (Reporting Information): Shannon & Wilson Inc, 400 N 34th St Suite 100, Seattle, WA 98103

Project Name: Walla Walla - Sudbury Landfill

Project Number: 21-1-12295-001

Project Manager: Jeremy Davis

Phone: 206-695-6871

Fax:

P.O. # / Billing Information: Bill to: ~~Schwyn~~ Schwyn Environmental, 4621 S. Custer Court, Spokane, WA 99223, (509)448-3187

Email Address for Result Reporting: jmd@shanwil.com

Sampler (Print & Sign): Jeremy Davis

CAS Contact:

Analysis Method and/or Analytes

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/Solid)	Canister ID (Bar Code # - AC, SC, etc.)	Flow Controller (Bar Code - FC #)	Sample Volume	TO-15 VOCs	Rad 25C			Comments e.g. Actual Preservative or specific instructions
GW-5	1	8/12/09	1340	Air	00109			X	X			
GW-6	2	8/12/09	1352	Air	00033			X	X			

Report Tier Levels - please select
Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) X
Tier III - (Data Validation Package) 10% Surcharge ____
Tier V - (client specified) ____

EDD required Yes / No
Type: ____
EDD Units: ____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	8/14/09	0930	[signature]	8/18/09	0950

Cooler / Blank

Temperature ____ ºC

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Shannon & Wilson, Incorporated Work order: P0902831
Project: Walla Walla-Sudbury Landfill / 21-1-12295-001
Sample(s) received on: 08/18/09 Date opened: 08/18/09 by: SSTAPLES

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature ______ °C Blank Temperature ______ °C			
10	Was a **trip blank** received?	☐	☒	☐
	Trip blank supplied by CAS: ______			
11	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? ______ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? ______ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
12	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were <u>**VOA vials**</u> checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P0902831-001.01	6.0 L Source Can					
P0902831-002.01	6.0 L Source Can					
P0902831-003.01	6.0 L Source Can					Returned Can

Explain any discrepancies: (include lab sample ID numbers):

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Shannon & Wilson, Incorporated**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001** CAS Project ID: P0902831

Total Gaseous Nonmethane Organics (TGNMO) as Hexane

Test Code: EPA Method 25C
Instrument ID: HP5890II/GC1/FID/TCA
Analyst: Wade Henton
Sampling Media: 6.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 8/12/09
Date Received: 8/18/09
Date Analyzed: 8/20/09

Client Sample ID	CAS Sample ID	Injection Volume ml(s)	Result ppmV	MRL* ppmV	Data Qualifier
GW-5	P0902831-001	0.50	**150**	0.22	
GW-6	P0902831-002	0.50	**70**	0.22	
Method Blank	P090820-MB	0.50	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = For consistency purposes, the actual MRL was divided by six and reported as hexane.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **GW-5**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P0902831-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00109

Date Collected: 8/12/09
Date Received: 8/18/09
Date Analyzed: 8/24/09
Volume(s) Analyzed: 0.0015 Liter(s)

Initial Pressure (psig): -0.7 Final Pressure (psig): 3.5

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	430	ND	250	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	430	ND	88	
74-87-3	Chloromethane	ND	430	ND	210	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	430	ND	62	
75-01-4	Vinyl Chloride	ND	430	ND	170	
106-99-0	1,3-Butadiene	ND	430	ND	200	
74-83-9	Bromomethane	ND	430	ND	110	
75-00-3	Chloroethane	ND	430	ND	160	
64-17-5	**Ethanol**	**10,000**	4,300	**5,300**	2,300	
75-05-8	Acetonitrile	ND	430	ND	260	
107-02-8	Acrolein	ND	430	ND	190	
67-64-1	Acetone	ND	4,300	ND	1,800	
75-69-4	Trichlorofluoromethane	ND	430	ND	77	
67-63-0	**2-Propanol (Isopropyl Alcohol)**	**5,100**	870	**2,100**	350	
107-13-1	Acrylonitrile	ND	430	ND	200	
75-35-4	1,1-Dichloroethene	ND	430	ND	110	
75-09-2	**Methylene Chloride**	**1,100**	430	**310**	120	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	430	ND	140	
76-13-1	Trichlorotrifluoroethane	ND	430	ND	57	
75-15-0	Carbon Disulfide	ND	430	ND	140	
156-60-5	trans-1,2-Dichloroethene	ND	430	ND	110	
75-34-3	1,1-Dichloroethane	ND	430	ND	110	
1634-04-4	Methyl tert-Butyl Ether	ND	430	ND	120	
108-05-4	Vinyl Acetate	ND	4,300	ND	1,200	
78-93-3	**2-Butanone (MEK)**	**3,000**	430	**1,000**	150	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: f Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **GW-5**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P0902831-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00109

Date Collected: 8/12/09
Date Received: 8/18/09
Date Analyzed: 8/24/09
Volume(s) Analyzed: 0.0015 Liter(s)

Initial Pressure (psig): -0.7 Final Pressure (psig): 3.5

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	**cis-1,2-Dichloroethene**	**11,000**	430	**2,700**	110	
141-78-6	Ethyl Acetate	ND	870	ND	240	
110-54-3	**n-Hexane**	**1,900**	430	**530**	120	
67-66-3	Chloroform	ND	430	ND	89	
109-99-9	**Tetrahydrofuran (THF)**	**790**	430	**270**	150	
107-06-2	1,2-Dichloroethane	ND	430	ND	110	
71-55-6	1,1,1-Trichloroethane	ND	430	ND	79	
71-43-2	**Benzene**	**940**	430	**290**	140	
56-23-5	Carbon Tetrachloride	ND	430	ND	69	
110-82-7	**Cyclohexane**	**1,600**	870	**450**	250	
78-87-5	1,2-Dichloropropane	ND	430	ND	94	
75-27-4	Bromodichloromethane	ND	430	ND	65	
79-01-6	**Trichloroethene**	**2,000**	430	**380**	81	
123-91-1	1,4-Dioxane	ND	430	ND	120	
80-62-6	Methyl Methacrylate	ND	870	ND	210	
142-82-5	**n-Heptane**	**8,800**	430	**2,100**	110	
10061-01-5	cis-1,3-Dichloropropene	ND	430	ND	95	
108-10-1	**4-Methyl-2-pentanone**	**920**	430	**230**	110	
10061-02-6	trans-1,3-Dichloropropene	ND	430	ND	95	
79-00-5	1,1,2-Trichloroethane	ND	430	ND	79	
108-88-3	**Toluene**	**52,000**	430	**14,000**	120	
591-78-6	2-Hexanone	ND	430	ND	110	
124-48-1	Dibromochloromethane	ND	430	ND	51	
106-93-4	1,2-Dibromoethane	ND	430	ND	56	
123-86-4	n-Butyl Acetate	ND	430	ND	91	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: P Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **GW-5**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P0902831-001

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00109

Date Collected: 8/12/09
Date Received: 8/18/09
Date Analyzed: 8/24/09
Volume(s) Analyzed: 0.0015 Liter(s)

Initial Pressure (psig): -0.7 Final Pressure (psig): 3.5

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	**n-Octane**	**7,200**	430	**1,500**	93	
127-18-4	**Tetrachloroethene**	**4,000**	430	**590**	64	
108-90-7	Chlorobenzene	ND	430	ND	94	
100-41-4	**Ethylbenzene**	**6,400**	430	**1,500**	100	
179601-23-1	**m,p-Xylenes**	**15,000**	870	**3,500**	200	
75-25-2	Bromoform	ND	430	ND	42	
100-42-5	Styrene	ND	430	ND	100	
95-47-6	**o-Xylene**	**3,300**	430	**760**	100	
111-84-2	**n-Nonane**	**4,700**	430	**890**	83	
79-34-5	1,1,2,2-Tetrachloroethane	ND	430	ND	63	
98-82-8	Cumene	ND	430	ND	88	
80-56-8	**alpha-Pinene**	**8,300**	430	**1,500**	78	
103-65-1	n-Propylbenzene	ND	430	ND	88	
622-96-8	4-Ethyltoluene	ND	430	ND	88	
108-67-8	**1,3,5-Trimethylbenzene**	**450**	430	**92**	88	
95-63-6	**1,2,4-Trimethylbenzene**	**970**	430	**200**	88	
100-44-7	Benzyl Chloride	ND	430	ND	84	
541-73-1	1,3-Dichlorobenzene	ND	430	ND	72	
106-46-7	1,4-Dichlorobenzene	ND	430	ND	72	
95-50-1	1,2-Dichlorobenzene	ND	430	ND	72	
5989-27-5	**d-Limonene**	**2,300**	430	**420**	78	
96-12-8	1,2-Dibromo-3-chloropropane	ND	430	ND	45	
120-82-1	1,2,4-Trichlorobenzene	ND	430	ND	58	
91-20-3	Naphthalene	ND	430	ND	83	
87-68-3	Hexachlorobutadiene	ND	430	ND	41	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: f Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **GW-6** CAS Project ID: P0902831
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001** CAS Sample ID: P0902831-002

Test Code: EPA TO-15 Date Collected: 8/12/09
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 8/18/09
Analyst: Simon Cao Date Analyzed: 8/24/09
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.0050 Liter(s)
Test Notes:
Container ID: SC00033

Initial Pressure (psig): -0.7 Final Pressure (psig): 3.5

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	**Propene**	**13,000**	130	**7,600**	76	M1
75-71-8	**Dichlorodifluoromethane (CFC 12)**	**7,900**	130	**1,600**	26	
74-87-3	**Chloromethane**	**150**	130	**74**	63	
76-14-2	**1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)**	**1,600**	130	**230**	19	
75-01-4	**Vinyl Chloride**	**2,200**	130	**870**	51	
106-99-0	1,3-Butadiene	ND	130	ND	59	
74-83-9	Bromomethane	ND	130	ND	33	
75-00-3	**Chloroethane**	**970**	130	**370**	49	
64-17-5	**Ethanol**	**6,600**	1,300	**3,500**	690	
75-05-8	Acetonitrile	ND	130	ND	77	
107-02-8	Acrolein	ND	130	ND	57	
67-64-1	Acetone	ND	1,300	ND	550	
75-69-4	**Trichlorofluoromethane**	**160**	130	**29**	23	
67-63-0	**2-Propanol (Isopropyl Alcohol)**	**1,300**	260	**530**	110	
107-13-1	Acrylonitrile	ND	130	ND	60	
75-35-4	**1,1-Dichloroethene**	**220**	130	**55**	33	
75-09-2	**Methylene Chloride**	**2,300**	130	**670**	37	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	130	ND	42	
76-13-1	Trichlorotrifluoroethane	ND	130	ND	17	
75-15-0	Carbon Disulfide	ND	130	ND	42	
156-60-5	**trans-1,2-Dichloroethene**	**260**	130	**67**	33	
75-34-3	**1,1-Dichloroethane**	**470**	130	**120**	32	
1634-04-4	Methyl tert-Butyl Ether	ND	130	ND	36	
108-05-4	Vinyl Acetate	ND	1,300	ND	370	
78-93-3	**2-Butanone (MEK)**	**990**	130	**330**	44	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M1 = Matrix interference due to coelution with a non-target compound; results may be biased high.

Verified By: f Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **GW-6**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P0902831-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00033

Date Collected: 8/12/09
Date Received: 8/18/09
Date Analyzed: 8/24/09
Volume(s) Analyzed: 0.0050 Liter(s)

Initial Pressure (psig): -0.7 Final Pressure (psig): 3.5

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	**cis-1,2-Dichloroethene**	**19,000**	130	**4,700**	33	
141-78-6	**Ethyl Acetate**	**1,200**	260	**350**	72	
110-54-3	**n-Hexane**	**5,800**	130	**1,700**	37	
67-66-3	Chloroform	ND	130	ND	27	
109-99-9	**Tetrahydrofuran (THF)**	**580**	130	**200**	44	
107-06-2	1,2-Dichloroethane	ND	130	ND	32	
71-55-6	1,1,1-Trichloroethane	ND	130	ND	24	
71-43-2	**Benzene**	**1,700**	130	**540**	41	
56-23-5	Carbon Tetrachloride	ND	130	ND	21	
110-82-7	**Cyclohexane**	**5,300**	260	**1,500**	76	
78-87-5	1,2-Dichloropropane	ND	130	ND	28	
75-27-4	Bromodichloromethane	ND	130	ND	19	
79-01-6	**Trichloroethene**	**3,200**	130	**600**	24	
123-91-1	1,4-Dioxane	ND	130	ND	36	
80-62-6	Methyl Methacrylate	ND	260	ND	64	
142-82-5	**n-Heptane**	**14,000**	130	**3,500**	32	
10061-01-5	cis-1,3-Dichloropropene	ND	130	ND	29	
108-10-1	**4-Methyl-2-pentanone**	**1,100**	130	**260**	32	
10061-02-6	trans-1,3-Dichloropropene	ND	130	ND	29	
79-00-5	1,1,2-Trichloroethane	ND	130	ND	24	
108-88-3	**Toluene**	**26,000**	130	**6,900**	35	
591-78-6	2-Hexanone	ND	130	ND	32	
124-48-1	Dibromochloromethane	ND	130	ND	15	
106-93-4	1,2-Dibromoethane	ND	130	ND	17	
123-86-4	**n-Butyl Acetate**	**390**	130	**82**	27	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: P Date: 8/31/09

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **GW-6**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P0902831-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:
Container ID: SC00033

Date Collected: 8/12/09
Date Received: 8/18/09
Date Analyzed: 8/24/09
Volume(s) Analyzed: 0.0050 Liter(s)

Initial Pressure (psig): -0.7 Final Pressure (psig): 3.5

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	**n-Octane**	**8,000**	130	**1,700**	28	
127-18-4	**Tetrachloroethene**	**9,900**	130	**1,500**	19	
108-90-7	Chlorobenzene	ND	130	ND	28	
100-41-4	**Ethylbenzene**	**3,900**	130	**910**	30	
179601-23-1	**m,p-Xylenes**	**8,200**	260	**1,900**	60	
75-25-2	Bromoform	ND	130	ND	13	
100-42-5	**Styrene**	**230**	130	**55**	31	
95-47-6	**o-Xylene**	**2,400**	130	**550**	30	
111-84-2	**n-Nonane**	**4,900**	130	**940**	25	
79-34-5	1,1,2,2-Tetrachloroethane	ND	130	ND	19	
98-82-8	**Cumene**	**250**	130	**50**	26	
80-56-8	**alpha-Pinene**	**8,400**	130	**1,500**	23	
103-65-1	**n-Propylbenzene**	**200**	130	**41**	26	
622-96-8	**4-Ethyltoluene**	**220**	130	**44**	26	
108-67-8	**1,3,5-Trimethylbenzene**	**230**	130	**47**	26	
95-63-6	**1,2,4-Trimethylbenzene**	**420**	130	**86**	26	
100-44-7	Benzyl Chloride	ND	130	ND	25	
541-73-1	1,3-Dichlorobenzene	ND	130	ND	22	
106-46-7	1,4-Dichlorobenzene	ND	130	ND	22	
95-50-1	1,2-Dichlorobenzene	ND	130	ND	22	
5989-27-5	**d-Limonene**	**8,300**	130	**1,500**	23	
96-12-8	1,2-Dibromo-3-chloropropane	ND	130	ND	13	
120-82-1	1,2,4-Trichlorobenzene	ND	130	ND	18	
91-20-3	Naphthalene	ND	130	ND	25	
87-68-3	Hexachlorobutadiene	ND	130	ND	12	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: f Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **Method Blank**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P090824-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/24/09
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
115-07-1	Propene	ND	0.50	ND	0.29	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	ND	0.10	
74-87-3	Chloromethane	ND	0.50	ND	0.24	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	ND	0.072	
75-01-4	Vinyl Chloride	ND	0.50	ND	0.20	
106-99-0	1,3-Butadiene	ND	0.50	ND	0.23	
74-83-9	Bromomethane	ND	0.50	ND	0.13	
75-00-3	Chloroethane	ND	0.50	ND	0.19	
64-17-5	Ethanol	ND	5.0	ND	2.7	
75-05-8	Acetonitrile	ND	0.50	ND	0.30	
107-02-8	Acrolein	ND	0.50	ND	0.22	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	0.50	ND	0.089	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	1.0	ND	0.41	
107-13-1	Acrylonitrile	ND	0.50	ND	0.23	
75-35-4	1,1-Dichloroethene	ND	0.50	ND	0.13	
75-09-2	Methylene Chloride	ND	0.50	ND	0.14	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.50	ND	0.16	
76-13-1	Trichlorotrifluoroethane	ND	0.50	ND	0.065	
75-15-0	Carbon Disulfide	ND	0.50	ND	0.16	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	ND	0.13	
75-34-3	1,1-Dichloroethane	ND	0.50	ND	0.12	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	ND	0.14	
108-05-4	Vinyl Acetate	ND	5.0	ND	1.4	
78-93-3	2-Butanone (MEK)	ND	0.50	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: f Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **Method Blank**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P090824-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/24/09
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.50	ND	0.13	
141-78-6	Ethyl Acetate	ND	1.0	ND	0.28	
110-54-3	n-Hexane	ND	0.50	ND	0.14	
67-66-3	Chloroform	ND	0.50	ND	0.10	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	ND	0.17	
107-06-2	1,2-Dichloroethane	ND	0.50	ND	0.12	
71-55-6	1,1,1-Trichloroethane	ND	0.50	ND	0.092	
71-43-2	Benzene	ND	0.50	ND	0.16	
56-23-5	Carbon Tetrachloride	ND	0.50	ND	0.080	
110-82-7	Cyclohexane	ND	1.0	ND	0.29	
78-87-5	1,2-Dichloropropane	ND	0.50	ND	0.11	
75-27-4	Bromodichloromethane	ND	0.50	ND	0.075	
79-01-6	Trichloroethene	ND	0.50	ND	0.093	
123-91-1	1,4-Dioxane	ND	0.50	ND	0.14	
80-62-6	Methyl Methacrylate	ND	1.0	ND	0.24	
142-82-5	n-Heptane	ND	0.50	ND	0.12	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	ND	0.11	
108-10-1	4-Methyl-2-pentanone	ND	0.50	ND	0.12	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	ND	0.11	
79-00-5	1,1,2-Trichloroethane	ND	0.50	ND	0.092	
108-88-3	Toluene	ND	0.50	ND	0.13	
591-78-6	2-Hexanone	ND	0.50	ND	0.12	
124-48-1	Dibromochloromethane	ND	0.50	ND	0.059	
106-93-4	1,2-Dibromoethane	ND	0.50	ND	0.065	
123-86-4	n-Butyl Acetate	ND	0.50	ND	0.11	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: P Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **Method Blank**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P090824-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/24/09
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	ND	0.11	
127-18-4	Tetrachloroethene	ND	0.50	ND	0.074	
108-90-7	Chlorobenzene	ND	0.50	ND	0.11	
100-41-4	Ethylbenzene	ND	0.50	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	0.50	ND	0.048	
100-42-5	Styrene	ND	0.50	ND	0.12	
95-47-6	o-Xylene	ND	0.50	ND	0.12	
111-84-2	n-Nonane	ND	0.50	ND	0.095	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	ND	0.073	
98-82-8	Cumene	ND	0.50	ND	0.10	
80-56-8	alpha-Pinene	ND	0.50	ND	0.090	
103-65-1	n-Propylbenzene	ND	0.50	ND	0.10	
622-96-8	4-Ethyltoluene	ND	0.50	ND	0.10	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	ND	0.10	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	ND	0.10	
100-44-7	Benzyl Chloride	ND	0.50	ND	0.097	
541-73-1	1,3-Dichlorobenzene	ND	0.50	ND	0.083	
106-46-7	1,4-Dichlorobenzene	ND	0.50	ND	0.083	
95-50-1	1,2-Dichlorobenzene	ND	0.50	ND	0.083	
5989-27-5	d-Limonene	ND	0.50	ND	0.090	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	ND	0.052	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	ND	0.067	
91-20-3	Naphthalene	ND	0.50	ND	0.095	
87-68-3	Hexachlorobutadiene	ND	0.50	ND	0.047	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: f Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

SURROGATE SPIKE RECOVERY RESULTS

Client: **Shannon & Wilson, Incorporated**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001** CAS Project ID: P0902831

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 8/12/09
Date(s) Received: 8/18/09
Date(s) Analyzed: 8/24/09

Client Sample ID	CAS Sample ID	1,2-Dichloroethane-d4 % Recovered	1,2-Dichloroethane-d4 Acceptance Limits	Toluene-d8 % Recovered	Toluene-d8 Acceptance Limits	Bromofluorobenzene % Recovered	Bromofluorobenzene Acceptance Limits	Data Qualifier
Method Blank	P090824-MB	**85**	70-130	**102**	70-130	**104**	70-130	
Lab Control Sample	P090824-LCS	**89**	70-130	**104**	70-130	**106**	70-130	
GW-5	P0902831-001	**88**	70-130	**102**	70-130	**107**	70-130	
GW-6	P0902831-002	**85**	70-130	**100**	70-130	**104**	70-130	

Verified By: f Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **Lab Control Sample**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P090824-LCS

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/24/09
Volume(s) Analyzed: NA Liter(s)

CAS #	Compound	Spike Amount ng	Result ng	% Recovery	CAS Acceptance Limits	Data Qualifier
115-07-1	Propene	26.3	**24.5**	**93**	58-134	
75-71-8	Dichlorodifluoromethane (CFC 12)	26.0	**21.6**	**83**	61-118	
74-87-3	Chloromethane	25.0	**23.7**	**95**	46-132	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	26.0	**24.9**	**96**	65-122	
75-01-4	Vinyl Chloride	25.3	**26.2**	**104**	57-132	
106-99-0	1,3-Butadiene	26.8	**30.2**	**113**	66-161	
74-83-9	Bromomethane	25.8	**27.1**	**105**	67-130	
75-00-3	Chloroethane	25.5	**25.2**	**99**	68-123	
64-17-5	Ethanol	130	**139**	**107**	50-155	
75-05-8	Acetonitrile	26.0	**25.9**	**100**	48-148	
107-02-8	Acrolein	26.3	**24.6**	**94**	67-138	
67-64-1	Acetone	132	**119**	**90**	59-121	
75-69-4	Trichlorofluoromethane	26.3	**22.1**	**84**	67-132	
67-63-0	2-Propanol (Isopropyl Alcohol)	48.0	**51.1**	**106**	54-126	
107-13-1	Acrylonitrile	25.8	**27.1**	**105**	65-134	
75-35-4	1,1-Dichloroethene	27.5	**28.4**	**103**	70-123	
75-09-2	Methylene Chloride	26.8	**24.7**	**92**	66-121	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	27.0	**28.6**	**106**	63-149	
76-13-1	Trichlorotrifluoroethane	27.5	**27.1**	**99**	69-126	
75-15-0	Carbon Disulfide	26.0	**22.6**	**87**	66-115	
156-60-5	trans-1,2-Dichloroethene	25.5	**24.8**	**97**	69-125	
75-34-3	1,1-Dichloroethane	26.5	**25.3**	**95**	72-130	
1634-04-4	Methyl tert-Butyl Ether	26.3	**23.8**	**90**	72-132	
108-05-4	Vinyl Acetate	126	**136**	**108**	73-158	
78-93-3	2-Butanone (MEK)	26.8	**26.5**	**99**	68-126	

Verified By: f Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Shannon & Wilson, Incorporated**
Client Sample ID: **Lab Control Sample**
Client Project ID: **Walla Walla-Sudbury Landfill / 21-1-12295-001**

CAS Project ID: P0902831
CAS Sample ID: P090824-LCS

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/24/09
Volume(s) Analyzed: NA Liter(s)

CAS #	Compound	Spike Amount ng	Result ng	% Recovery	CAS Acceptance Limits	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	27.0	**25.3**	**94**	69-124	
141-78-6	Ethyl Acetate	52.0	**55.9**	**108**	65-126	
110-54-3	n-Hexane	26.0	**25.2**	**97**	63-125	
67-66-3	Chloroform	27.5	**24.4**	**89**	68-126	
109-99-9	Tetrahydrofuran (THF)	26.5	**25.0**	**94**	65-124	
107-06-2	1,2-Dichloroethane	26.3	**22.3**	**85**	61-129	
71-55-6	1,1,1-Trichloroethane	26.0	**23.0**	**88**	69-127	
71-43-2	Benzene	25.8	**22.4**	**87**	68-122	
56-23-5	Carbon Tetrachloride	26.3	**26.8**	**102**	68-137	
110-82-7	Cyclohexane	51.8	**48.8**	**94**	68-121	
78-87-5	1,2-Dichloropropane	26.0	**27.6**	**106**	69-128	
75-27-4	Bromodichloromethane	26.3	**26.3**	**100**	71-131	
79-01-6	Trichloroethene	25.8	**25.8**	**100**	72-122	
123-91-1	1,4-Dioxane	26.0	**28.1**	**108**	73-127	
80-62-6	Methyl Methacrylate	52.8	**52.7**	**100**	80-133	
142-82-5	n-Heptane	25.8	**26.2**	**102**	69-126	
10061-01-5	cis-1,3-Dichloropropene	24.5	**24.4**	**100**	73-122	
108-10-1	4-Methyl-2-pentanone	26.8	**27.2**	**101**	67-122	
10061-02-6	trans-1,3-Dichloropropene	27.0	**28.1**	**104**	75-131	
79-00-5	1,1,2-Trichloroethane	26.0	**28.2**	**108**	76-125	
108-88-3	Toluene	26.8	**24.0**	**90**	74-119	
591-78-6	2-Hexanone	27.0	**27.3**	**101**	64-118	
124-48-1	Dibromochloromethane	28.3	**29.0**	**102**	79-129	
106-93-4	1,2-Dibromoethane	26.3	**26.9**	**102**	79-125	
123-86-4	n-Butyl Acetate	27.5	**27.3**	**99**	70-136	

Verified By: P Date: 8/31/09

COLUMBIA ANALYTICAL SERVICES, INC.

LABORATORY CONTROL SAMPLE SUMMARY

Client: Shannon & Wilson, Incorporated
Client Sample ID: Lab Control Sample
Client Project ID: Walla Walla-Sudbury Landfill / 21-1-12295-001

CAS Project ID: P0902831
CAS Sample ID: P090824-LCS

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Simon Cao
Sampling Media: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/24/09
Volume(s) Analyzed: NA Liter(s)

CAS #	Compound	Spike Amount ng	Result ng	% Recovery	CAS Acceptance Limits	Data Qualifier
111-65-9	n-Octane	26.3	**25.7**	**98**	75-126	
127-18-4	Tetrachloroethene	25.3	**26.1**	**103**	72-125	
108-90-7	Chlorobenzene	26.5	**24.9**	**94**	74-121	
100-41-4	Ethylbenzene	26.3	**24.7**	**94**	76-120	
179601-23-1	m,p-Xylenes	51.5	**46.2**	**90**	75-120	
75-25-2	Bromoform	26.5	**25.5**	**96**	76-143	
100-42-5	Styrene	26.3	**25.6**	**97**	78-124	
95-47-6	o-Xylene	26.0	**24.0**	**92**	76-121	
111-84-2	n-Nonane	25.8	**24.5**	**95**	69-129	
79-34-5	1,1,2,2-Tetrachloroethane	27.0	**28.1**	**104**	77-126	
98-82-8	Cumene	25.3	**23.1**	**91**	78-125	
80-56-8	alpha-Pinene	24.8	**24.3**	**98**	78-125	
103-65-1	n-Propylbenzene	25.3	**23.8**	**94**	80-127	
622-96-8	4-Ethyltoluene	26.3	**23.4**	**89**	75-123	
108-67-8	1,3,5-Trimethylbenzene	26.5	**24.7**	**93**	76-124	
95-63-6	1,2,4-Trimethylbenzene	25.5	**24.0**	**94**	76-123	
100-44-7	Benzyl Chloride	26.8	**29.5**	**110**	80-137	
541-73-1	1,3-Dichlorobenzene	26.0	**26.1**	**100**	74-125	
106-46-7	1,4-Dichlorobenzene	26.3	**25.1**	**95**	74-126	
95-50-1	1,2-Dichlorobenzene	25.8	**25.8**	**100**	75-124	
5989-27-5	d-Limonene	26.5	**26.3**	**99**	66-129	
96-12-8	1,2-Dibromo-3-chloropropane	27.0	**29.5**	**109**	79-144	
120-82-1	1,2,4-Trichlorobenzene	27.3	**26.5**	**97**	70-139	
91-20-3	Naphthalene	25.0	**27.0**	**108**	69-141	
87-68-3	Hexachlorobutadiene	26.8	**25.9**	**97**	68-138	

Verified By: f Date: 8/31/09

APPENDIX D

Data Summary

TABLE D1
LIST OF GROUNDWATER SAMPLES
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Conventionals	Metals	VOCs
Upgradient Wells					
MW-05	MW-5 Q1-91	03/01/1991	X	X	
MW-05	MW-5 Q2-91	06/01/1991	X	X	
MW-05	MW-5 Q3-91	09/01/1991	X	X	
MW-05	MW-5 Q4-91	12/01/1991	X	X	
MW-05	MW-5 Q1-92	03/01/1992	X	X	
MW-05	MW-5 Q2-92	06/01/1992	X	X	
MW-05	MW-5 Q3-92	09/01/1992	X	X	
MW-05	MW-5 Q4-92	12/01/1992	X	X	
MW-05	MW-5 Q1-93	03/30/1993	X	X	X
MW-05	MW-5 Q2-93	04/13/1993			X
MW-05	MW-5 Q2(Jun)-93	06/14/1993	X	X	X
MW-05	MW-5 Q3-93	09/01/1993	X	X	X
MW-05	MW-5 Q4- 93	12/01/1993	X	X	
MW-05	MW-5 Q1-94	03/01/1994	X		
MW-05	MW-5 Q2-94	04/01/1994		X	
MW-05	MW-5 Q3-94	08/01/1994	X	X	X
MW-05	MW-5 Q3(Sept)-94	09/01/1994	X	X	X
MW-05	MW-5 Q4-94	10/01/1994		X	
MW-05	MW-5 Q4(Nov)-94	11/01/1994	X	X	X
MW-05	MW-5 Q4(Dec)-94	12/01/1994	X	X	X
MW-05	MW-5 Q1-95	01/01/1995	X	X	X
MW-05	MW-5 Q1(Feb)-95	02/01/1995	X	X	X
MW-05	MW-5 Q4-95	10/30/1995	X		
MW-05	MW-5 Q4(Dec)-95	12/20/1995	X	X	X
MW-05	MW-5 Q1-96	02/01/1996	X		
MW-05	MW-5 Q2-96	05/01/1996	X	X	X
MW-05	MW-5 Q3-96	09/01/1996	X	X	X
MW-05	MW-5 Q4-96	10/01/1996	X	X	X
MW-05	MW-5 Q1-97	03/24/1997	X	X	
MW-05	MW-5 Q2-97	06/24/1997	X	X	X
MW-05	MW-5 Q3-97	09/11/1997	X	X	X
MW-05	MW-5 Q4-97	11/25/1997	X	X	X
MW-05	MW-5 Q1-98	03/25/1998	X	X	X
MW-05	MW-5 Q3-98	09/21/1998	X	X	X
MW-05	MW-5 Q4-98	12/30/1998	X	X	X
MW-05	MW-5 Q1-99	03/03/1999	X	X	X
MW-05	MW-5 Q2-99	06/14/1999	X	X	X
MW-05	MW-5 Q1-00	03/15/2000	X		X
MW-05	MW-5 Q3-00	09/27/2000	X		X
MW-05	MW-5 Q3-01	09/06/2001	X		X
MW-05	MW-5 Q4-01	12/14/2001	X		X
MW-05	MW-5 Q1-02	03/27/2002	X		X
MW-05	MW-5 Q2-04	06/17/2004			X
MW-07	MW-7 Q3-98	07/01/1998			X
MW-07	MW-7 Q1-01	01/31/2001			X
MW-07	MW-7 Q3-10	07/15/2010			X
MW-07	MW-7 Q4-10	11/03/2010			X
MW-07	SLF-MW-07-GW-110510	11/05/2010	X	X	X
MW-07	SLF-MW-07-GW-021011	02/10/2011	X	X	X
MW-09	MW-9 Q1-93	03/30/1993			X
MW-09	MW-9 Q2-93	04/13/1993			X

TABLE D1
LIST OF GROUNDWATER SAMPLES
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Conventionals	Metals	VOCs
Upgradient Wells Continued					
MW-09	MW-9 Q2(Jun)-93	06/14/1993			X
MW-09	MW-9 Q3-93	08/31/1993			X
MW-09	MW-9 Q3(Sept)-93	09/01/1993			X
MW-09	MW-9 Q1-98	02/01/1998			X
MW-09	MW-9 Q2-98	07/01/1998			X
MW-09	MW-9 Q1-02	01/31/2002			X
MW-09	MW-9 Q3-10	07/15/2010			X
MW-09	SLF-MW-09-GW-110410	11/04/2010	X	X	X
MW-09	MW-9 Q4-10	11/04/2010			X
MW-09	SLF-MW-09-GW-021011	02/10/2011	X	X	X
MW-10	MW-10 Q1-98	02/01/1998			X
MW-10	MW-10 Q3-98	07/01/1998			X
MW-10	MW-10 Q1-02	03/27/2002			X
MW-10	MW-10 Q3-10	07/15/2010			X
MW-10	MW-10 Q4-10	11/04/2010			X
MW-10	SLF-MW-10-GW-110410	11/04/2010	X	X	X
MW-10	SLF-MW-10-GW-021011	02/10/2011	X	X	X
MW-12	MW-12 Q1-95	03/01/1995	X	X	X
MW-12	MW-12 Q3-95	07/01/1995	X	X	X
MW-12	MW-12 Q3(Sept)-95	09/20/1995	X	X	X
MW-12	MW-12 Q4t-95	10/30/1995	X	X	X
MW-12	MW-12 Q4(Nov)-95	11/29/1995	X	X	
MW-12	MW-12 Q4(Dec)-95	12/20/1995	X	X	X
MW-12	MW-12 Q1-96	02/01/1996	X	X	X
MW-12	MW-12 Q2-96	05/29/1996	X	X	X
MW-12	MW-12 Q2(Jun)-96	06/01/1996			X
MW-12	MW-12 Q3-96	09/01/1996	X	X	X
MW-12	MW-12 Q4-96	10/01/1996	X	X	X
MW-12	MW-12 Q1-97	03/24/1997	X	X	X
MW-12	MW-12 Q2-97	06/24/1997	X	X	X
MW-12	MW-12 Q3-97	09/11/1997	X	X	
MW-12	MW-12 Q4-97	11/25/1997	X	X	X
MW-12	MW-12 Q1-98	03/25/1998	X	X	X
MW-12	MW-12 Q2-98	06/29/1998	X	X	
MW-12	MW-12 Q3-98	09/21/1998	X	X	X
MW-12	MW-12 Q4-98	12/30/1998	X	X	X
MW-12	MW-12 Q1-99	03/03/1999	X	X	X
MW-12	MW-12 Q2-99	06/14/1999	X	X	X
MW-12	MW-12 Q3-99	09/22/1999	X	X	X
MW-12	MW-12 Q4-99	12/09/1999	X	X	X
MW-12	MW-12 Q1-00	03/15/2000	X	X	X
MW-12	MW-12 Q2-00	06/21/2000	X	X	X
MW-12	MW-12 Q3-00	09/27/2000	X	X	X
MW-12	MW-12 Q4-00	12/05/2000	X	X	X
MW-12	MW-12 Q1-01	03/27/2001	X	X	X
MW-12	MW-12 Q2-01	06/27/2001	X	X	X
MW-12	MW-12 Q3-01	09/06/2001	X	X	X
MW-12	MW-12 Q4-01	12/14/2001	X	X	X
MW-12	MW-12 Q1-02	03/27/2002	X	X	X
MW-12	MW-12 Q2-02	06/13/2002	X	X	X
MW-12	MW-12 Q3-02	09/18/2002	X	X	X

TABLE D1
LIST OF GROUNDWATER SAMPLES
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Conventionals	Metals	VOCs
Upgradient Wells Continued					
MW-12	MW-12 Q4-02	12/17/2002	X	X	X
MW-12	MW-12 Q1-03	03/26/2003	X	X	X
MW-12	MW-12 Q2-03	06/26/2003	X	X	X
MW-12	MW-12 Q3-03	09/25/2003	X	X	X
MW-12	MW-12 Q4-03	12/18/2003	X	X	X
MW-12	MW-12 Q1-04	03/17/2004	X	X	X
MW-12	MW-12 Q2-04	06/17/2004	X	X	X
MW-12	MW-12 Q3-04	09/30/2004	X	X	X
MW-12	MW-12 Q4-04	12/15/2004	X	X	X
MW-12	MW-12 Q1-05	03/31/2005	X	X	X
MW-12	MW-12 Q2-05	06/23/2005	X	X	X
MW-12	MW-12 Q3-05	09/29/2005	X	X	X
MW-12	MW-12 Q1-06	03/30/2006	X	X	X
MW-12	MW-12 Q2-06	06/21/2006	X	X	X
MW-12	MW-12 Q3-06	09/21/2006	X	X	X
MW-12	MW-12 Q3-07	09/26/2007	X	X	X
MW-12b	MW-12b Q3-08	09/24/2008	X	X	X
MW-12b	MW-12b Q4-08	12/17/2008	X	X	X
MW-12b	MW-12b Q1-09	03/20/2009	X	X	X
MW-12b	MW-12b Q2-09	06/24/2009	X	X	X
MW-12b	MW-12b Q3-09	09/24/2009	X	X	X
MW-12b	MW-12b Q4-09	12/18/2009	X	X	X
MW-12b	MW-12b Q2-10	06/23/2010	X	X	X
MW-12b	MW-12b Q3-10	09/29/2010	X	X	X
MW-12b	MW-12b Q4-10	12/15/2010	X	X	X
MW-12b	MW-12b Q1-2011	03/24/2011	X	X	X
Downgradient Wells					
MW-01	MW-1 Q1-91	01/01/1991	X	X	
MW-01	MW-1 Q2-91	04/01/1991	X	X	
MW-01	MW-1 Q3-91	07/01/1991	X	X	
MW-01	MW-1 Q4-91	10/01/1991	X	X	
MW-01	MW-1 Q1-92	01/01/1992	X	X	
MW-01	MW-1 Q2-92	04/01/1992	X	X	
MW-01	MW-1 Q3-92	07/01/1992	X	X	
MW-01	MW-1 Q4-92	10/01/1992	X	X	
MW-01	MW-1 Q1-93	01/01/1993	X	X	
MW-01	MW-1 Q2-93	04/01/1993	X	X	
MW-01	MW-1 Q3-93	07/01/1993	X	X	
MW-01	MW-1 Q4-93	10/01/1993	X	X	
MW-01	MW-1 Q1-94	03/01/1994	X		
MW-01	MW-1 Q2-94	04/01/1994		X	
MW-01	MW-1 Q3-94	08/01/1994	X	X	X
MW-01	MW-1 Q3(Sept)-94	09/01/1994	X	X	X
MW-01	MW-1 Q4-94	10/01/1994		X	
MW-01	MW-1 Q4(Nov)-94	11/01/1994	X	X	X
MW-01	MW-1 Q4(Dec)-94	12/01/1994	X	X	X
MW-01	MW-1 Q1-95	01/01/1995	X	X	X
MW-01	MW-1 Q1(Feb)-95	02/01/1995	X	X	X
MW-01	MW-1 Q3-95	07/01/1995	X	X	X
MW-01	MW-1 Q1(Sep)-95	09/20/1995	X	X	X
MW-01	MW-1 Q4-95	12/18/1995	X	X	X

TABLE D1
LIST OF GROUNDWATER SAMPLES
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Conventionals	Metals	VOCs
Downgradient Wells Continued					
MW-01	MW-1 Q1-96	02/01/1996	X	X	X
MW-01	MW-1 Q2-96	05/01/1996	X	X	X
MW-01	MW-1 Q3-96	09/01/1996	X	X	X
MW-01	MW-1 Q4-96	10/01/1996	X	X	X
MW-01	MW-1 Q1-97	03/24/1997	X	X	
MW-01	MW-1 Q2-97	06/24/1997	X	X	X
MW-01	MW-1 Q3-97	09/11/1997	X	X	X
MW-01	MW-1 Q4-97	11/25/1997			X
MW-01	MW-1 Q1-98	03/25/1998	X	X	X
MW-01	MW-1 Q2-98	06/29/1998	X	X	X
MW-01	MW-1 Q3-98	09/21/1998	X	X	X
MW-01	MW-1 Q1-99	03/03/1999	X	X	X
MW-01	MW-1 Q2-99	06/14/1999	X	X	X
MW-01	MW-1 Q3-99	09/22/1999	X	X	X
MW-01	MW-1 Q4-99	12/09/1999	X	X	X
MW-01	MW-1 Q1-00	03/15/2000	X	X	X
MW-01	MW-1 Q2-00	06/21/2000	X	X	X
MW-01	MW-1 Q3-00	09/27/2000	X	X	X
MW-01	MW-1 Q4-00	12/05/2000	X	X	X
MW-01	MW-1 Q1-01	03/27/2001	X	X	X
MW-01	MW-1 Q2-01	06/27/2001	X	X	X
Well #2	MW-13 Q4-02	12/17/2002			X
MW-03	MW-3 Q1-91	01/01/1991	X	X	
MW-03	MW-3 Q2-91	04/01/1991	X	X	
MW-03	MW-3 Q3-91	07/01/1991	X	X	
MW-03	MW-3 Q4-91	10/01/1991	X	X	
MW-03	MW-3 Q1-92	01/01/1992	X	X	
MW-03	MW-3 Q2-92	04/01/1992	X	X	
MW-03	MW-3 Q3-92	07/01/1992	X	X	
MW-03	MW-3 Q4-92	10/01/1992	X	X	
MW-03	MW-3 Q1-93	01/01/1993	X	X	
MW-03	MW-3 Q2-93	04/01/1993	X	X	
MW-03	MW-3 Q3-93	07/01/1993	X	X	
MW-03	MW-3 Q4-93	10/01/1993	X	X	
MW-03	MW-3 Q1-94	02/01/1994	X		
MW-03	MW-3 Q1(Mar)-94	03/01/1994	X		
MW-03	MW-3 Q2-94	04/01/1994		X	
MW-03	MW-3 Q3-94	08/01/1994	X	X	X
MW-03	MW-3 Q3(Sept)-94	09/01/1994	X	X	X
MW-03	MW-3 Q4-94	10/01/1994		X	
MW-03	MW-3 Q4(Nov)-94	11/01/1994	X	X	X
MW-03	MW-3 Q4(Dec)-94	12/01/1994	X	X	X
MW-03	MW-3 Q1-95	01/01/1995	X	X	X
MW-03	MW-3 Q1(Feb)-95	02/01/1995	X	X	X
MW-03	MW-3 Q3-95	07/01/1995	X	X	X
MW-03	MW-3 Q3(Sept)-95	09/20/1995		X	X
MW-03	MW-3 Q4-95	12/18/1995	X	X	X
MW-03	MW-3 Q1-96 Dup	02/01/1996		X	X
MW-03	MW-3 Q1-96	02/01/1996	X	X	X
MW-03	MW-3 Q2-96	05/01/1996	X	X	X
MW-03	MW-3 Q3-96	09/01/1996	X	X	X

TABLE D1
LIST OF GROUNDWATER SAMPLES
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Conventionals	Metals	VOCs
Downgradient Wells Continued					
MW-03	MW-3 Q4-96	10/01/1996	X	X	X
MW-03	MW-3 Q1-97	03/24/1997	X	X	
MW-03	MW-3 Q2-97	06/24/1997	X	X	X
MW-03	MW-3 Q3-97	09/11/1997	X	X	X
MW-03	MW-3 Q4-97	11/25/1997	X	X	
MW-03	MW-3 Q1-98	03/25/1998	X	X	X
MW-03	MW-3 Q2-98	06/29/1998	X	X	X
MW-03	MW-3 Q3-98	09/21/1998	X	X	X
MW-03	MW-3 Q4-98	12/30/1998	X	X	X
MW-03	MW-3 Q1-99	03/03/1999	X	X	X
MW-03	MW-3 Q2-99	06/14/1999	X	X	X
MW-03	MW-3 Q3-99	09/22/1999	X	X	X
MW-03	MW-3 Q4-99	12/09/1999	X	X	X
MW-03	MW-3 Q1-00	03/15/2000	X	X	X
MW-03	MW-3 Q2-00	06/21/2000	X	X	X
MW-03	MW-3 Q3-00	09/27/2000	X	X	X
MW-03	MW-3 Q4-00	12/05/2000	X	X	X
MW-03	MW-3 Q1-01	03/27/2001	X	X	X
MW-03	MW-3 Q2-01	06/27/2001	X	X	X
MW-11	MW-11 Q1-95	03/01/1995	X	X	X
MW-11	MW-11 Q1-95 Dup	03/01/1995	X	X	X
MW-11	MW-11 Q3-95	07/01/1995	X	X	X
MW-11	MW-11 Q3-95 Dup	07/01/1995	X	X	X
MW-11	MW-11 Q3(Sept)-95	09/20/1995	X	X	X
MW-11	MW-11 Q3(Sept)-95 Dup	09/20/1995	X	X	X
MW-11	MW-11 Q4-95	10/30/1995	X	X	X
MW-11	MW-11 Q4-95 Dup	10/30/1995	X	X	X
MW-11	MW-11 Q4(Nov)-95	11/29/1995	X	X	
MW-11	MW-11 Q4(Nov)-95 Dup	11/29/1995	X	X	
MW-11	MW-11 Q4(Dec)-95	12/18/1995	X	X	X
MW-11	MW-11 Q1-96	02/01/1996	X	X	X
MW-11	MW-11 Q2-96	05/01/1996	X	X	X
MW-11	MW-11 Q2-96 Dup	05/01/1996		X	
MW-11	MW-11 Q2(Jun)-96	06/01/1996			X
MW-11	MW-11 Q3-96	09/01/1996	X	X	X
MW-11	MW-11 Q4-96	10/01/1996	X	X	X
MW-11	MW-11 Q1-97	03/24/1997	X	X	X
MW-11	MW-11 Q2-97	06/24/1997	X	X	X
MW-11	MW-11 Q3-97	09/11/1997	X	X	
MW-11	MW-11 Q4-97	11/25/1997	X	X	X
MW-11	MW-11 Q1-98	03/25/1998	X	X	X
MW-11	MW-11 Q2-98	06/29/1998	X	X	X
MW-11	MW-11 Q3-98	09/21/1998	X	X	X
MW-11	MW-11 Q4-98	12/30/1998	X	X	X
MW-11	MW-11 Q1-99	03/03/1999	X	X	X
MW-11	MW-11 Q2-99	06/14/1999	X	X	X
MW-11	MW-11 Q3-99	09/22/1999	X	X	X
MW-11	MW-11 Q4-99	12/09/1999	X	X	X
MW-11	MW-11 Q1-00	03/15/2000	X	X	X
MW-11	MW-11 Q2-00	06/21/2000	X	X	X
MW-11	MW-11 Q3-00	09/27/2000	X	X	X

TABLE D1
LIST OF GROUNDWATER SAMPLES
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Conventionals	Metals	VOCs
Downgradient Wells Continued					
MW-11	MW-11 Q4-00	12/05/2000	X	X	X
MW-11	MW-11 Q1-01	03/27/2001	X	X	X
MW-11	MW-11 Q2-01	06/27/2001	X	X	X
MW-11	MW-11 Q3-01	09/06/2001	X	X	X
MW-11	MW-11 Q4-01	12/14/2001	X	X	X
MW-11	MW-11 Q1-02	03/27/2002	X	X	X
MW-11	MW-11 Q2-02	06/13/2002	X	X	X
MW-11	MW-11 Q3-02	09/18/2002	X	X	X
MW-11	MW-11 Q4-02	12/17/2002	X	X	X
MW-11	MW-11 Q1-03	03/26/2003	X	X	X
MW-11	MW-11 Q2-03	06/26/2003	X	X	X
MW-11	MW-11 Q3-03	09/25/2003	X	X	X
MW-11	MW-11 Q4-03	12/18/2003	X	X	X
MW-11	MW-11 Q1-04	03/17/2004	X	X	X
MW-11	MW-11 Q2-04	06/17/2004	X	X	X
MW-11	MW-11 Q3-04	09/30/2004	X	X	X
MW-11	MW-11 Q4-04	12/15/2004	X	X	X
MW-11	MW-11 Q1-05	03/31/2005	X	X	X
MW-11	MW-11 Q2-05	06/23/2005	X	X	X
MW-11	MW-11 Q3-05	09/29/2005	X	X	X
MW-11	MW-11 Q4-05	12/14/2005	X	X	X
MW-11	MW-11 Q1-06	03/30/2006	X	X	X
MW-11	MW-11 Q2-06	06/21/2006	X	X	X
MW-11	MW-11 Q3-06	09/21/2006	X	X	X
MW-11	MW-11 Q4-06	12/28/2006	X	X	X
MW-11	MW-11 Q1-07	03/22/2007	X	X	X
MW-11	MW-11 Q2-07	06/28/2007	X	X	X
MW-11	MW-11 Q3-07	09/26/2007	X	X	X
MW-11	MW-11 Q4-07	12/27/2007	X	X	X
MW-11	MW-11 Q1-08	03/27/2008	X	X	X
MW-11	MW-11 Q2-08	06/25/2008	X	X	X
MW-11	MW-11 Q3-08	09/24/2008	X	X	X
MW-11	MW-11 Q4-08	12/17/2008	X	X	X
MW-11	MW-11 Q1-09	03/20/2009	X	X	X
MW-11	MW-11 Q2-09	06/24/2009	X	X	X
MW-11	MW-11 Q3-09	09/24/2009	X	X	X
MW-11	MW-11 Q4-09	12/18/2009	X	X	X
MW-11	MW-11 Q1-10	03/30/2010	X	X	X
MW-11	MW-11 Q2-10	06/23/2010	X	X	X
MW-11	MW-11 Q3-10	09/29/2010	X	X	X
MW-11	MW-11 Q4-10	12/15/2010	X	X	X
MW-11	MW-11 Q1-2011	03/24/2011	X	X	X
MW-14	MW-14 Q3-99	09/22/1999	X	X	X
MW-14	MW-14 Q4-99	12/09/1999	X	X	X
MW-14	MW-14 Q1-00	03/15/2000	X	X	X
MW-14	MW-14 Q2-00	06/21/2000	X	X	X
MW-14	MW-14 Q3-00	09/27/2000	X	X	X
MW-14	MW-14 Q4-00	12/05/2000	X	X	X
MW-14	MW-14 Q1-01	03/27/2001	X	X	X
MW-14	MW-14 Q2-01	06/27/2001	X	X	X
MW-14	MW-14 Q3-01	09/06/2001	X	X	X

TABLE D1
LIST OF GROUNDWATER SAMPLES
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Conventionals	Metals	VOCs
Downgradient Wells Continued					
MW-14	MW-14 Q4-01	12/14/2001	X	X	X
MW-14	MW-14 Q1-02	03/27/2002	X	X	X
MW-14	MW-14 Q2-02	06/13/2002	X	X	X
MW-14	MW-14 Q3-02	09/18/2002	X	X	X
MW-14	MW-14 Q4-02	12/17/2002	X	X	X
MW-14	MW-14 Q1-03	03/26/2003	X	X	X
MW-14	MW-14 Q2-03	06/26/2003	X	X	X
MW-14	MW-14 Q3-03	09/25/2003	X	X	X
MW-14	MW-14 Q4-03	12/18/2003	X	X	X
MW-14	MW-14 Q1-04	03/17/2004	X	X	X
MW-14	MW-14 Q2-04	06/17/2004	X	X	X
MW-14	MW-14 Q3-04	09/30/2004	X	X	X
MW-14	MW-14 Q4-04	12/15/2004	X	X	X
MW-14	MW-14 Q1-05	03/31/2005	X	X	X
MW-14	MW-14 Q2-05	06/23/2005	X	X	X
MW-14	MW-14 Q3-05	09/29/2005	X	X	X
MW-14	MW-14 Q4-05	12/14/2005	X	X	X
MW-14	MW-14 Q1-06	03/30/2006	X	X	X
MW-14	MW-14 Q3-06	09/21/2006	X	X	X
MW-14	MW-14 Q4-06	12/28/2006	X	X	X
MW-14	MW-14 Q1-07	03/22/2007	X	X	X
MW-14	MW-14 Q2-07	06/28/2007	X	X	X
MW-14	MW-14 Q3-07	09/26/2007	X	X	X
MW-14	MW-14 Q4-07	12/27/2007	X	X	X
MW-14	MW-14 Q1-08	03/27/2008	X	X	X
MW-14	MW-14 Q2-08	06/25/2008	X	X	X
MW-14	MW-14 Q3-08	09/24/2008	X	X	X
MW-14	MW-14 Q4-08	12/17/2008	X	X	X
MW-14	MW-14 Q1-09	03/20/2009	X	X	X
MW-14	MW-14 Q2-09	06/24/2009	X	X	X
MW-14	MW-14 Q3-09	09/24/2009	X	X	X
MW-14	MW-14 Q4-09	12/18/2009	X	X	X
MW-14	MW-14 Q1-10	03/30/2010	X	X	X
MW-14	MW-14 Q2-10	06/23/2010	X	X	X
MW-14	MW-14 Q3-10	09/29/2010	X	X	X
MW-14	MW-14 Q4-10	12/15/2010	X	X	X
MW-14	MW-14 Q1-2011	03/24/2011	X	X	X
MW-15	MW-15 Q3-01	09/06/2001	X	X	X
MW-15	MW-15 Q4-01	12/14/2001	X	X	X
MW-15	MW-15 Q1-02	03/27/2002	X	X	X
MW-15	MW-15 Q2-02	06/13/2002	X	X	X
MW-15	MW-15 Q3-02	09/18/2002	X	X	X
MW-15	MW-15 Q4-02	12/17/2002	X	X	X
MW-15	MW-15 Q1-03	03/26/2003	X	X	X
MW-15	MW-15 Q2-03	06/26/2003	X	X	X
MW-15	MW-15 Q3-03	09/25/2003	X	X	X
MW-15	MW-15 Q4-03	12/18/2003	X	X	X
MW-15	MW-15 Q1-04	03/17/2004	X	X	X
MW-15	MW-15 Q2-04	06/17/2004	X	X	X
MW-15	MW-15 Q3-04	09/30/2004	X	X	X
MW-15	MW-15 Q4-04	12/15/2004	X	X	X

TABLE D1
LIST OF GROUNDWATER SAMPLES
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Conventionals	Metals	VOCs
Downgradient Wells Continued					
MW-15	MW-15 Q1-05	03/31/2005	X	X	X
MW-15	MW-15 Q2-05	06/23/2005	X	X	X
MW-15	MW-15 Q3-05	09/29/2005	X	X	X
MW-15	MW-15 Q4-05	12/14/2005	X	X	X
MW-15	MW-15 Q1-06	03/30/2006	X	X	X
MW-15	MW-15 Q2-06	06/21/2006	X	X	X
MW-15	MW-15 Q3(Sept)-06	09/21/2006	X	X	X
MW-15	MW-15 Q4-06	12/28/2006	X	X	X
MW-15	MW-15 Q1-07	03/22/2007	X	X	X
MW-15	MW-15 Q2-07	06/28/2007	X	X	X
MW-15	MW-15 Q3-07	09/26/2007	X	X	X
MW-15	MW-15 Q4-07	12/27/2007	X	X	X
MW-15	MW-15 Q1-08	03/27/2008	X	X	X
MW-15	MW-15 Q2-08	06/25/2008	X	X	X
MW-15	MW-15 Q3-08	09/24/2008	X	X	X
MW-15	MW-15 Q4-08	12/17/2008	X	X	X
MW-15	MW-15 Q1-09	03/20/2009	X	X	X
MW-15	MW-15 Q2-09	06/24/2009	X	X	X
MW-15	MW-15 Q3-09	09/24/2009	X	X	X
MW-15	MW-15 Q4-09	12/18/2009	X	X	X
MW-15	MW-15 Q1-10	03/30/2010	X	X	X
MW-15	MW-15 Q2-10	06/23/2010	X	X	X
MW-15	MW-15 Q3-10	09/29/2010	X	X	X
MW-15	MW-15 Q4-10	12/15/2010	X	X	X
MW-15	MW-15 Q1-2011	03/24/2011	X	X	X
MW-16	MW-16 Q3-05	09/01/2005	X	X	X
MW-16	MW-16 Q2-06	06/21/2006	X	X	X
MW-16	MW-16 Q3(Sept)-06	09/21/2006	X	X	X
MW-16	MW-16 Q1-2011	03/24/2011			X
Residential Wells					
Camp Ranch	Camp Q1-05	03/31/2005			X
Camp Ranch	Camp Q2-05	06/23/2005			X
Camp Ranch	Camp Q3-05	09/29/2005			X
Camp Ranch	Camp Q3-06	09/21/2006			X
Camp Ranch	Camp Q2-09	06/24/2009			X
Kinman Ranch	Kinman Q1-05	03/31/2005			X
Kinman Ranch	Kinman Q2-05	06/23/2005			X
Small Ranch	Small 061302	06/13/2002			X
Small Ranch	Small 062602	06/26/2002			X
Small Ranch	Small Q1-04	03/17/2004			X
Small Ranch	Small Q3-04	09/30/2004			X
Small Ranch	Small Q4-04	12/15/2004			X
Small Ranch	Small Q1-05	03/31/2005			X
Small Ranch	Small Q3-05	09/29/2005			X
Small Ranch	Small Q3-06	09/21/2006			X
Small Ranch	Small Q2-09	06/24/2009			X
Small Ranch	Small Q3-10	09/29/2010			X

Notes:
X indicates that a sample was collected and analyzed for the specified chemical group.
Blank indicates that a sample was not analyzed for the specified chemical group.

TABLE D2
ADDITIONAL ASSESSMENT MONITORING RESULTS
City of Walla Walla Sudbury Road Landfill

Parameter Class	Analysis Method	Number of Samples	Number of Samples with a Detected Result
Polychlorinated Biphenyls	EPA 8082	6	0
Organochlorine Pesticides	EPA 8081A	6	0
Organophosphorus Pesticides	EPA 8141A	6	0
Chlorinated Herbicides	EPA 8151A	6	0
SVOCs	EPA 8270C	5	0
VOCs[1]	EPA 8260C	9	0

Notes:
1 This includes an expanded parameter list of 63 VOCs. Not all samples were tested for every VOC parameter on the expanded list. All reported VOC concentrations on the expanded list were below the method reporting limit.

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date (Parameter)	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Upgradient Wells													
MW-05	MW-5 Q1-91	03/01/1991	NA	0.05	NA	NA	56	700	9.87	NA	NA	NA	NA
MW-05	MW-5 Q2-91	06/01/1991	NA	0.05	NA	NA	39.6	640	10	NA	NA	NA	NA
MW-05	MW-5 Q3-91	09/01/1991	NA	0.025	NA	NA	65	750	10.25	NA	NA	NA	NA
MW-05	MW-5 Q4-91	12/01/1991	NA	NA	NA	NA	151	1080	1.3	NA	NA	NA	NA
MW-05	MW-5 Q1-92	03/01/1992	NA	0.05	NA	NA	80.8	710	10.9	NA	NA	NA	NA
MW-05	MW-5 Q2-92	06/01/1992	NA	0.05	NA	NA	74.7	700	9.7	NA	NA	NA	NA
MW-05	MW-5 Q3-92	09/01/1992	NA	0.05	NA	NA	50.1	600	11.5	NA	NA	NA	NA
MW-05	MW-5 Q4-92	12/01/1992	NA	0.05	NA	NA	49.4	610	11.4	NA	NA	NA	NA
MW-05	MW-5 Q1-93	03/30/1993	NA	0.1 U	NA	NA	55	735	53.8	NA	NA	NA	NA
MW-05	MW-5 Q2(Jun)-93	06/14/1993	NA	0.1 U	NA	NA	51.6	610	11.6	NA	NA	NA	NA
MW-05	MW-5 Q3-93	09/01/1993	NA	0.1 U	NA	NA	54.8	575	11.8	NA	NA	NA	NA
MW-05	MW-5 Q4- 93	12/01/1993	NA	0.1 U	NA	NA	61.2	582	11.7	NA	NA	NA	NA
MW-05	MW-5 Q1-94	03/01/1994	220	NA	NA	NA	NA	593	NA	7.1	NA	512	NA
MW-05	MW-5 Q3-94	08/01/1994	204.1	0.0025 U	NA	NA	58.5	570	14.2	6.9	32.8	431	5.5
MW-05	MW-5 Q3(Sept)-94	09/01/1994	195	0.0025 U	NA	NA	49.6	570	11.6	7	19.1	195	1.3
MW-05	MW-5 Q4(Nov)-94	11/01/1994	206	0.0025 U	257	NA	49.9	630	11.5	6.8	26.3	428	1.4
MW-05	MW-5 Q4(Dec)-94	12/01/1994	200	0.0025 U	261	NA	64.6	740	13	6.8	26.6	387	1.37
MW-05	MW-5 Q1-95	01/01/1995	204	0.0025 U	263	NA	56.8	810	14.4	6.8	22.2	468	0.8
MW-05	MW-5 Q1(Feb)-95	02/01/1995	116	0.0025 U	265	NA	61.1	770	14.5	6.7	21.6	456	0.865
MW-05	MW-5 Q4-95	10/30/1995	NA	NA	NA	NA	NA	840	14.5	NA	NA	NA	NA
MW-05	MW-5 Q4(Dec)-95	12/20/1995	210	0.0025 U	185	NA	166.5	961	16.2	NA	23.1	660	1.07
MW-05	MW-5 Q1-96	02/01/1996	NA	NA	NA	NA	NA	910	NA	7.1	NA	NA	NA
MW-05	MW-5 Q2-96	05/01/1996	NA	NA	NA	NA	NA	840	NA	7.2	NA	NA	NA
MW-05	MW-5 Q3-96	09/01/1996	219	0.05 U	219	NA	70	850	16	7.04	33	494	0.05 U
MW-05	MW-5 Q4-96	10/01/1996	212	0.05 U	212	NA	76	860	14	7.2	29	492	0.5 U

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date (Parameter)	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Upgradient Wells Continued													
MW-05	MW-5 Q1-97	03/24/1997	216	0.05 U	NA	NA	68	880	14	5.35	28	503	0.5 U
MW-05	MW-5 Q2-97	06/24/1997	210	0.05 U	210	NA	57	640	13	6.9	27	453	0.5 U
MW-05	MW-5 Q3-97	09/11/1997	210	NA	210	NA	56.3	712	12	7.23	24.6	424	NA
MW-05	MW-5 Q4-97	11/25/1997	212	0.05 U	NA	NA	55.6	612	13.7	7.81	NA	403	0.5 U
MW-05	MW-5 Q1-98	03/25/1998	207	0.05 U	207	NA	47.7	515	NA	7.12	25.8	408	0.5 U
MW-05	MW-5 Q3-98	09/21/1998	222	0.05 U	NA	NA	44.4	705	12.8	7.27	24.5	418	0.8
MW-05	MW-5 Q4-98	12/30/1998	212	0.05 U	212	NA	47	680	13.8	7.2	27.8	412	0.6
MW-05	MW-5 Q1-99	03/03/1999	207	0.05 U	207	NA	43.7	436	13.3	7.8	26	416	0.5 U
MW-05	MW-5 Q2-99	06/14/1999	215	0.05 U	215	NA	41.8	353	NA	7.31	24	449	0.6
MW-05	MW-5 Q1-00	03/15/2000	NA	NA	NA	NA	NA	729	NA	7.53	NA	NA	NA
MW-05	MW-5 Q3-00	09/27/2000	NA	NA	NA	NA	NA	640	NA	7.75	NA	NA	NA
MW-05	MW-5 Q3-01	09/06/2001	NA	NA	NA	NA	NA	560	NA	7.7	NA	NA	NA
MW-05	MW-5 Q4-01	12/14/2001	NA	NA	NA	NA	NA	120	NA	7.54	NA	NA	NA
MW-05	MW-5 Q1-02	03/27/2002	NA	NA	NA	NA	NA	490	NA	7.25	NA	NA	NA
MW-07	SLF-MW-07-GW-110510	11/05/2010	74	0.073	NA	20 U	NA	NA	1.6	NA	5 U	NA	NA
MW-07	SLF-MW-07-GW-021011	02/10/2011	74	0.05 U	NA	NA	NA	NA	1.4	NA	5 U	NA	NA
MW-09	SLF-MW-09-GW-110410	11/04/2010	330	0.1	NA	20 U	NA	NA	16	NA	28	NA	NA
MW-09	SLF-MW-09-GW-021011	02/10/2011	320	0.05 U	NA	NA	NA	NA	12	NA	27	NA	NA
MW-10	SLF-MW-10-GW-110410	11/04/2010	160	0.08	NA	20 U	NA	NA	6.6	NA	36	NA	NA
MW-10	SLF-MW-10-GW-021011	02/10/2011	150	0.05 U	NA	NA	NA	NA	6.8	NA	24	NA	NA
MW-12	MW-12 Q1-95	03/01/1995	321	0.0025 U	393.7	NA	182.8	1397	11.7	8.13	51.7	903	78.04
MW-12	MW-12 Q3-95	07/01/1995	346	0.0025 U	NA	NA	202.4	1400	10.6	6.2	53.6	849	2.21
MW-12	MW-12 Q3(Sept)-95	09/20/1995	320	0.0025 U	290	NA	193.1	157.5	10.8	6.5	57.9	815.3	NA
MW-12	MW-12 Q4t-95	10/30/1995	330	0.0025 U	310	NA	NA	162	10.6	7.78	5.8	762.9	NA
MW-12	MW-12 Q4(Nov)-95	11/29/1995	345	0.0025 U	310	NA	210.7	132	16.4	NA	39.6	782.3	24.5

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Upgradient Wells Continued													
MW-12	MW-12 Q4(Dec)-95	12/20/1995	230	0.0025 U	200	NA	221.7	1142	17.7	NA	41	770	3.1
MW-12	MW-12 Q1-96	02/01/1996	NA	NA	NA	NA	NA	1400	NA	6.8	NA	NA	NA
MW-12	MW-12 Q2-96	05/29/1996	NA	NA	NA	NA	NA	1390	NA	6.26	NA	NA	NA
MW-12	MW-12 Q3-96	09/01/1996	338	0.05 U	338	NA	190	1420	12	6.68	41	764	0.6
MW-12	MW-12 Q4-96	10/01/1996	320	0.1	320	NA	220	1390	12	6.62	48	840	0.7
MW-12	MW-12 Q1-97	03/24/1997	342	0.05 U	342	NA	220	1270	12	7.13	45	818	0.9
MW-12	MW-12 Q2-97	06/24/1997	339	0.05 U	339	NA	180	1280	12	7.09	40	800	0.5
MW-12	MW-12 Q3-97	09/11/1997	328	0.05 U	328	NA	182	1308	10.4	7.23	43.7	738	0.5
MW-12	MW-12 Q4-97	11/25/1997	335	0.05 U	NA	NA	210	822	11.6	7.65	NA	752	0.8
MW-12	MW-12 Q1-98	03/25/1998	298	0.05 U	298	NA	194	690	NA	7.2	54.6	725	0.7
MW-12	MW-12 Q2-98	06/29/1998	325	0.05 U	325	NA	199	884	12.2	7.1	41.4	791	0.7
MW-12	MW-12 Q3-98	09/21/1998	321	0.05 U	NA	NA	196	633	11.5	7.55	45	808	0.8
MW-12	MW-12 Q4-98	12/30/1998	295	0.05 U	295	NA	230	696	12.2	7.51	44.9	764	0.6
MW-12	MW-12 Q1-99	03/03/1999	302	0.05 U	302	NA	205	546	12.2	7.46	43.6	799	0.7
MW-12	MW-12 Q2-99	06/14/1999	317	0.05 U	317	NA	194	769	NA	7.23	44.2	800	0.8
MW-12	MW-12 Q3-99	09/22/1999	313	0.05 U	313	NA	193	742	11.3	6.96	42	852	0.5
MW-12	MW-12 Q4-99	12/09/1999	329	0.05 U	329	NA	200	1361	11.8	7.53	43.2	714	0.8
MW-12	MW-12 Q1-00	03/15/2000	316	NA	316	NA	186	1352	10.9	7.6	40.8	NA	NA
MW-12	MW-12 Q2-00	06/21/2000	323	0.05 U	323	NA	206	1384	11.8	7.79	42.7	823	0.8
MW-12	MW-12 Q3-00	09/27/2000	308	0.05 U	308	NA	189	1147	NA	8	NA	747	0.5 U
MW-12	MW-12 Q4-00	12/05/2000	305	0.05 U	305	NA	199	1030	11.1	7.98	41.1	792	0.8
MW-12	MW-12 Q1-01	03/27/2001	314	0.05 U	314	NA	184	620	11	8.3	39.9	816	0.7
MW-12	MW-12 Q2-01	06/27/2001	318	0.05 U	318	NA	191	530	11.9	7.4	41.5	644	0.9
MW-12	MW-12 Q3-01	09/06/2001	314	0.05 U	314	NA	205	590	12.4	7.65	45	736	0.8
MW-12	MW-12 Q4-01	12/14/2001	320	0.05 U	320	NA	209	490	12.1	7.65	43	700	0.6

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Upgradient Wells Continued													
MW-12	MW-12 Q1-02	03/27/2002	314	0.05 U	314	NA	184	849	12.1	7.4	44.5	976	0.7
MW-12	MW-12 Q2-02	06/13/2002	289	0.05 U	289	NA	194	877	12	7.39	46.8	868	0.6
MW-12	MW-12 Q3-02	09/18/2002	322	0.05 U	322	NA	182	859	11.9	7.35	42.6	632	1
MW-12	MW-12 Q4-02	12/17/2002	315	0.05 U	315	NA	184	877	13	7.32	42	776	1
MW-12	MW-12 Q1-03	03/26/2003	310	0.05 U	315	NA	173	877	12	7.32	45	772	1.1
MW-12	MW-12 Q2-03	06/26/2003	307	0.05 U	307	NA	174	853	10	7.2	45	804	1
MW-12	MW-12 Q3-03	09/25/2003	304	0.05 U	304	NA	161	863	10.9	7.14	46	760	0.5 U
MW-12	MW-12 Q4-03	12/18/2003	301	0.05 U	301	NA	190	791	10	7.28	51	865	1.1
MW-12	MW-12 Q1-04	03/17/2004	305	0.05 U	305	NA	199	684	10	7.37	45	890	1
MW-12	MW-12 Q2-04	06/17/2004	304	0.05 U	304	NA	186	737	9.4	7.37	44.9	820	1.1
MW-12	MW-12 Q3-04	09/30/2004	303	0.05 U	303	NA	190	737	9.6	6.84	43.6	856	0.9
MW-12	MW-12 Q4-04	12/15/2004	308	0.05 U	308	NA	240	700	9.8	7.13	44.6	880	1.1
MW-12	MW-12 Q1-05	03/31/2005	302	0.05 U	302	2 U	185	NA	11.4	NA	54	750	0.9
MW-12	MW-12 Q2-05	06/23/2005	300	0.05 U	300	NA	183	NA	11.5	NA	47	780	1
MW-12	MW-12 Q3-05	09/29/2005	291	0.05 U	291	2 U	176	NA	11.2	NA	48	785	1.5
MW-12	MW-12 Q1-06	03/30/2006	300	0.05 U	300	NA	174	769	12.1	7.22	45.5	755	1
MW-12	MW-12 Q2-06	06/21/2006	477	0.05 U	477	NA	100	751	19.8	7.18	31.6	788	1.2
MW-12	MW-12 Q3-06	09/21/2006	397	0.05 U	397	NA	126	NA	20.2	NA	37.5	735	1.4
MW-12	MW-12 Q3-07	09/26/2007	292	NA	292	NA	59	NA	NA	NA	17.8	NA	NA
MW-12b	MW-12b Q3-08	09/24/2008	295	0.05 U	295	NA	165	818	11.7	7.12	33.9	713	1
MW-12b	MW-12b Q4-08	12/17/2008	296	0.05 U	NA	NA	170	831	NA	7.2	35.6	NA	0.9
MW-12b	MW-12b Q1-09	03/20/2009	293	0.05 U	295	NA	173	825	12.5	7.15	37	737	0.5 U
MW-12b	MW-12b Q2-09	06/24/2009	304	0.05 U	295	NA	157	724	13	7.37	40	691	0.8
MW-12b	MW-12b Q3-09	09/24/2009	295	0.05 U	295	NA	168	748	12.4	7.38	39	700	0.84
MW-12b	MW-12b Q4-09	12/18/2009	287	0.05 U	NA	NA	164	758	12.9	7.38	41.2	669	0.76

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date (Parameter)	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Upgradient Wells Continued													
MW-12b	MW-12b Q2-10	06/23/2010	292	0.05 U	295	NA	126	854	12.8	6.7	42.3	696	0.71
MW-12b	MW-12b Q3-10	09/29/2010	299	0.05 U	NA	NA	161	NA	12.6	NA	41.7	1360	1.2
MW-12b	MW-12b Q4-10	12/15/2010	299	0.05 U	NA	NA	161	847	11.5	6.77	39.6	709	0.83
MW-12b	MW-12b Q1-2011	03/24/2011	284	0.05 U	NA	NA	158	NA	11.7	NA	39.3	556	0.69
Downgradient Wells													
MW-01	MW-1 Q1-91	01/01/1991	NA	0.05	NA	NA	111	750	0.0069	NA	NA	NA	NA
MW-01	MW-1 Q2-91	04/01/1991	NA	0.05	NA	NA	100	740	0.0091	NA	NA	NA	NA
MW-01	MW-1 Q3-91	07/01/1991	NA	0.05	NA	NA	99	750	0.0088	NA	NA	NA	NA
MW-01	MW-1 Q4-91	10/01/1991	NA	0.05	NA	NA	107	780	0.0013	NA	NA	NA	NA
MW-01	MW-1 Q1-92	01/01/1992	NA	0.05	NA	NA	105.7	740	0.0083	NA	NA	NA	NA
MW-01	MW-1 Q2-92	04/01/1992	NA	0.05	NA	NA	109.2	725	0.0097	NA	NA	NA	NA
MW-01	MW-1 Q3-92	07/01/1992	NA	0.05	NA	NA	110.7	740	0.0084	NA	NA	NA	NA
MW-01	MW-1 Q4-92	10/01/1992	NA	0.05	NA	NA	110.1	700	0.0084	NA	NA	NA	NA
MW-01	MW-1 Q1-93	01/01/1993	NA	0.1 U	NA	NA	112.3	900	0.0379	NA	NA	NA	NA
MW-01	MW-1 Q2-93	04/01/1993	NA	0.1 U	NA	NA	112.9	750	0.0086	NA	NA	NA	NA
MW-01	MW-1 Q3-93	07/01/1993	NA	0.1 U	NA	NA	102.6	465	0.0079	NA	NA	NA	NA
MW-01	MW-1 Q4-93	10/01/1993	NA	0.1 U	NA	NA	102.4	725	0.0084	NA	NA	NA	NA
MW-01	MW-1 Q1-94	03/01/1994	160	NA	NA	NA	NA	694	NA	6.2	NA	601	NA
MW-01	MW-1 Q3-94	08/01/1994	162.5	0.0025 U	NA	NA	118.8	796	8.6	NA	41.1	545	32.3
MW-01	MW-1 Q3(Sept)-94	09/01/1994	165	0.0025 U	NA	NA	117.5	670	8.4	7	37.7	535	33.1
MW-01	MW-1 Q4(Nov)-94	11/01/1994	174	0.0025 U	NA	NA	116.9	840	8.4	7	49.2	525	39.4
MW-01	MW-1 Q4(Dec)-94	12/01/1994	210	0.0025 U	NA	NA	119.4	800	9	6.6	50	543	0.9
MW-01	MW-1 Q1-95	01/01/1995	172.2	0.0025 U	NA	NA	103.7	880	9.3	6.4	40.8	508	1.3
MW-01	MW-1 Q1(Feb)-95	02/01/1995	156	0.0025 U	NA	NA	99.4	870	9.1	7.2	38.7	527	0.655
MW-01	MW-1 Q3-95	07/01/1995	165	0.0025 U	NA	NA	119.4	840	9	6.3	54.7	397	0.73

TABLE D3
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City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Downgradient Wells Continued													
MW-01	MW-1 Q1(Sep)-95	09/20/1995	170	0.0025 U	NA	NA	120.7	830	9.9	6.2	53.7	586.8	NA
MW-01	MW-1 Q4-95	12/18/1995	180	0.0025 U	NA	NA	139.7	820	13.9	NA	46.5	608	3.34
MW-01	MW-1 Q1-96	02/01/1996	NA	NA	NA	NA	NA	750	NA	6.8	NA	NA	NA
MW-01	MW-1 Q2-96	05/01/1996	NA	NA	NA	NA	NA	740	NA	7.2	NA	NA	NA
MW-01	MW-1 Q3-96	09/01/1996	175	0.05 U	NA	NA	110	940	9.2	6.43	47	525	0.5 U
MW-01	MW-1 Q4-96	10/01/1996	171	0.05 U	NA	NA	130	960	9	7.2	49	582	0.5 U
MW-01	MW-1 Q1-97	03/24/1997	172	0.05 U	NA	NA	120	710	9.2	7.15	49	531	0.5 U
MW-01	MW-1 Q2-97	06/24/1997	166	0.05 U	NA	NA	110	720	9	6.62	110	560	0.5 U
MW-01	MW-1 Q3-97	09/11/1997	160	0.05 U	NA	NA	103	822	7.6	6.93	40.2	486	0.5 U
MW-01	MW-1 Q1-98	03/25/1998	150	0.05 U	NA	NA	103	548	NA	7.12	79	464	0.5 U
MW-01	MW-1 Q2-98	06/29/1998	165	0.05 U	NA	NA	119	642	9.1	7.3	45.5	523	0.5 U
MW-01	MW-1 Q3-98	09/21/1998	174	0.05 U	NA	NA	113	475	9.1	7.55	42.2	574	0.5 U
MW-01	MW-1 Q1-99	03/03/1999	161	0.05 U	NA	NA	104	384	8.5	7.34	39.3	475	0.5 U
MW-01	MW-1 Q2-99	06/14/1999	162	0.05 U	NA	NA	104	440	NA	7.29	39.4	1080	0.5 U
MW-01	MW-1 Q3-99	09/22/1999	156	0.05 U	NA	NA	95.1	409	8	7.01	36.6	468	0.5 U
MW-01	MW-1 Q4-99	12/09/1999	156	0.05 U	NA	NA	101	790	8.5	7.54	38.2	463	0.5 U
MW-01	MW-1 Q1-00	03/15/2000	150	NA	NA	NA	88.8	733	7.8	7.65	34.5	NA	NA
MW-01	MW-1 Q2-00	06/21/2000	152	0.05 U	NA	NA	97.6	746	8.3	7.85	35.7	476	0.5 U
MW-01	MW-1 Q3-00	09/27/2000	150	0.05 U	NA	NA	93.4	598	NA	8.03	NA	408	0.5 U
MW-01	MW-1 Q4-00	12/05/2000	154	0.05 U	NA	NA	93.6	567	8.3	8.07	38.4	472	0.5 U
MW-01	MW-1 Q1-01	03/27/2001	151	0.05 U	NA	NA	95.7	300	8	7.9	33.1	416	0.5 U
MW-01	MW-1 Q2-01	06/27/2001	156	0.05 U	NA	NA	90.1	320	9	7.51	34.9	438	0.7
MW-03	MW-3 Q1-91	01/01/1991	NA	0.05	NA	NA	74	525	7	NA	NA	NA	NA
MW-03	MW-3 Q2-91	04/01/1991	NA	0.05	NA	NA	107	750	9.14	NA	NA	NA	NA
MW-03	MW-3 Q3-91	07/01/1991	NA	0.05	NA	NA	100	750	8.46	NA	NA	NA	NA

TABLE D3
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Location	Sample ID	Sample Date (Parameter)	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Downgradient Wells Continued													
MW-03	MW-3 Q4-91	10/01/1991	NA	0.05	NA	NA	77	600	1.3	NA	NA	NA	NA
MW-03	MW-3 Q1-92	01/01/1992	NA	0.05	NA	NA	96.2	660	8.1	NA	NA	NA	NA
MW-03	MW-3 Q2-92	04/01/1992	NA	0.05	NA	NA	104.6	660	9.4	NA	NA	NA	NA
MW-03	MW-3 Q3-92	07/01/1992	NA	0.05	NA	NA	105.3	625	8.2	NA	NA	NA	NA
MW-03	MW-3 Q4-92	10/01/1992	NA	0.05	NA	NA	111.9	680	0.97	NA	NA	NA	NA
MW-03	MW-3 Q1-93	01/01/1993	NA	0.1 U	NA	NA	126.4	934	41.2	NA	NA	NA	NA
MW-03	MW-3 Q2-93	04/01/1993	NA	0.1 U	NA	NA	113.1	740	8.7	NA	NA	NA	NA
MW-03	MW-3 Q3-93	07/01/1993	NA	0.1 U	NA	NA	115.7	770	8.8	NA	NA	NA	NA
MW-03	MW-3 Q4-93	10/01/1993	NA	0.1 U	NA	NA	123.3	790	9.2	NA	NA	NA	NA
MW-03	MW-3 Q1-94	02/01/1994	NA	NA	NA	NA	6.9	NA	NA	NA	NA	NA	NA
MW-03	MW-3 Q1(Mar)-94	03/01/1994	190	NA	NA	NA	7.5	730	NA	7	NA	703	NA
MW-03	MW-3 Q3-94	08/01/1994	177.4	0.0025 U	NA	NA	127.5	918	9.1	NA	37.2	619	34.9
MW-03	MW-3 Q3(Sept)-94	09/01/1994	165	0.0025 U	NA	NA	131.2	710	8.9	7.2	33.6	608	32.2
MW-03	MW-3 Q4(Nov)-94	11/01/1994	170	0.0025 U	NA	NA	130.1	880	8.7	7	43.9	531	38.4
MW-03	MW-3 Q4(Dec)-94	12/01/1994	150	0.0025 U	NA	NA	129.6	850	9.4	7.1	44.1	539	1
MW-03	MW-3 Q1-95	01/01/1995	162.4	0.0025 U	NA	NA	111.3	830	9.5	6.7	35.1	489	0.7
MW-03	MW-3 Q1(Feb)-95	02/01/1995	144	0.0025 U	NA	NA	112.5	850	9.7	NA	35.4	546	0.624
MW-03	MW-3 Q3-95	07/01/1995	200	0.0025 U	NA	NA	153.6	950	10.4	6.3	54	626	1.11
MW-03	MW-3 Q4-95	12/18/1995	190	0.0025 U	NA	NA	154.2	853	14.9	NA	40.6	590	0.82
MW-03	MW-3 Q1-96	02/01/1996	NA	NA	NA	NA	NA	1320	NA	7.1	NA	NA	NA
MW-03	MW-3 Q2-96	05/01/1996	NA	NA	NA	NA	NA	780	NA	7.5	NA	NA	NA
MW-03	MW-3 Q3-96	09/01/1996	183	0.05 U	NA	NA	140	1040	10.2	NA	44	583	0.5 U
MW-03	MW-3 Q4-96	10/01/1996	179	0.1 U	NA	NA	160	1070	10	7.4	47	674	0.5 U
MW-03	MW-3 Q1-97	03/24/1997	185	0.05 U	NA	NA	150	834	11	7.08	49	586	0.5
MW-03	MW-3 Q2-97	06/24/1997	196	0.05 U	NA	NA	160	930	10	7.03	44	632	0.5 U

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City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Downgradient Wells Continued													
MW-03	MW-3 Q3-97	09/11/1997	153	0.05 U	NA	NA	124	830	8.4	7.99	39.2	528	0.5 U
MW-03	MW-3 Q4-97	11/25/1997	146	0.05 U	NA	NA	117	444	9.5	7.95	NA	416	0.5 U
MW-03	MW-3 Q1-98	03/25/1998	163	0.05 U	NA	NA	139	880	NA	7.72	39.4	480	0.5 U
MW-03	MW-3 Q2-98	06/29/1998	189	0.05 U	NA	NA	154	751	10.7	7.43	45.1	614	0.5 U
MW-03	MW-3 Q3-98	09/21/1998	195	0.05 U	NA	NA	156	539	10.7	7.49	41.8	656	0.7
MW-03	MW-3 Q4-98	12/30/1998	142	0.05 U	NA	NA	85.4	486	7.3	8.4	31	372	0.9
MW-03	MW-3 Q1-99	03/03/1999	138	0.05 U	NA	NA	86	285	7.1	8.7	28.9	365	0.5 U
MW-03	MW-3 Q2-99	06/14/1999	206	0.05 U	NA	NA	152	620	NA	7.46	41.2	696	0.5
MW-03	MW-3 Q3-99	09/22/1999	214	0.05 U	NA	NA	98.2	574	10.6	7.4	43.3	680	0.5 U
MW-03	MW-3 Q4-99	12/09/1999	225	0.05 U	NA	NA	154	928	10.3	8.28	41.9	593	0.5
MW-03	MW-3 Q1-00	03/15/2000	198	NA	NA	NA	154	986	10	7.72	39.9	NA	NA
MW-03	MW-3 Q2-00	06/21/2000	210	0.05 U	NA	NA	169	1048	10.7	7.73	42.9	600	0.5 U
MW-03	MW-3 Q3-00	09/27/2000	177	0.05 U	NA	NA	150	844	NA	8.04	NA	561	0.5 U
MW-03	MW-3 Q4-00	12/05/2000	196	0.05 U	NA	NA	138	708	9.8	7.9	40.2	612	0.5 U
MW-03	MW-3 Q1-01	03/27/2001	158	0.05 U	NA	NA	125	410	9.5	7.6	36.4	616	0.5 U
MW-03	MW-3 Q2-01	06/27/2001	206	0.05 U	NA	NA	155	410	10.9	7.5	39.1	620	0.6
MW-11	MW-11 Q1-95	03/01/1995	318	0.0025 U	401.1	NA	169.7	1262	13.3	7.44	50.9	845	75.97
MW-11	MW-11 Q1-95 Dup	03/01/1995	NA	NA	400.5	NA	NA	NA	NA	NA	NA	NA	NA
MW-11	MW-11 Q3-95	07/01/1995	335	0.0025 U	NA	NA	181.3	1320	11.4	6.2	54.7	814	1.6
MW-11	MW-11 Q3-95 Dup	07/01/1995	336	0.0025 U	NA	NA	179	1320	11.4	6.2	55	823	2.67
MW-11	MW-11 Q3(Sept)-95	09/20/1995	323	0.0025 U	280	NA	177.7	1320	12.9	6.3	54	816.7	NA
MW-11	MW-11 Q3(Sept)-95 Dup	09/20/1995	325	0.0025 U	280	NA	177.7	1320	12.8	6.3	54.3	793	NA
MW-11	MW-11 Q4-95	10/30/1995	360	0.0025 U	340	NA	NA	150	11.6	7.37	49.3	754.3	NA
MW-11	MW-11 Q4-95 Dup	10/30/1995	360	0.0025 U	340	NA	177.7	150	11.2	7.36	49.2	768	NA
MW-11	MW-11 Q4(Nov)-95	11/29/1995	310	0.0025 U	270	NA	174.5	124	15.5	NA	41.4	766.2	3.7

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City of Walla Walla Sudbury Road Landfill

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Downgradient Wells Continued													
MW-11	MW-11 Q4(Nov)-95 Dup	11/29/1995	330	0.0025 U	310	NA	186.4	123	16.5	NA	43.6	750.7	4.85
MW-11	MW-11 Q4(Dec)-95	12/18/1995	320	0.0025 U	280	NA	194.2	1172	17.6	NA	44.4	812	8.25
MW-11	MW-11 Q1-96	02/01/1996	NA	NA	NA	NA	NA	1290	NA	6.5	NA	NA	NA
MW-11	MW-11 Q2-96	05/01/1996	NA	NA	NA	NA	NA	840	NA	6.29	NA	NA	NA
MW-11	MW-11 Q3-96	09/01/1996	319	0.05 U	319	NA	170	1140	14	6.43	46	750	0.06
MW-11	MW-11 Q4-96	10/01/1996	308	0.05 U	398	NA	200	1145	12	6.5	48	860	0.5 U
MW-11	MW-11 Q1-97	03/24/1997	326	0.05 U	326	NA	200	1400	12	6.32	48	754	0.8
MW-11	MW-11 Q2-97	06/24/1997	321	0.05	321	NA	180	1200	11	6.52	43	786	0.5
MW-11	MW-11 Q3-97	09/11/1997	310	0.05 U	310	NA	182	1288	10.3	7.39	42.4	720	0.5 U
MW-11	MW-11 Q4-97	11/25/1997	327	0.05 U	NA	NA	192	1185	11.2	7.33	NA	788	0.5 U
MW-11	MW-11 Q1-98	03/25/1998	312	0.05 U	312	NA	182	810	NA	6.94	44.3	741	0.6
MW-11	MW-11 Q2-98	06/29/1998	324	0.05 U	324	NA	188	894	12	7.18	44.9	784	0.7
MW-11	MW-11 Q3-98	09/21/1998	336	0.05 U	NA	NA	183	1553	11.5	7.27	48.7	806	0.8
MW-11	MW-11 Q4-98	12/30/1998	318	0.05 U	318	NA	197	592	12.4	7.49	49.8	744	0.6
MW-11	MW-11 Q1-99	03/03/1999	312	0.05 U	312	NA	184	664	12.2	7.3	47.2	769	0.7
MW-11	MW-11 Q2-99	06/14/1999	316	0.05 U	316	NA	177	823	NA	7.2	47	773	0.8
MW-11	MW-11 Q3-99	09/22/1999	320	0.05 U	320	NA	168	603	11.4	7.1	41	804	0.6
MW-11	MW-11 Q4-99	12/09/1999	326	0.05 U	326	NA	190	603	12	7.4	46	745	0.8
MW-11	MW-11 Q1-00	03/15/2000	320	NA	320	NA	181	1392	11.1	7.57	43.4	NA	NA
MW-11	MW-11 Q2-00	06/21/2000	320	0.05 U	320	NA	190	1319	11.8	7.5	48	775	0.7
MW-11	MW-11 Q3-00	09/27/2000	307	0.05 U	307	NA	183	1317	NA	7.71	NA	726	0.6
MW-11	MW-11 Q4-00	12/05/2000	312	0.05 U	312	NA	182	1005	11.5	7.73	46.1	824	0.7
MW-11	MW-11 Q1-01	03/27/2001	314	0.05 U	314	NA	170	560	11.3	7.1	43.5	688	0.7
MW-11	MW-11 Q2-01	06/27/2001	310	0.05 U	310	NA	170	580	12.1	7.18	42.5	732	2.1
MW-11	MW-11 Q3-01	09/06/2001	314	0.05 U	314	NA	175	575	12.5	7.14	46.6	688	0.9

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Downgradient Wells Continued													
MW-11	MW-11 Q4-01	12/14/2001	322	0.05 U	322	NA	180	730	12.8	7.38	44.9	816	0.6
MW-11	MW-11 Q1-02	03/27/2002	312	0.05 U	312	NA	191	822	13	7.21	42.3	836	0.7
MW-11	MW-11 Q2-02	06/13/2002	291	0.05 U	291	NA	184	894	13.3	7.16	44.6	796	0.8
MW-11	MW-11 Q3-02	09/18/2002	320	0.05 U	320	NA	172	883	13.2	7.14	40.8	788	0.7
MW-11	MW-11 Q4-02	12/17/2002	320	0.05 U	320	NA	177	879	13	7.09	39	940	0.9
MW-11	MW-11 Q1-03	03/26/2003	313	0.05 U	320	NA	174	879	13	7.09	39	916	0.9
MW-11	MW-11 Q2-03	06/26/2003	316	0.05 U	316	NA	175	864	11	7.14	41	808	1
MW-11	MW-11 Q3-03	09/25/2003	310	0.05 U	310	NA	151	855	12.3	6.94	41	700	0.5 U
MW-11	MW-11 Q4-03	12/18/2003	304	0.05 U	304	NA	177	776	11	7.14	42	820	0.9
MW-11	MW-11 Q1-04	03/17/2004	307	0.05 U	307	NA	198	665	10	7.73	38	750	1.6
MW-11	MW-11 Q2-04	06/17/2004	311	0.05 U	311	NA	170	714	10.7	7.02	36.9	792	1
MW-11	MW-11 Q3-04	09/30/2004	310	0.05 U	310	NA	177	683	10.6	7.04	36.1	848	0.7
MW-11	MW-11 Q4-04	12/15/2004	304	0.05 U	304	NA	147	659	10.3	7.01	36.6	880	1
MW-11	MW-11 Q1-05	03/31/2005	302	0.05 U	302	2 U	151	NA	12.5	NA	44	700	0.6
MW-11	MW-11 Q2-05	06/23/2005	302	0.05 U	302	NA	150	NA	12.1	NA	39.2	705	0.8
MW-11	MW-11 Q3-05	09/29/2005	302	0.05 U	302	2 U	140	NA	11.9	NA	39.7	740	0.7
MW-11	MW-11 Q4-05	12/14/2005	296	0.05 U	296	NA	142	686	12.4	7.15	36	665	1.1
MW-11	MW-11 Q1-06	03/30/2006	318	0.05 U	318	NA	131	699	11.7	7.14	37.6	730	0.9
MW-11	MW-11 Q2-06	06/21/2006	301	0.05 U	301	NA	128	718	11.2	7	37.6	663	0.6
MW-11	MW-11 Q3-06	09/21/2006	296	0.05 U	296	NA	132	NA	11.3	NA	37.1	656	0.9
MW-11	MW-11 Q4-06	12/28/2006	294	0.05 U	294	NA	151	736	10.9	7.36	35.3	671	0.8
MW-11	MW-11 Q1-07	03/22/2007	310	0.05 U	310	NA	136	730	11.5	7.07	36.8	643	1
MW-11	MW-11 Q2-07	06/28/2007	294	0.05 U	294	NA	132	728	11.2	7.45	36.8	631	0.7
MW-11	MW-11 Q3-07	09/26/2007	286	0.05 U	286	NA	127	732	10.8	6.91	35.2	575	0.6
MW-11	MW-11 Q4-07	12/27/2007	287	0.05 U	287	NA	126	730	10.9	6.89	34.9	623	0.9

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Downgradient Wells Continued													
MW-11	MW-11 Q1-08	03/27/2008	288	0.05 U	288	NA	126	745	11.1	6.94	35.5	635	0.7
MW-11	MW-11 Q2-08	06/25/2008	282	0.05 U	282	NA	128	748	10.8	6.99	36.5	703	0.8
MW-11	MW-11 Q3-08	09/24/2008	284	0.05 U	284	NA	124	726	10.3	7.09	33.3	539	0.9
MW-11	MW-11 Q4-08	12/17/2008	286	0.05 U	NA	NA	99	735	NA	7.03	31	NA	0.8
MW-11	MW-11 Q1-09	03/20/2009	282	0.05 U	288	NA	117	717	10.9	7.14	33.7	608	0.6
MW-11	MW-11 Q2-09	06/24/2009	296	0.05 U	282	NA	113	639	10.8	7.26	34	593	0.8
MW-11	MW-11 Q3-09	09/24/2009	281	0.05 U	284	NA	110	649	10.7	7.1	33	599	0.79
MW-11	MW-11 Q4-09	12/18/2009	278	0.05 U	NA	NA	107	654	10.9	7.15	33.8	579	0.59
MW-11	MW-11 Q1-10	03/30/2010	288	0.05	NA	NA	102	NA	9.9	NA	32	557	0.51
MW-11	MW-11 Q2-10	06/23/2010	289	0.05 U	282	NA	80.3	719	10.6	6.67	34.2	573	0.88
MW-11	MW-11 Q3-10	09/29/2010	290	0.05 U	NA	NA	102	NA	10.4	NA	33.8	139	1.22
MW-11	MW-11 Q4-10	12/15/2010	288	0.05 U	NA	NA	101	716	9.51	6.71	31.8	515	0.83
MW-11	MW-11 Q1-2011	03/24/2011	286	0.05 U	NA	NA	101	NA	9.8	NA	33.9	540	0.5 U
MW-14	MW-14 Q3-99	09/22/1999	150	0.05 U	150	NA	109	280	7.5	7.36	44.1	538	0.5 U
MW-14	MW-14 Q4-99	12/09/1999	168	0.05 U	168	NA	110	584	8.1	8.12	45.5	485	0.5
MW-14	MW-14 Q1-00	03/15/2000	119	NA	119	NA	79.9	571	6.8	8.16	32.7	NA	NA
MW-14	MW-14 Q2-00	06/21/2000	117	0.05 U	117	NA	79.6	581	7	8.25	33.4	414	0.5 U
MW-14	MW-14 Q3-00	09/27/2000	111	0.05 U	111	NA	69.2	533	NA	8.58	NA	353	0.5 U
MW-14	MW-14 Q4-00	12/05/2000	108	0.05 U	108	NA	92.4	497	6.8	8.48	29.5	394	0.5 U
MW-14	MW-14 Q1-01	03/27/2001	112	0.05 U	112	NA	43.3	350	5.9	8.8	15.4	278	0.5 U
MW-14	MW-14 Q2-01	06/27/2001	112	0.05 U	112	NA	42.8	405	6.1	8.01	18.1	278	0.5 U
MW-14	MW-14 Q3-01	09/06/2001	118	0.05 U	118	NA	85.3	375	8	7.81	34.7	350	0.5 U
MW-14	MW-14 Q4-01	12/14/2001	134	0.05 U	134	NA	92	340	7.8	8.36	38.6	420	0.5 U
MW-14	MW-14 Q1-02	03/27/2002	124	0.05 U	124	NA	65.2	388	7.2	8.04	25	302	0.5 U
MW-14	MW-14 Q2-02	06/13/2002	103	0.05 U	106	NA	71.7	422	7.7	8.02	30.6	420	0.1 U

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Downgradient Wells Continued													
MW-14	MW-14 Q3-02	09/18/2002	129	0.05 U	129	NA	62.8	352	7.6	8.08	24.8	358	0.5 U
MW-14	MW-14 Q4-02	12/17/2002	117	0.05 U	117	NA	58	419	6.7	7.99	27	354	0.5 U
MW-14	MW-14 Q1-03	03/26/2003	120	0.05 U	117	NA	61	419	7	7.99	27	408	0.5 U
MW-14	MW-14 Q2-03	06/26/2003	136	0.05 U	136	NA	84	370	6	8.02	38	420	0.5 U
MW-14	MW-14 Q3-03	09/25/2003	110	0.05 U	110	NA	52	354	6	7.94	23	332	0.5 U
MW-14	MW-14 Q4-03	12/18/2003	140	0.05 U	140	NA	99	491	7	7.83	53	404	0.6
MW-14	MW-14 Q1-04	03/17/2004	136	0.05 U	136	NA	78	385	6.5	7.82	33	368	0.5 U
MW-14	MW-14 Q2-04	06/17/2004	132	0.05 U	132	NA	57.8	372	5.5	7.8	30.7	424	0.5 U
MW-14	MW-14 Q3-04	09/30/2004	136	0.05 U	136	NA	65.8	373	5.6	7.82	31.5	436	0.5 U
MW-14	MW-14 Q4-04	12/15/2004	131	0.05 U	131	NA	65.4	357	5.6	7.55	31.6	396	0.5 U
MW-14	MW-14 Q1-05	03/31/2005	148	0.05 U	148	2 U	79.1	NA	6.7	NA	46.2	408	0.5 U
MW-14	MW-14 Q2-05	06/23/2005	115	0.08	115	NA	40.5	NA	5.3	NA	18.5	252	0.5 U
MW-14	MW-14 Q3-05	09/29/2005	122	0.05 U	122	2 U	44.8	NA	5.4	NA	23.2	344	0.5 U
MW-14	MW-14 Q4-05	12/14/2005	131	0.05 U	131	NA	44.8	374	5.6	7.69	23.4	336	0.5 U
MW-14	MW-14 Q1-06	03/30/2006	157	0.05 U	157	NA	59.3	345	5.9	7.75	37.7	376	0.5 U
MW-14	MW-14 Q3-06	09/21/2006	127	0.05 U	127	NA	43.6	NA	6	NA	22.3	313	0.5 U
MW-14	MW-14 Q4-06	12/28/2006	123	0.05 U	123	NA	49.8	487	6.3	7.48	26.5	345	0.5 U
MW-14	MW-14 Q1-07	03/22/2007	156	0.05 U	156	NA	81.7	430	6.2	8.03	48.3	458	0.6
MW-14	MW-14 Q2-07	06/28/2007	127	0.05 U	127	NA	42.1	374	5.1	7.85	23.2	287	0.5 U
MW-14	MW-14 Q3-07	09/26/2007	134	0.05 U	134	NA	36.9	415	5.4	7.23	19.9	259	0.5 U
MW-14	MW-14 Q4-07	12/27/2007	148	0.05 U	148	NA	41.8	415	5.8	7.33	23.9	322	0.5 U
MW-14	MW-14 Q1-08	03/27/2008	168	0.05 U	168	NA	58	488	6.4	7.59	33.7	364	0.5
MW-14	MW-14 Q2-08	06/25/2008	138	0.05 U	138	NA	38.9	425	5.4	7.23	20.6	345	0.5 U
MW-14	MW-14 Q3-08	09/24/2008	142	0.05 U	142	NA	38.1	462	5.9	7.35	22.5	284	0.6
MW-14	MW-14 Q4-08	12/17/2008	146	0.05 U	NA	NA	52	502	NA	7.68	28.6	NA	0.5 U

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Downgradient Wells Continued													
MW-14	MW-14 Q1-09	03/20/2009	136	0.05 U	168	NA	42.8	504	5.6	7.29	22.2	304	0.5 U
MW-14	MW-14 Q2-09	06/24/2009	164	0.05 U	138	NA	53.3	382	6.4	7.58	27.9	373	0.5 U
MW-14	MW-14 Q3-09	09/24/2009	152	0.05 U	142	NA	52.5	415	6.24	7.78	27.1	354	5 U
MW-14	MW-14 Q4-09	12/18/2009	152	0.05 U	NA	NA	72.7	448	6.62	7.46	46.9	427	0.5 U
MW-14	MW-14 Q1-10	03/30/2010	166	0.05	NA	NA	52.2	NA	6.78	NA	28.3	334	0.5
MW-14	MW-14 Q2-10	06/23/2010	165	0.05 U	138	NA	78.7	448	7.81	7.21	44.3	428	0.5 U
MW-14	MW-14 Q3-10	09/29/2010	151	0.05 U	NA	NA	54	NA	5.1	NA	25.9	677	0.65
MW-14	MW-14 Q4-10	12/15/2010	151	0.05 U	NA	NA	49.8	512	4.86	7.38	22.2	121	0.5 U
MW-14	MW-14 Q1-2011	03/24/2011	160	0.05 U	NA	NA	77	NA	5.8	NA	38.1	437	0.5 U
MW-15	MW-15 Q3-01	09/06/2001	648	0.05 U	648	NA	105	415	9.5	7.55	44.8	992	1.7
MW-15	MW-15 Q4-01	12/14/2001	568	0.05 U	568	NA	116	360	9.3	7.35	43.4	924	1.3
MW-15	MW-15 Q1-02	03/27/2002	570	0.05 U	570	NA	114	985	9.6	7.04	44	856	1
MW-15	MW-15 Q2-02	06/13/2002	613	0.05 U	613	NA	99.2	1053	9.3	7.03	47	1060	1.2
MW-15	MW-15 Q3-02	09/18/2002	658	0.05 U	658	NA	109	1046	9.6	7.02	42.1	868	2.2
MW-15	MW-15 Q4-02	12/17/2002	598	0.05 U	598	NA	120	1012	10	7.07	41	812	1.6
MW-15	MW-15 Q1-03	03/26/2003	634	0.05 U	598	NA	274 J	1012	9	7.07	43	936	2
MW-15	MW-15 Q2-03	06/26/2003	658	0.05 U	658	NA	117	1012	7	6.95	44	980	2.4
MW-15	MW-15 Q3-03	09/25/2003	618	0.05 U	618	NA	99	1049	8	6.97	41	890	0.9
MW-15	MW-15 Q4-03	12/18/2003	593	0.05 U	593	NA	115	902	8	7.02	45	940	2.2
MW-15	MW-15 Q1-04	03/17/2004	513	0.05 U	513	NA	145	761	8.7	7.01	42	920	1.8
MW-15	MW-15 Q2-04	06/17/2004	564	0.05 U	564	NA	113	818	7.1	6.9	39.3	820	2.1
MW-15	MW-15 Q3-04	09/30/2004	566	0.05 U	566	NA	133	782	7.3	6.9	38.6	880	1.7
MW-15	MW-15 Q4-04	12/15/2004	520	0.05 U	520	NA	130	780	7.8	6.8	39.6	915	1.5
MW-15	MW-15 Q1-05	03/31/2005	716	0.05 U	716	2 U	101	NA	7.7	NA	49	965	2.1
MW-15	MW-15 Q2-05	06/23/2005	94	0.19	94	NA	132	NA	8.1	NA	42.9	945	2.4

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)
Downgradient Wells Continued													
MW-15	MW-15 Q3-05	09/29/2005	532	0.05 U	532	2 U	125	NA	8.2	NA	44.9	890	1.6
MW-15	MW-15 Q4-05	12/14/2005	502	0.05 U	502	NA	131	820	8.8	7.05	39.8	875	1.7
MW-15	MW-15 Q1-06	03/30/2006	64	0.05 U	64	NA	111	859	7.5	7	45.6	898	1.7
MW-15	MW-15 Q2-06	06/21/2006	528	0.05 U	528	NA	124	876	7.7	7	45	880	1.5
MW-15	MW-15 Q3(Sept)-06	09/21/2006	582	0.05 U	582	NA	128	NA	8.1	NA	45.1	905	1.6
MW-15	MW-15 Q4-06	12/28/2006	628	0.05 U	628	NA	107	969	7.3	7.02	43.6	931	2.5
MW-15	MW-15 Q1-07	03/22/2007	606	0.05 U	606	NA	133	935	8.9	7.04	43.4	853	2
MW-15	MW-15 Q2-07	06/28/2007	555	0.05 U	555	NA	133	947	7.6	6.99	46.6	885	1.5
MW-15	MW-15 Q3-07	09/26/2007	586	0.05 U	586	NA	115	945	7.2	6.93	43.4	924	1.9
MW-15	MW-15 Q4-07	12/27/2007	557	0.05 U	557	NA	133	943	9.2	6.9	39.9	855	2
MW-15	MW-15 Q1-08	03/27/2008	498	0.05 U	498	NA	148	952	10	6.98	41.1	812	1.3
MW-15	MW-15 Q2-08	06/25/2008	512	0.05 U	512	NA	144	961	9.1	6.98	39.8	820	1.5
MW-15	MW-15 Q3-08	09/24/2008	488	0.05 U	488	NA	132	949	9.9	7.04	40.6	777	1.9
MW-15	MW-15 Q4-08	12/17/2008	475	0.05 U	NA	NA	147	946	NA	7.14	42.1	NA	1.3
MW-15	MW-15 Q1-09	03/20/2009	467	0.05 U	498	NA	151	947	9.3	7.11	42.6	824	1.1
MW-15	MW-15 Q2-09	06/24/2009	507	0.05 U	512	NA	141	826	9.9	7.26	39	856	1.3
MW-15	MW-15 Q3-09	09/24/2009	489	0.05 U	488	NA	140	851	7.5	7.12	38.3	861	1.63
MW-15	MW-15 Q4-09	12/18/2009	447	0.05 U	NA	NA	138	877	8.91	7.27	44.5	857	1.01
MW-15	MW-15 Q1-10	03/30/2010	490	0.05	NA	NA	138	NA	8.2	NA	42.4	796	1.06
MW-15	MW-15 Q2-10	06/23/2010	472	0.05 U	512	NA	144	1002	9.01	6.59	45.4	837	1.22
MW-15	MW-15 Q3-10	09/29/2010	467	0.05 U	NA	NA	144	NA	9.17	NA	44	488	1.81
MW-15	MW-15 Q4-10	12/15/2010	488	0.05 U	NA	NA	139	1005	8.12	6.76	42.7	837	1.43
MW-15	MW-15 Q1-2011	03/24/2011	499	0.05 U	NA	NA	136	NA	8.18	NA	44.8	860	1.57
MW-16	MW-16 Q3-05	09/01/2005	541	NA	NA	NA	185	NA	11.6	NA	45.1	NA	NA
MW-16	MW-16 Q2-06	06/21/2006	256	0.05 U	256	NA	130	690	9.5	7.23	42.6	618	0.6
MW-16	MW-16 Q3(Sept)-06	09/21/2006	262	0.05 U	262	NA	163	NA	9.9	NA	42.1	671	0.5

TABLE D3
SUMMARY OF CONVENTIONAL GROUNDWATER CHEMISTRY DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date (Parameter)	Alkalinity (mg/L)	Ammonia (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Chloride (mg/L)	Conductivity (uohm/cm)	Nitrate (mg/L)	pH (std pH units)	Sulfate (mg/L)	Total Dissolved Solids (mg/L)	Total Organic Carbon (mg/L)

Notes:

Only samples that were tested for at least one Conventional Analyte appear in this Table. See Table D.1 for an complete Analytical Schedule by sample.

J Analyte was detected, the result is an estimated value.

U Analyte was not detected at the given reporting limit.

NA Not analyzed

TABLE D4
SUMMARY OF METALS GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Calcium (mg/L)	Cyanide (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)
Upgradient Wells																									
MW-05	MW-5 Q1-91	03/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.39	NA	0.005	NA	NA
MW-05	MW-5 Q2-91	06/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01	NA	0.005	NA	NA
MW-05	MW-5 Q3-91	09/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.76	NA	0.005	NA	NA
MW-05	MW-5 Q4-91	12/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.17	NA	0.025	NA	NA
MW-05	MW-5 Q1-92	03/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.18	NA	0.0005	NA	NA
MW-05	MW-5 Q2-92	06/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.69	NA	0.0005	NA	NA
MW-05	MW-5 Q3-92	09/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.46	NA	0.006	NA	NA
MW-05	MW-5 Q4-92	12/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.94	NA	0.0005	NA	NA
MW-05	MW-5 Q1-93	03/30/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.96	NA	0.001	NA	NA
MW-05	MW-5 Q2(Jun)-93	06/14/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.262	NA	0.003 U	NA	NA
MW-05	MW-5 Q3-93	09/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.086	NA	0.003 U	NA	NA
MW-05	MW-5 Q4- 93	12/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.433	NA	0.003 U	NA	NA
MW-05	MW-5 Q2-94	04/01/1994	NA	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-05	MW-5 Q3-94	08/01/1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	68.5	NA	NA	33.4	NA	9.3	14.4
MW-05	MW-5 Q3(Sept)-94	09/01/1994	10 U	0.01 U	NA	2E-04 U	2 U	9.4	0.005 U	3.5	2 U	NA	0.5 U	5 U	5 U	0.002 U	0.013	231.6	66.7	NA	0.0137	22.4	NA	6.4	13.1
MW-05	MW-5 Q4-94	10/01/1994	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-05	MW-5 Q4(Nov)-94	11/01/1994	10 U	0.01 U	NA	2E-04 U	2 U	6.3	0.005 U	2 U	2 U	NA	0.5 U	5 U	5 U	0.002 U	0.011	158.8	61.7	NA	0.0091	31.7	NA	7.5	15.7
MW-05	MW-5 Q4(Dec)-94	12/01/1994	10 U	0.01 U	NA	2E-04 U	2 U	5.7	0.005 U	2 U	2 U	NA	0.5 U	5 U	5 U	0.002 U	0.012	259.7	74.1	NA	0.0219	19.4	NA	6.5	13.7
MW-05	MW-5 Q1-95	01/01/1995	10 U	10 U	130	2 U	2 U	13	10 U	2.01	2 U	NA	0.5 U	5 U	5 U	2 U	19	293.4	95.1	NA	0.0177	34.6	10 U	7.4	22.9
MW-05	MW-5 Q1(Feb)-95	02/01/1995	5 U	10 U	290	2 U	2 U	10 U	10 U	20 U	2 U	NA	0.04 U	5 U	10 U	2 U	49	580	48.3	NA	0.33	19.4	10 U	6.5	13.1
MW-05	MW-5 Q4(Dec)-95	12/20/1995	0.02	0.5 U	93.8	0.02 U	0.03	0.7	0.2	1.85	1.41	NA	1.7	5 U	0.02 U	0.02 U	10.5	188	141.2	NA	238	48.7	0.00141	7.4	35.8
MW-05	MW-5 Q2-96	05/01/1996	0.03	0.5 U	81.1	5 U	0.07	0.5	0.38	1.1	0.52	NA	4.3	5 U	0.11	0.02 U	10.2	150	NA	NA	NA	NA	NA	NA	NA
MW-05	MW-5 Q3-96	09/01/1996	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	81.6	NA	0.176	35.8	0.005 U	6.9	22.1
MW-05	MW-5 Q4-96	10/01/1996	50 U	5 U	64	0.02 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	312	89.7	NA	0.135	38.6	0.005 U	9.07	22.9
MW-05	MW-5 Q1-97	03/24/1997	50 U	5 U	63	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	101	78.8	NA	0.05	35	0.005 U	6.87	19.6
MW-05	MW-5 Q2-97	06/24/1997	50 U	5 U	66	5 U	4 U	5 U	10 U	10 U	6	NA	20 U	5 U	10 U	5 U	14	393	75.2	NA	1.36	32.8	0.007	7.1	20.5
MW-05	MW-5 Q3-97	09/11/1997	50 U	5 U	65	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	212	74.7	NA	0.115	32.7	0.005 U	6.86	20.6
MW-05	MW-5 Q4-97	11/25/1997	50 U	5 U	5 U	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	215	70.6	NA	0.164	31.1	0.005 U	6.4	19.6
MW-05	MW-5 Q1-98	03/25/1998	50 U	5 U	59	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	206	73	NA	0.314	31.2	0.005 U	6.7	18.7
MW-05	MW-5 Q3-98	09/21/1998	0.04 U	1 U	58.4	0.04 U	0.2	0.6	0.4	0.8	0.79	NA	8.4	5 U	0.04 U	0.04 U	10.4	196	70	NA	0.171	31.4	0.00128	7.6	17.4
MW-05	MW-5 Q4-98	12/30/1998	50 U	5 U	58	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	275	77.2	NA	1.32	32.6	0.008	7	16.8
MW-05	MW-5 Q1-99	03/03/1999	50 U	5 U	55	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	185	72.5	NA	0.239	32.1	0.005 U	6.38	15.5
MW-05	MW-5 Q2-99	06/14/1999	0.02 U	2.4	58.2	0.02 U	0.03	5.3	0.5	0.8	5.7	NA	6.9	15	0.02 U	0.03	10.9	371	73.1	NA	0.464	31.4	0.005 U	7.78	15.5
MW-07	SLF-MW-07-GW-110510	11/05/2010	NA	3 U	NA	NA	4 U	10 U	NA	10 U	1 U	0.5 U	NA	NA	NA	NA	NA	NA	15	NA	NA	NA	0.01 U	NA	6.3
MW-07	SLF-MW-07-GW-021011	02/10/2011	NA	3 U	NA	NA	4 U	10 U	NA	10 U	1 U	0.5 U	NA	NA	NA	NA	NA	NA	14	NA	NA	NA	0.011 U	NA	6.4
MW-09	SLF-MW-09-GW-110410	11/04/2010	NA	3.3 U	NA	NA	4.4 U	11 U	NA	11 U	6.6	0.5 U	NA	NA	NA	NA	NA	NA	88	NA	NA	NA	0.012	NA	34
MW-09	SLF-MW-09-GW-021011	02/10/2011	NA	3 U	NA	NA	4 U	10 U	NA	10 U	1 U	0.5 U	NA	NA	NA	NA	NA	NA	90	NA	NA	NA	0.011 U	NA	35
MW-10	SLF-MW-10-GW-110410	11/04/2010	NA	3 U	NA	NA	4 U	10 U	NA	10 U	1 U	0.5 U	NA	NA	NA	NA	NA	NA	48	NA	NA	NA	0.01 U	NA	16
MW-10	SLF-MW-10-GW-021011	02/10/2011	NA	3 U	NA	NA	4 U	10 U	NA	10 U	1 U	0.5 U	NA	NA	NA	NA	NA	NA	45	NA	NA	NA	0.011 U	NA	17
MW-12	MW-12 Q1-95	03/01/1995	5 U	10 U	410	2 U	4	10 U	10 U	20 U	2 U	NA	0.04 U	5 U	10 U	2 U	36	NA	52.7	NA	380	34.5	0.172	10.1	6.3
MW-12	MW-12 Q3-95	07/01/1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	5 U	NA	NA	30 U	140.5	NA	NA	58.6	NA	10.4	65
MW-12	MW-12 Q3(Sept)-95	09/20/1995	0.1	0.7	93.1	0.02 U	0.44	1.4	1.69	2.81	0.05	NA	13.2	5 U	0.04	0.02 U	9.4	6.9	76.6	NA	0.039	50.4	0.0994	9.2	61.2
MW-12	MW-12 Q4t-95	10/30/1995	0.1	0.6	97.9	0.07	0.31	5.5	4.1	2.93	0.05	NA	66.3	5 U	0.02 U	0.02 U	10.8	5.5	143.1	NA	0.039	59.5	0.109	8.5	45.1

TABLE D4
SUMMARY OF METALS GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Calcium (mg/L)	Cyanide (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)
Upgradient Wells Continued																									
MW-12	MW-12 Q4(Nov)-95	11/29/1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	109.5	NA	NA	62.2	NA	9.3	72
MW-12	MW-12 Q4(Dec)-95	12/20/1995	0.12	0.5 U	106	0.03	0.15	9.9	3.97	5.6	1.35	NA	35.1	5 U	0.02 U	0.02 U	13.6	5.5	160.7	NA	3.29	69.8	0.0978	9.3	75.1
MW-12	MW-12 Q1-96	02/01/1996	0.22	0.5 U	90.3	0.02 U	0.13	4.4	7.58	2.15	0.03	NA	175	5 U	0.02 U	0.02 U	10.1	3.3	NA	NA	0.039	NA	0.073	NA	NA
MW-12	MW-12 Q2-96	05/29/1996	0.62	0.7	98	0.02 U	0.21	1.7	5.29	2.9	0.22	NA	12.7	5 U	0.35	0.02 U	10.2	33.1	NA	NA	0.041	NA	0.0275	NA	NA
MW-12	MW-12 Q3-96	09/01/1996	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	125	NA	2.33	56.8	0.046	9.1	59.9
MW-12	MW-12 Q4-96	10/01/1996	50 U	5 U	84	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	127	NA	2.32	58	0.062	8.7	59.2
MW-12	MW-12 Q1-97	03/24/1997	50 U	5 U	90	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	128	NA	3.49	59.3	0.08	9.47	59.6
MW-12	MW-12 Q2-97	06/24/1997	50 U	5 U	102	5 U	4 U	8	10 U	10 U	2 U	NA	26	5 U	10 U	22	18	10 U	130	NA	4.29	60.6	0.099	9.9	60.9
MW-12	MW-12 Q3-97	09/11/1997	50 U	5 U	96	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	132	NA	2.03	60.2	0.065	9.73	59.3
MW-12	MW-12 Q4-97	11/25/1997	50 U	5 U	144	5 U	4 U	25	16	42	5	NA	46	5 U	10 U	5 U	58	46	119	NA	7.39	54.7	0.161	10.7	58.4
MW-12	MW-12 Q1-98	03/25/1998	50 U	5 U	88	5 U	4 U	8	10 U	10 U	2 U	NA	24	5 U	10 U	5 U	13	10 U	125	NA	0.854	55.8	0.029	10.2	57.8
MW-12	MW-12 Q2-98	06/29/1998	50 U	5 U	102	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	10 U	10 U	124	NA	1.49	57.2	0.027	7.9	58.2
MW-12	MW-12 Q3-98	09/21/1998	0.13	1 U	100	0.05	0.3	21.7	3.21	2.5	0.62	NA	46.4	5 U	0.04 U	0.04 U	14.2	3	126	NA	3.78	58.9	0.032	10.5	57.1
MW-12	MW-12 Q4-98	12/30/1998	50 U	5 U	89	5 U	4 U	5 U	10 U	10 U	2 U	NA	67	5 U	10 U	5 U	14	3 U	135	NA	2.09	59.4	0.054	10.3	56.2
MW-12	MW-12 Q1-99	03/03/1999	50 U	5 U	83	5 U	4 U	5 U	10 U	10 U	2 U	NA	41	5 U	10 U	5 U	12	10 U	130	NA	3.9	59.9	0.097	9.34	54.3
MW-12	MW-12 Q2-99	06/14/1999	0.1	3.6	92	0.03	0.04	18.1	2.55	2.5	6.94	NA	53.3	24	0.02 U	0.03	12.8	1.24	124	NA	1.38	55.9	0.043	10.2	52.7
MW-12	MW-12 Q3-99	09/22/1999	50 U	5 U	83	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	137	NA	35.1	61	0.567	10.2	55.4
MW-12	MW-12 Q4-99	12/09/1999	50 U	5 U	90	5 U	4 U	5 U	10 U	10 U	2 U	NA	41	5 U	10 U	5 U	16	10 U	137	NA	9.18	62	0.167	11	55.8
MW-12	MW-12 Q1-00	03/15/2000	50 U	10 U	80	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	132	NA	4.02	62.2	0.071	8.8	57.8
MW-12	MW-12 Q2-00	06/21/2000	50 U	5 U	84	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	122	NA	5.93	55.8	0.1	8.7	49.3
MW-12	MW-12 Q3-00	09/27/2000	50 U	5 U	80	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	122	NA	1.53	56.6	0.026	8.2	49.7
MW-12	MW-12 Q4-00	12/05/2000	50 U	5 U	87	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	121	NA	1.87	58.4	0.033	9	52.4
MW-12	MW-12 Q1-01	03/27/2001	50 U	5 U	94	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	18	10 U	136	NA	0.942	62.1	0.018	8.63	53.2
MW-12	MW-12 Q2-01	06/27/2001	50 U	5 U	85	5 U	4 U	5 U	26	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	135	NA	2.47	62	0.05	8.3	51.2
MW-12	MW-12 Q3-01	09/06/2001	50 U	5 U	82	5 U	5 U	5 U	11	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	133	NA	1.49	61.2	0.031	9.36	50.1
MW-12	MW-12 Q4-01	12/14/2001	50 U	5 U	88.5	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	15.9	10 U	133	NA	0.652	61.3	0.0195	9.24	50.4
MW-12	MW-12 Q1-02	03/27/2002	50 U	5 U	85.4	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	12	10 U	131	NA	0.884	61.9	0.0197	8.82	49.2
MW-12	MW-12 Q2-02	06/13/2002	50 U	5 U	89	5 U	5 U	6	19	10 U	2 U	NA	20 U	10 U	10 U	5 U	20	10 U	131	NA	1.2	62.4	0.0228	9.67	50.8
MW-12	MW-12 Q3-02	09/18/2002	50 U	5 U	84.6	5 U	5 U	5 U	17	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	124	NA	1.24	58.4	0.0251	8.63	47.1
MW-12	MW-12 Q4-02	12/17/2002	50 U	5 U	83.4	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	12.7	10 U	124	NA	0.423	60.2	0.0086	8.41	47.9
MW-12	MW-12 Q1-03	03/26/2003	50 U	5 U	80.2	5 U	5 U	8	30	10 U	2 U	NA	20 U	10 U	10 U	5 U	13	10 U	122	0.01 U	5.53	57.2	0.0952	8.54	45.2
MW-12	MW-12 Q2-03	06/26/2003	50 U	5 U	78	5 U	5 U	6.6	12	10 U	2 U	NA	20 U	10 U	10 U	5 U	17	10 U	127	0.01 U	0.382	56	0.0085	7.63	43.5
MW-12	MW-12 Q3-03	09/25/2003	50 U	5 U	72	5 U	5 U	7.1	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	11	10 U	123	0.01 U	0.173	55.5	0.0074	7.97	42.8
MW-12	MW-12 Q4-03	12/18/2003	50 U	8 U	75	5 U	5 U	7.6	11	10 U	2 U	NA	20 U	8 U	10 U	5 U	14	10 U	127	0.01 U	0.131	55.4	0.005 U	8.32	44.1
MW-12	MW-12 Q1-04	03/17/2004	50 U	5 U	78	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13.2	10 U	127	NA	0.16	58.7	0.005 U	9.19	44.1
MW-12	MW-12 Q2-04	06/17/2004	50 U	5 U	75.3	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	14	10 U	124	NA	0.603	60.5	0.0106	9.19	45.2
MW-12	MW-12 Q3-04	09/30/2004	50 U	5 U	81.9	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	16	10 U	130	NA	0.604	59.2	0.0132	8.44	44.5
MW-12	MW-12 Q4-04	12/15/2004	50 U	5 U	78.8	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15.5	10 U	125	NA	0.182	58.1	0.005 U	8.65	42.7
MW-12	MW-12 Q1-05	03/31/2005	50 U	5 U	79	5 U	5 U	5 U	26	10 U	2 U	NA	20 U	10 U	10 U	5 U	16	10 U	127	NA	1.92	58.4	0.0447	7.67	43.7
MW-12	MW-12 Q2-05	06/23/2005	50 U	5 U	82	5 U	5 U	5 U	14	10 U	4 U	NA	20 U	5 U	10 U	5 U	12	10 U	126	NA	0.443	58.1	0.012	8.82	43.2
MW-12	MW-12 Q3-05	09/29/2005	50 U	5 U	80.6	5 U	5 U	5 U	88	10 U	2 U	NA	20 U	5 U	10 U	5 U	10	10 U	12.8	NA	1.32	60.7	0.0249	8.4	46.6
MW-12	MW-12 Q1-06	03/30/2006	50 U	5 U	76.5	5 U	5 U	5 U	107	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	143	NA	4.59	58.8	0.091	9.65	42
MW-12	MW-12 Q2-06	06/21/2006	50 U	5 U	90.6	5 U	5 U	5 U	189	15	2 U	NA	37	5 U	10 U	5 U	17	10 U	138	NA	0.287	63.6	0.0277	9.31	45.6

TABLE D4
SUMMARY OF METALS GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Calcium (mg/L)	Cyanide (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)
Upgradient Wells Continued																									
MW-12	MW-12 Q3-06	09/21/2006	50 U	5 U	86.3	5 U	5 U	5 U	85	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	132	NA	0.738	60.1	0.018	9.2	43.5
MW-12	MW-12 Q3-07	09/26/2007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	123	NA	7.98	57.7	0.19	9.1	43.3
MW-12b	MW-12b Q3-08	09/24/2008	50 U	5 U	86.5	5 U	5 U	5 U	10 U	10 U	10 U	NA	20 U	5 U	10 U	5 U	14	10 U	111	NA	0.228	52.3	0.0053	8.11	29.5
MW-12b	MW-12b Q4-08	12/17/2008	50 U	5 U	73	5 U	5 U	5 U	10 U	10 U	10 U	NA	20 U	5 U	10 U	5 U	12	10 U	112	NA	0.093	52.7	0.005 U	7.96	30.8
MW-12b	MW-12b Q1-09	03/20/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	120	NA	0.088	55.3	0.005 U	8.46	33.5
MW-12b	MW-12b Q2-09	06/24/2009	50 U	5 U	86.1	5 U	5 U	5 U	10 U	10 U	10 U	NA	20 U	5 U	10 U	5 U	14	10 U	118	NA	0.0448	54.7	0.005 U	8.14	33.4
MW-12b	MW-12b Q3-09	09/24/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	118	NA	0.024	54	0.005 U	8.14	34.2
MW-12b	MW-12b Q4-09	12/18/2009	50 U	5 U	85.2	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13.6	10 U	120	NA	0.0362	56.7	0.005 U	8.4	35.4
MW-12b	MW-12b Q2-10	06/23/2010	50 U	5 U	84.5	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	4 U	10 U	5 U	15	10 U	117	NA	5.71	52.4	0.0835	8.66	32.7
MW-12b	MW-12b Q3-10	09/29/2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	117	NA	0.235	54.6	0.005 U	8.33	33.5
MW-12b	MW-12b Q4-10	12/15/2010	50 U	5 U	71.6	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	117	NA	0.101	53.1	0.005 U	8.1	33.2
MW-12b	MW-12b Q1-2011	03/24/2011	50 U	5 U	79.2	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	14.5	10 U	113	NA	0.2	52	0.005 U	7.77	32.6
Downgradient Wells																									
MW-01	MW-1 Q1-91	01/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.9	NA	0.005	NA	NA
MW-01	MW-1 Q2-91	04/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02	NA	0.005	NA	NA
MW-01	MW-1 Q3-91	07/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.69	NA	0.04	NA	NA
MW-01	MW-1 Q4-91	10/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.16	NA	0.05	NA	NA
MW-01	MW-1 Q1-92	01/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.025	NA	0.001	NA	NA
MW-01	MW-1 Q2-92	04/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.48	NA	0.001	NA	NA
MW-01	MW-1 Q3-92	07/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.38	NA	0.001	NA	NA
MW-01	MW-1 Q4-92	10/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.12	NA	0.001	NA	NA
MW-01	MW-1 Q1-93	01/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.2	NA	0.006	NA	NA
MW-01	MW-1 Q2-93	04/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.438	NA	0.014	NA	NA
MW-01	MW-1 Q3-93	07/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.096	NA	0.0003 U	NA	NA
MW-01	MW-1 Q4-93	10/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.432	NA	0.001	NA	NA
MW-01	MW-1 Q2-94	04/01/1994	NA	7.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-01	MW-1 Q3-94	08/01/1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	82.5	NA	NA	43.8	NA	6.6	13.3
MW-01	MW-1 Q3(Sept)-94	09/01/1994	10 U	0.01 U	NA	0.002 U	2 U	9.8	0.005 U	2 U	2 U	NA	50 U	5 U	5 U	0.002 U	0.015 U	80 U	86.7	NA	NA	40.2	NA	7	11.1
MW-01	MW-1 Q4-94	10/01/1994	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-01	MW-1 Q4(Nov)-94	11/01/1994	10 U	0.01 U	NA	0.002 U	2 U	9.9	0.005 U	2 U	2 U	NA	50 U	5 U	5 U	0.002 U	0.016	80 U	72.8	NA	0.005 U	38.3	NA	7.6	11.8
MW-01	MW-1 Q4(Dec)-94	12/01/1994	10 U	0.01 U	NA	0.002 U	2 U	8.5	0.005 U	2 U	2 U	NA	50 U	5 U	5 U	0.002 U	0.012	80 U	81.6	NA	0.005 U	36	NA	6.7	12.8
MW-01	MW-1 Q1-95	01/01/1995	10 U	10 U	220	2 U	2 U	12.4	10 U	2.8	2 U	NA	50 U	5 U	10 U	2 U	12	80 U	70.8	NA	0.005 U	29.3	0.001 U	10.3	52.4
MW-01	MW-1 Q1(Feb)-95	02/01/1995	5 U	10 U	380	2 U	2 U	10 U	10 U	20 U	2 U	NA	40 U	5 U	5 U	2 U	55	50 U	51.1	NA	0.08	19.9	0.001 U	6.3	9.2
MW-01	MW-1 Q3-95	07/01/1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	5 U	NA	NA	30 U	82.9	NA	NA	37	NA	7.5	13.5
MW-01	MW-1 Q1(Sep)-95	09/20/1995	0.04	0.5 U	61	0.02 U	0.08	0.7	0.42	0.72	0.12	NA	6.6	5 U	0.06	0.02 U	10.6	11.4	58.8	NA	0.027	86.2	0.00016	6.5	12.7
MW-01	MW-1 Q4-95	12/18/1995	0.04	0.5 U	65.8	0.02 U	0.08	1.4	0.16	1.97	0.28	NA	1.6	5 U	0.02 U	0.02 U	12.8	5.2	114.2	NA	0.079	42.5	0.00099	6.43	14.99
MW-01	MW-1 Q1-96	02/01/1996	0.02 U	0.5	61.7	0.02 U	0.07	2.5	0.14	1.55	0.06	NA	1.7	5 U	0.02 U	0.02 U	13.2	5.7	NA	NA	0.027	NA	0.00012	NA	NA
MW-01	MW-1 Q2-96	05/01/1996	0.02 U	0.6	63.9	0.02 U	0.16	0.8	0.36	1.3	0.17	NA	4.3	5 U	0.1	0.02 U	12	10.7	NA	NA	NA	NA	NA	NA	NA
MW-01	MW-1 Q3-96	09/01/1996	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	90.2	NA	0.052	41.6	0.005 U	7	12.5
MW-01	MW-1 Q4-96	10/01/1996	0.5 U	5	57	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10	89.7	NA	0.071	41.2	0.005 U	6.2	12.3
MW-01	MW-1 Q1-97	03/24/1997	50 U	5 U	58	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	11	79.2	NA	0.087	36.9	0.005 U	6.58	12
MW-01	MW-1 Q2-97	06/24/1997	50 U	5 U	60 U	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	84	NA	0.063	38.8	0.005 U	7.1	12.1
MW-01	MW-1 Q3-97	09/11/1997	50 U	5 U	62	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	56	78.6	NA	0.034	36.2	0.005 U	6.61	11.6

TABLE D4
SUMMARY OF METALS GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Calcium (mg/L)	Cyanide (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)
Downgradient Wells Continued																									
MW-01	MW-1 Q1-98	03/25/1998	50 U	5 U	60	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	82.6	NA	0.72	37.2	0.005 U	6.8	12.5
MW-01	MW-1 Q2-98	06/29/1998	50 U	5 U	59	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	81.2	NA	0.043	37.2	0.005 U	6	12.2
MW-01	MW-1 Q3-98	09/21/1998	0.04 U	1 U	62.1	0.04 U	0.2	1.3	0.47	1.2	0.12	NA	12.5	5 U	0.04 U	0.04 U	12	3	82.2	NA	0.08	39.1	0.00122	7.9	1.2
MW-01	MW-1 Q1-99	03/03/1999	50 U	5 U	54	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	81.1	NA	0.267	37.3	0.006	6.4	11.5
MW-01	MW-1 Q2-99	06/14/1999	0.02 U	2.3	56.8	0.02 U	0.11	4.5	0.57	1.5	0.41	NA	7.6	15	0.02 U	0.04	10.9	2.5	82.9	NA	0.102	37.4	0.005 U	7.7	12
MW-01	MW-1 Q3-99	09/22/1999	50 U	5 U	53	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	76.1	NA	0.029	34.3	0.005 U	6.1	11.6
MW-01	MW-1 Q4-99	12/09/1999	50 U	5 U	55	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	77.4	NA	0.167	35.9	0.006	6.5	11.9
MW-01	MW-1 Q1-00	03/15/2000	50 U	10 U	54	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	18	10 U	75.4	NA	0.136	35.5	0.005 U	5.9	12.3
MW-01	MW-1 Q2-00	06/21/2000	50 U	5 U	49	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	72.9	NA	0.09	33.8	0.005 U	6.1	11.4
MW-01	MW-1 Q3-00	09/27/2000	50 U	5 U	49	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	72.4	NA	0.077	33.3	0.005 U	6	11.1
MW-01	MW-1 Q4-00	12/05/2000	50 U	5 U	53	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	71.2	NA	0.098	34.3	0.005 U	6.4	11.8
MW-01	MW-1 Q1-01	03/27/2001	50 U	5 U	56	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	76.6	NA	0.061	35.1	0.005	5.82	12.1
MW-01	MW-1 Q2-01	06/27/2001	50 U	5 U	54	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	78.1	NA	0.063	35.8	5 U	5.4	11.8
MW-03	MW-3 Q1-91	01/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1	NA	0.005	NA	NA
MW-03	MW-3 Q2-91	04/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.03	NA	0.005	NA	NA
MW-03	MW-3 Q3-91	07/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.12	NA	0.005	NA	NA
MW-03	MW-3 Q4-91	10/01/1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.09	NA	0.05	NA	NA
MW-03	MW-3 Q1-92	01/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05	NA	0.005	NA	NA
MW-03	MW-3 Q2-92	04/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.51	NA	0.005	NA	NA
MW-03	MW-3 Q3-92	07/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.42	NA	0.002	NA	NA
MW-03	MW-3 Q4-92	10/01/1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.029	NA	0.0005	NA	NA
MW-03	MW-3 Q1-93	01/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.9	NA	0.003	NA	NA
MW-03	MW-3 Q2-93	04/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2	NA	0.0003 U	NA	NA
MW-03	MW-3 Q3-93	07/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11	NA	0.0003 U	NA	NA
MW-03	MW-3 Q4-93	10/01/1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.383	NA	0.0003 U	NA	NA
MW-03	MW-3 Q2-94	04/01/1994	NA	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-03	MW-3 Q3-94	08/01/1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	93.2	NA	NA	44.8	NA	6.6	17
MW-03	MW-3 Q3(Sept)-94	09/01/1994	10 U	0.01 U	NA	0.002 U	2 U	10.2	0.005 U	2 U	2 U	NA	50 U	5 U	NA	0.005 U	0.016	80 U	88.7	NA	NA	44.8	NA	7.1	14.3
MW-03	MW-3 Q4-94	10/01/1994	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	50 U	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-03	MW-3 Q4(Nov)-94	11/01/1994	10 U	0.01 U	NA	0.002 U	2 U	7.7	0.005 U	2 U	2 U	NA	50 U	5 U	5 U	0.005 U	0.014	80 U	73.7	NA	5 U	41	NA	7.6	16.3
MW-03	MW-3 Q4(Dec)-94	12/01/1994	10 U	0.01 U	NA	0.002 U	2 U	9.2	0.005 U	2 U	2 U	NA	50 U	5 U	5 U	0.005 U	0.016	80 U	79.8	NA	5 U	37	NA	7.6	16.8
MW-03	MW-3 Q1-95	01/01/1995	10 U	10 U	230	2 U	2 U	14.5	10 U	2 U	2 U	NA	50 U	5 U	5 U	2 U	14	80 U	68.9	NA	5 U	29.8	10 U	7	12.8
MW-03	MW-3 Q1(Feb)-95	02/01/1995	5 U	10 U	390	2 U	3	10 U	10 U	20 U	2 U	NA	40 U	5 U	10 U	2 U	10 U	50 U	50.9	NA	50	21.6	10 U	6.3	11.4
MW-03	MW-3 Q3-95	07/01/1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	5 U	NA	NA	30 U	101.4	NA	NA	46.3	NA	7.7	16.3
MW-03	MW-3 Q3(Sept)-95	09/20/1995	0.1	0.6	62.4	0.02 U	0.06	1.6	0.36	2.69	0.19	NA	8.6	5 U	0.07	0.02	12.4	6.4	NA	NA	0.021	NA	0.00035	NA	NA
MW-03	MW-3 Q4-95	12/18/1995	0.05	0.5 U	76.2	0.02 U	0.04	1.9	0.17	2.52	0.23	NA	3.5	5 U	0.02 U	0.02 U	14.9	4.4	112.9	NA	0.044	47.6	0.00038	6.62	20.5
MW-03	MW-3 Q1-96 Dup	02/01/1996	0.02 U	0.5	61.8	0.02 U	0.03	2.5	0.11	1.33	0.06	NA	1.7	5 U	0.02 U	0.02 U	15.5	3.4	NA	NA	0.021	NA	0.00011	NA	NA
MW-03	MW-3 Q1-96	02/01/1996	0.02 U	0.5 U	59.9	0.02 U	0.02 U	2.7	0.11	1.37	0.06	NA	1.9	5 U	0.02 U	0.02 U	15.5	7	NA	NA	0.02 U	NA	0.00029	NA	NA
MW-03	MW-3 Q2-96	05/01/1996	0.04	0.5	75.8	0.02 U	0.27	1.9	0.36	2.9	0.64	NA	5.1	5 U	0.2	0.02 U	13.3	23	NA	NA	NA	NA	NA	NA	NA
MW-03	MW-3 Q3-96	09/01/1996	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	110	NA	0.042	53.3	0.005 U	8.1	18.7
MW-03	MW-3 Q4-96	10/01/1996	50 U	50 U	73	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	93.3	NA	0.034	45.2	0.005 U	7.4	16.5
MW-03	MW-3 Q1-97	03/24/1997	50 U	5 U	76	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10	93.9	NA	0.032	46.1	0.005 U	6.96	16.4
MW-03	MW-3 Q2-97	06/24/1997	50 U	5 U	84	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	99.9	NA	0.046	49	0.005 U	7.4	17

TABLE D4
SUMMARY OF METALS GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Calcium (mg/L)	Cyanide (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)
Downgradient Wells Continued																									
MW-03	MW-3 Q3-97	09/11/1997	50 U	5 U	82	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	98.5	NA	0.027	48.6	0.005 U	7.27	17.5
MW-03	MW-3 Q4-97	11/25/1997	50 U	5 U	5 U	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	19	10 U	62.8	NA	0.095	37.2	0.005 U	7	19.2
MW-03	MW-3 Q1-98	03/25/1998	50 U	5 U	67	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	90.9	NA	0.48	44.8	0.005 U	7.2	17.9
MW-03	MW-3 Q2-98	06/29/1998	50 U	5 U	82	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	95.6	NA	0.055	46.8	0.005 U	6.3	17.1
MW-03	MW-3 Q3-98	09/21/1998	0.04 U	1 U	79.8	0.04 U	0.2	1.2	0.52	1.4	0.08	NA	11.6	5 U	0.05	0.04 U	12.8	2	96.2	NA	0.032	47.6	0.00025	8.1	16.5
MW-03	MW-3 Q4-98	12/30/1998	50 U	5 U	37	5 U	4 U	5 U	10 U	18	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	29.5	NA	0.648	43.1	0.022	9.4	32.8
MW-03	MW-3 Q1-99	03/03/1999	50 U	5 U	33	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	26.4	NA	0.126	40.8	0.005 U	8.4	29
MW-03	MW-3 Q2-99	06/14/1999	0.02 U	4.1	86.4	0.02 U	0.04	8.8	0.8	1.3	0.1	NA	10.4	28	0.02 U	0.03	13	2.8	107	NA	0.094	50.6	0.005 U	8.5	17.2
MW-03	MW-3 Q3-99	09/22/1999	50 U	5 U	42	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	104	NA	0.265	49.4	0.006	6.4	16.4
MW-03	MW-3 Q4-99	12/09/1999	50 U	5 U	79	5 U	4 U	5 U	10 U	10 U	2 U	NA	330	5 U	10 U	5 U	16	10 U	97.4	NA	0.373	54.4	0.011	8.1	18.5
MW-03	MW-3 Q1-00	03/15/2000	50 U	10 U	82	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	106	NA	0.06	52.8	0.005 U	6.9	18.3
MW-03	MW-3 Q2-00	06/21/2000	50 U	5 U	82	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	18	10 U	105	NA	0.051	49.6	0.005 U	7.1	16.7
MW-03	MW-3 Q3-00	09/27/2000	50 U	5 U	75	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	18	10 U	97	NA	0.042	47.8	0.005 U	6.8	17
MW-03	MW-3 Q4-00	12/05/2000	50 U	5 U	80	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	92.3	NA	0.199	47.7	0.006	7.1	17.6
MW-03	MW-3 Q1-01	03/27/2001	50 U	5 U	77	5 U	4 U	5 U	10 U	10 U	2 U	NA	78	5 U	10 U	5 U	18	10 U	88.2	NA	0.054	42	0.005	6.28	17.8
MW-03	MW-3 Q2-01	06/27/2001	50 U	5 U	84	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	18	10 U	108	NA	0.062	52.3	5 U	6.5	17.5
MW-11	MW-11 Q1-95	03/01/1995	5 U	10 U	500	2 U	3	10 U	10 U	20 U	2 U	NA	4 U	5 U	10 U	2 U	40	50 U	66.6	NA	NA	36	0.027	10.3	1
MW-11	MW-11 Q1-95 Dup	03/01/1995	5 U	10 U	410	2 U	3	10 U	10 U	20 U	2 U	NA	4 U	5 U	10 U	2 U	37	NA	NA	NA	NA	NA	NA	NA	NA
MW-11	MW-11 Q3-95	07/01/1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	5	NA	NA	30 U	151.8	NA	NA	54.1	NA	9.9	48.7
MW-11	MW-11 Q3-95 Dup	07/01/1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	5	NA	NA	30 U	149.1	NA	NA	53.6	NA	9.9	49.2
MW-11	MW-11 Q3(Sept)-95	09/20/1995	0.05	0.05 U	109	0.02 U	0.06	1.7	0.6	0.61	0.05	NA	9.7	5 U	0.08	0.02 U	9.1	1.2	71.6	NA	0.035	96.5	0.00048	8.6	46.3
MW-11	MW-11 Q3(Sept)-95 Dup	09/20/1995	0.03	0.05 U	109	0.02 U	0.06	1.7	0.64	1.03	0.07	NA	9.3	5 U	0.03	0.02 U	9.4	1.8	71.29	NA	0.035	126.1	0.00054	8.5	45.6
MW-11	MW-11 Q4-95	10/30/1995	0.02 U	0.5 U	113	0.1	0.05	8.1	0.57	0.97	0.05	NA	8.4	5 U	0.02 U	0.02 U	11.7	3.9	141.9	NA	0.038	59	0.00047	8.5	45.1
MW-11	MW-11 Q4-95 Dup	10/30/1995	0.02 U	0.5 U	113	0.09	0.05	8.2	0.56	1.02	0.05	NA	7.7	5 U	0.02 U	0.02 U	11.6	3.7	142.3	NA	0.039	60.2	0.00044	8.5	45.1
MW-11	MW-11 Q4(Nov)-95	11/29/1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	111.88	NA	NA	52.33	NA	8.75	53.63
MW-11	MW-11 Q4(Nov)-95 Dup	11/29/1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	111.18	NA	NA	55.57	NA	9.05	53.23
MW-11	MW-11 Q4(Dec)-95	12/18/1995	0.13	0.6	133	0.11	0.18	6.5	3.47	37.4	3.57	NA	18.3	5 U	0.02 U	0.03	16.3	17.3	186.4	NA	7.86	59.5	0.0822	8.7	55.7
MW-11	MW-11 Q1-96	02/01/1996	0.02 U	0.5 U	95.7	0.02 U	0.02	5.3	1.5	0.88	0.03	NA	2.9	5 U	0.02 U	0.02 U	11.5	4.3	NA	NA	0.034	NA	0.00107	NA	NA
MW-11	MW-11 Q2-96	05/01/1996	0.03	0.5 U	107	0.02 U	0.04	1.6	1.8	2.6	0.27	NA	6.4	5 U	0.21	0.02 U	10	1.5	NA	NA	0.038	NA	0.0017	NA	NA
MW-11	MW-11 Q2-96 Dup	05/01/1996	0.02	0.5 U	109	0.02 U	0.04	1.6	1.9	0.6	0.16	NA	6.3	5 U	0.64	0.02 U	10.2	0.9	NA	NA	0.041	NA	0.00128	NA	NA
MW-11	MW-11 Q3-96	09/01/1996	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	129	NA	0.116	51.6	0.005 U	9.2	45.9
MW-11	MW-11 Q4-96	10/01/1996	50 U	5 U	94	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	133	NA	0.316	52.8	0.007	8.8	46.5
MW-11	MW-11 Q1-97	03/24/1997	50 U	5 U	96	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	130	NA	2.53	53.1	0.044	9.46	48
MW-11	MW-11 Q2-97	06/24/1997	50 U	5 U	107	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	135	NA	0.152	54	0.005 U	9.8	51.1
MW-11	MW-11 Q3-97	09/11/1997	50 U	5 U	100	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	132	NA	0.338	53.6	0.009	9.71	53.1
MW-11	MW-11 Q4-97	11/25/1997	50 U	5 U	5 U	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	18	10 U	129	NA	1.04	51.9	0.02	9.6	50.4
MW-11	MW-11 Q1-98	03/25/1998	50 U	5 U	99	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	133	NA	1.4	52.5	0.032	9.9	54.1
MW-11	MW-11 Q2-98	06/29/1998	50 U	5 U	86	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	125	NA	0.129	49.9	0.005 U	7.9	51.2
MW-11	MW-11 Q3-98	09/21/1998	0.09	1 U	106	0.05	0.3	3.4	1.18	1.9	0.64	NA	16	5 U	0.05	0.04 U	10.6	2	132	NA	2.04	54	0.0174	10.8	53.5
MW-11	MW-11 Q4-98	12/30/1998	50 U	5 U	101	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	142	NA	3.56	56	0.051	10.7	56.5
MW-11	MW-11 Q1-99	03/03/1999	50 U	5 U	102	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	10 U	134	NA	0.305	54.1	0.005	9.23	52.8
MW-11	MW-11 Q2-99	06/14/1999	0.02 U	2.6	103	0.02 U	0.03	11.8	1.26	1.3	0.08	NA	13.7	18	0.02 U	0.04	11.2	0.33	133	NA	0.308	52.1	0.005	10.8	53.2
MW-11	MW-11 Q3-99	09/22/1999	50 U	5 U	95	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	129	NA	0.485	50.9	0.005	9.1	54.1

TABLE D4
SUMMARY OF METALS GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Calcium (mg/L)	Cyanide (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)
Downgradient Wells Continued																									
MW-11	MW-11 Q4-99	12/09/1999	50 U	5 U	108	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	134	NA	0.189	53.8	0.005 U	10	54.4
MW-11	MW-11 Q1-00	03/15/2000	50 U	10 U	104	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	129	NA	0.554	52.5	0.01	9.2	55.8
MW-11	MW-11 Q2-00	06/21/2000	50 U	5 U	97	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	125	NA	0.02 U	49	0.005 U	8.5	49.8
MW-11	MW-11 Q3-00	09/27/2000	50 U	5 U	92	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	10 U	124	NA	0.109	50.5	0.005 U	9	53
MW-11	MW-11 Q4-00	12/05/2000	50 U	5 U	99	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	123	NA	0.455	52	0.007	9.7	55.1
MW-11	MW-11 Q1-01	03/27/2001	50 U	5 U	110	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	131	NA	0.03	52.3	0.006	9.46	56.1
MW-11	MW-11 Q2-01	06/27/2001	50 U	5 U	105	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	10 U	133	NA	20 U	52.7	5 U	9	54.2
MW-11	MW-11 Q3-01	09/06/2001	50 U	5 U	95	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	10 U	129	NA	0.07	52	0.005 U	9.86	54
MW-11	MW-11 Q4-01	12/14/2001	50 U	5 U	105	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	13.1	10 U	133	NA	0.02 U	53.3	0.005 U	9.82	55.1
MW-11	MW-11 Q1-02	03/27/2002	50 U	5 U	100	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	12	10 U	126	NA	0.104	52.1	0.005 U	8.9	52.6
MW-11	MW-11 Q2-02	06/13/2002	50 U	5 U	107	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	14	10 U	131	NA	2.08	54.9	0.0344	10.5	57.3
MW-11	MW-11 Q3-02	09/18/2002	50 U	5 U	96.2	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	129	0.01 U	0.02 U	52.9	0.005 U	10.1	55
MW-11	MW-11 Q4-02	12/17/2002	50 U	5 U	106	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	11.4	10 U	129	0.01 U	0.102	54.4	0.005 U	9.83	55.8
MW-11	MW-11 Q1-03	03/26/2003	50 U	5 U	97.3	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	14	10 U	121	0.01 U	1.31	50	0.0256	9.4	51.7
MW-11	MW-11 Q2-03	06/26/2003	50 U	5 U	95	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	16	10 U	133	0.01 U	0.02 U	51.7	0.005 U	9.26	53.8
MW-11	MW-11 Q3-03	09/25/2003	50 U	5 U	88	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	12	10 U	122	NA	1.69	49.1	0.03	8.73	50.5
MW-11	MW-11 Q4-03	12/18/2003	50 U	8 U	88	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	8 U	10 U	5 U	14	10 U	127	NA	0.183	48.9	0.005 U	9.31	52.5
MW-11	MW-11 Q1-04	03/17/2004	50 U	5 U	89.4	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13.5	10 U	122	NA	0.026	49.8	0.005 U	10.3	52.6
MW-11	MW-11 Q2-04	06/17/2004	50 U	5 U	87.2	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	13	10 U	117	NA	0.427	49.7	0.0063	9.78	52.8
MW-11	MW-11 Q3-04	09/30/2004	50 U	5 U	90.4	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	12	10 U	120	NA	0.072	47.4	0.005 U	9.49	51.8
MW-11	MW-11 Q4-04	12/15/2004	50 U	5 U	94.6	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15.1	10 U	117	NA	0.104	47.6	0.005 U	9.21	51.5
MW-11	MW-11 Q1-05	03/31/2005	50 U	5 U	87	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	13	10 U	116	NA	0.45	46.7	0.0102	8.49	51.7
MW-11	MW-11 Q2-05	06/23/2005	50 U	5 U	91	5 U	5 U	5 U	10 U	10 U	4 U	NA	20 U	5 U	10 U	5 U	11	10 U	115	NA	0.142	46.3	0.005 U	10	51.4
MW-11	MW-11 Q3-05	09/29/2005	50 U	5 U	92.9	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	117	NA	0.038	48.3	0.005 U	8.8	54.7
MW-11	MW-11 Q4-05	12/14/2005	50 U	5 U	89	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	118	NA	0.02 U	46	0.005 U	9.04	50.5
MW-11	MW-11 Q1-06	03/30/2006	50 U	5 U	82.4	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	10 U	10 U	116	NA	0.407	43.3	0.0083	9.83	48.7
MW-11	MW-11 Q2-06	06/21/2006	50 U	5 U	88.9	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	114	NA	0.03	45.8	0.005 U	9.31	49.9
MW-11	MW-11 Q3-06	09/21/2006	50 U	5 U	86.4	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	110	NA	0.128	43.4	0.005 U	10	46.7
MW-11	MW-11 Q4-06	12/28/2006	50 U	5 U	84.8	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	114	NA	0.223	43.9	0.005 U	9.1	47.3
MW-11	MW-11 Q1-07	03/22/2007	50 U	5 U	82.4	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	111	NA	0.454	44.9	0.0071	7.8	49.5
MW-11	MW-11 Q2-07	06/28/2007	50 U	5 U	83.3	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	110	NA	0.406	43.7	0.005 U	10	48.2
MW-11	MW-11 Q3-07	09/26/2007	50 U	5 U	74.3	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	108	NA	0.084	43.1	0.005 U	9	46.8
MW-11	MW-11 Q4-07	12/27/2007	50 U	5 U	78.3	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	10 U	111	NA	0.043	44	0.005 U	8.65	47
MW-11	MW-11 Q1-08	03/27/2008	50 U	5 U	69.8	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	10 U	10 U	101	NA	0.297	41.6	0.005 U	9.3	43.1
MW-11	MW-11 Q2-08	06/25/2008	50 U	5 U	71.7	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	10 U	10 U	103	NA	0.035	41.6	0.005 U	9.11	44.6
MW-11	MW-11 Q3-08	09/24/2008	50 U	5 U	79.8	5 U	5 U	5 U	10 U	10 U	10 U	NA	20 U	5 U	10 U	5 U	13	10 U	96.2	NA	0.02 U	39.7	0.005 U	8.83	43.1
MW-11	MW-11 Q4-08	12/17/2008	50 U	5 U	65	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	94.1	NA	6.23	39.5	0.0939	8.62	40.9
MW-11	MW-11 Q1-09	03/20/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	101	NA	0.02 U	40.7	0.005 U	8.92	44.5
MW-11	MW-11 Q2-09	06/24/2009	50 U	5 U	79.3	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	10 U	97.9	NA	0.0254	39.4	0.005 U	8.46	42.5
MW-11	MW-11 Q3-09	09/24/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	97.6	NA	0.02 U	39.4	0.005 U	8.47	42.7
MW-11	MW-11 Q4-09	12/18/2009	50 U	5 U	77.8	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12.5	10 U	100	NA	0.02 U	40.8	0.005 U	8.66	43.4
MW-11	MW-11 Q1-10	03/30/2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.1	NA	0.02 U	38.5	0.005	8.44	41.1
MW-11	MW-11 Q2-10	06/23/2010	50 U	5 U	77.7	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	4 U	10 U	5 U	14	10 U	95.8	NA	0.05 U	37.3	0.005 U	8.35	38.9

TABLE D4
SUMMARY OF METALS GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Calcium (mg/L)	Cyanide (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)
Downgradient Wells Continued																									
MW-11	MW-11 Q3-10	09/29/2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98.4	NA	0.569	39.5	0.0101	8.73	40.5
MW-11	MW-11 Q4-10	12/15/2010	50 U	5 U	63.9	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	95.6	NA	0.027	38.1	0.005 U	8.59	40.2
MW-11	MW-11 Q1-2011	03/24/2011	50 U	5 U	71.9	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	13.6	10 U	95	NA	0.0353	37.9	0.005 U	8.05	39.6
MW-14	MW-14 Q3-99	09/22/1999	50 U	5 U	49	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	102	NA	8.83	36	0.213	7.2	12.4
MW-14	MW-14 Q4-99	12/09/1999	50 U	5 U	64	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	127	NA	24.8	46.6	0.468	9.5	13
MW-14	MW-14 Q1-00	03/15/2000	50 U	10 U	40	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	62.9	NA	1.35	27.5	0.032	4.6	10.6
MW-14	MW-14 Q2-00	06/21/2000	50 U	5 U	32	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	57.9	NA	0.108	25.4	0.008	5	9.96
MW-14	MW-14 Q3-00	09/27/2000	50 U	5 U	35	5 U	4 U	5 U	10 U	10 U	2 U	NA	35	5 U	10 U	5 U	14	10 U	59	NA	0.162	24.6	0.008	4.5	9.93
MW-14	MW-14 Q4-00	12/05/2000	50 U	5 U	31	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	59.7	NA	1.2	24.6	0.24	5.4	10.4
MW-14	MW-14 Q1-01	03/27/2001	50 U	5 U	31	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	22	10 U	51.8	NA	0.267	23.5	0.008	4.09	9.76
MW-14	MW-14 Q2-01	06/27/2001	50 U	15	26	5 U	4 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	20	10 U	51.5	NA	0.334	22.7	0.01	3.2	9.31
MW-14	MW-14 Q3-01	09/06/2001	50 U	5 U	32	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	62.1	NA	0.154	26.3	0.005	5.07	10
MW-14	MW-14 Q4-01	12/14/2001	50 U	5 U	37	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	15.6	10 U	70.2	NA	0.129	29.2	0.0057	5.52	11.2
MW-14	MW-14 Q1-02	03/27/2002	50 U	5 U	25.1	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	20	10 U	57.1	NA	0.082	25.7	0.005 U	4.41	9.98
MW-14	MW-14 Q2-02	06/13/2002	50 U	5 U	30.2	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	18	10 U	61.4	NA	0.122	27.1	0.005 U	5.74	10.6
MW-14	MW-14 Q3-02	09/18/2002	50 U	5 U	25.8	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	19	10 U	56.8	NA	0.035	23.8	0.005 U	4.95	9.86
MW-14	MW-14 Q4-02	12/17/2002	50 U	5 U	39.6	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	10.5	10 U	50.3	0.02	0.213	22.2	0.005 U	4.79	9.57
MW-14	MW-14 Q1-03	03/26/2003	50 U	5 U	33	5 U	5 U	5 U	10 U	10 U	2 U	NA	21	10 U	10 U	5 U	14	10 U	48.2	0.01 U	0.521	21.1	0.0132	4.49	8.69
MW-14	MW-14 Q2-03	06/26/2003	50 U	5 U	35.1	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	18	10 U	69.6	0.01 U	0.45	26.7	0.011	4.98	10.8
MW-14	MW-14 Q3-03	09/25/2003	50 U	5 U	27	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	18	10 U	54.1	0.01 U	0.097	22.4	0.005 U	4.49	9.21
MW-14	MW-14 Q4-03	12/18/2003	50 U	8 U	37	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	8 U	10 U	5 U	11	10 U	86.2	NA	1.72	31.5	0.041	5.94	12.4
MW-14	MW-14 Q1-04	03/17/2004	50 U	5 U	32.8	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	66.5	0.01 U	0.102	27.1	0.005 U	6.06	10.8
MW-14	MW-14 Q2-04	06/17/2004	50 U	5 U	29.2	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	15	10 U	59.2	0.01 U	0.056	25.9	0.005 U	5.19	10.6
MW-14	MW-14 Q3-04	09/30/2004	50 U	5 U	33.7	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	15	10 U	64.1	0.01 U	0.479	24.3	0.0133	4.97	10.4
MW-14	MW-14 Q4-04	12/15/2004	50 U	5 U	34.2	5 U	5 U	6.6	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	18	10 U	63.5	0.01 U	0.113	24.6	0.005 U	5.55	10.7
MW-14	MW-14 Q1-05	03/31/2005	50 U	5 U	32	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	20	10 U	78.1	NA	7.31	31.1	0.0952	5.35	11.8
MW-14	MW-14 Q2-05	06/23/2005	50 U	5 U	25	5 U	5 U	5 U	10 U	10 U	4 U	NA	35	5 U	10 U	5 U	17	10 U	44	NA	0.45	19	0.0114	4.08	8.83
MW-14	MW-14 Q3-05	09/29/2005	50 U	5 U	26.5	5 U	5 U	5 U	10 U	10 U	2 U	NA	44	5 U	10 U	5 U	13	10 U	51.6	NA	0.108	20.8	0.005 U	3.84	10.3
MW-14	MW-14 Q4-05	12/14/2005	50 U	5 U	29	5 U	5 U	5 U	10 U	10 U	2 U	NA	46	5 U	10 U	5 U	15	10 U	54	NA	0.081	21	0.005 U	4.53	9.67
MW-14	MW-14 Q1-06	03/30/2006	50 U	5 U	34.4	5 U	5 U	5.8	10 U	10 U	2 U	NA	62	5 U	10 U	5 U	10	10 U	60.8	NA	1.4	23.7	0.034	5.31	9.73
MW-14	MW-14 Q3-06	09/21/2006	50 U	5 U	30	5 U	5 U	5 U	10 U	10 U	2 U	NA	35	5 U	10 U	5 U	17	10 U	56.3	NA	0.18	21.7	0.005 U	4.7	10.2
MW-14	MW-14 Q4-06	12/28/2006	50 U	5 U	38.8	5 U	5 U	5 U	10 U	10 U	2 U	NA	36	5 U	10 U	5 U	12	10 U	47.3	NA	0.28	19.6	0.0085	4.6	8.56
MW-14	MW-14 Q1-07	03/22/2007	50 U	5 U	25.8	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	18	10 U	81.8	NA	0.818	31.2	0.0198	5.5	12.7
MW-14	MW-14 Q2-07	06/28/2007	50 U	5 U	27.7	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	55.5	NA	0.143	21.7	0.005 U	5.5	10.2
MW-14	MW-14 Q3-07	09/26/2007	50 U	5 U	21.6	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	18	10 U	49.1	NA	0.137	20.4	0.005 U	4.6	9.19
MW-14	MW-14 Q4-07	12/27/2007	50 U	5 U	30.7	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	56.5	NA	0.144	22.3	0.0057	5.35	10
MW-14	MW-14 Q1-08	03/27/2008	50 U	5 U	32.9	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10.5	10 U	5 U	11.5	10 U	85.8	NA	0.439	32.9	0.012	6.37	12.3
MW-14	MW-14 Q2-08	06/25/2008	50 U	5 U	28.4	5 U	5 U	6.1	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	10 U	53.6	NA	0.089	21.9	0.005 U	4.95	9.76
MW-14	MW-14 Q3-08	09/24/2008	50 U	5 U	29.7	5 U	5 U	5.6	10 U	10 U	10 U	NA	20 U	5 U	10 U	5 U	16	10 U	48.2	NA	0.104	19.9	0.005 U	4.46	9.04
MW-14	MW-14 Q4-08	12/17/2008	50 U	5 U	25	5 U	5 U	5.1	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	12	10 U	49	NA	0.096	20.4	0.005 U	4.46	9.1
MW-14	MW-14 Q1-09	03/20/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	52.7	NA	0.225	21.3	0.0068	4.75	9.71
MW-14	MW-14 Q2-09	06/24/2009	50 U	5 U	36.8	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	68.4	NA	0.143	26.5	0.0057	5.21	11.5
MW-14	MW-14 Q3-09	09/24/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	63.9	NA	0.049	25.1	0.005 U	5.16	11.2

TABLE D4
SUMMARY OF METALS GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter Sample Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Calcium (mg/L)	Cyanide (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)
Downgradient Wells Continued																									
MW-14	MW-14 Q4-09	12/18/2009	50 U	5 U	36.1	5 U	5 U	5	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14.1	10 U	65.9	NA	1.13	26.7	0.0324	5.4	11.2
MW-14	MW-14 Q1-10	03/30/2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	79.5	NA	0.507	29.7	0.0133	5.82	12.2
MW-14	MW-14 Q2-10	06/23/2010	50 U	5 U	43.2	5 U	5 U	5.3	10 U	10 U	2 U	NA	20 U	2 U	10 U	5 U	14	10 U	73.7	NA	0.905	27.6	0.0219	5.7	11.2
MW-14	MW-14 Q3-10	09/29/2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	71.9	NA	1.22	27.2	0.0294	5.68	11
MW-14	MW-14 Q4-10	12/15/2010	50 U	5 U	33.4	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	70.8	NA	1.86	26.4	0.0461	5.65	10.7
MW-14	MW-14 Q1-2011	03/24/2011	50 U	5 U	31.3	5 U	5 U	5.8	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	14.5	10 U	83.3	NA	1.59	31.6	0.0409	5.97	12.4
MW-15	MW-15 Q3-01	09/06/2001	50 U	5 U	245	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	170	NA	0.034	56.2	0.025	9.92	102
MW-15	MW-15 Q4-01	12/14/2001	50 U	5 U	240	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	17.9	10 U	175	NA	0.0719	58.3	0.0101	10.1	95.1
MW-15	MW-15 Q1-02	03/27/2002	50 U	5 U	228	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	16	10 U	174	NA	0.061	59.3	0.0072	9.58	93.8
MW-15	MW-15 Q2-02	06/13/2002	58	5 U	320	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	18	10 U	177	NA	0.02 U	60.2	0.0104	11.4	118
MW-15	MW-15 Q3-02	09/18/2002	50 U	5 U	274	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	175	NA	0.047	59.4	0.0073	10.8	99.8
MW-15	MW-15 Q4-02	12/17/2002	50 U	5 U	242	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	13.2	10 U	162	0.01 U	0.163	56.9	0.0065	10.2	87
MW-15	MW-15 Q1-03	03/26/2003	50 U	5 U	263	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	14	10 U	165	0.01 U	0.16	55.7	0.0101	9.46	110
MW-15	MW-15 Q2-03	06/26/2003	50 U	5 U	226	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	16	10 U	176	0.01 U	0.048	56	0.0053	8.56	99.3
MW-15	MW-15 Q3-03	09/25/2003	50 U	5 U	229	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	13	10 U	167	0.01 U	0.026	54	0.005 U	8.7	91.6
MW-15	MW-15 Q4-03	12/18/2003	50 U	8 U	225	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	8 U	10 U	5 U	18	10 U	168	NA	0.064	51.5	0.005	8.95	92.1
MW-15	MW-15 Q1-04	03/17/2004	50 U	5 U	202	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14.8	10 U	158	NA	0.061	53.5	0.005 U	10.3	90.4
MW-15	MW-15 Q2-04	06/17/2004	50 U	5 U	201	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	15	10 U	152	NA	0.024	52.2	0.0051	9.46	94.4
MW-15	MW-15 Q3-04	09/30/2004	50 U	5 U	205	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	14	10 U	154	NA	0.02 U	50.6	0.005 U	8.47	74.7
MW-15	MW-15 Q4-04	12/15/2004	50 U	5 U	202	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	163	NA	0.02 U	55.7	0.005 U	10.1	75
MW-15	MW-15 Q1-05	03/31/2005	50 U	5 U	251	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	16	10 U	178	NA	0.02 U	57.1	0.0165	9.4	124
MW-15	MW-15 Q2-05	06/23/2005	50 U	5 U	221	5 U	5 U	5 U	10 U	10 U	4 U	NA	20 U	5 U	10 U	5 U	14	10 U	167	NA	0.02 U	55.2	0.0185	9.44	87.1
MW-15	MW-15 Q3-05	09/29/2005	50 U	5 U	213	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	168	NA	0.02 U	57.2	0.0163	8.7	75.1
MW-15	MW-15 Q4-05	12/14/2005	50 U	5 U	198	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	170	NA	0.02 U	55.1	0.0246	9.11	69.8
MW-15	MW-15 Q1-06	03/30/2006	50 U	5 U	194	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	174	NA	0.02 U	53	0.038	9.49	74.2
MW-15	MW-15 Q2-06	06/21/2006	50 U	5 U	212	5 U	5 U	5 U	10 U	10 U	2.7	NA	20 U	5 U	10 U	5 U	14	10 U	162	NA	0.02 U	53	0.0436	9.34	75.6
MW-15	MW-15 Q3(Sept)-06	09/21/2006	50 U	5 U	221	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	167	NA	0.02 U	53.2	0.0521	9.38	82.2
MW-15	MW-15 Q4-06	12/28/2006	50 U	5 U	226	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	173	NA	0.02 U	52.5	0.0641	9.2	90.5
MW-15	MW-15 Q1-07	03/22/2007	50 U	5 U	200	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	17	10 U	163	NA	0.02 U	52.2	0.0588	8.8	86.5
MW-15	MW-15 Q2-07	06/28/2007	50 U	5 U	211	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	169	NA	0.02 U	55.4	0.0477	10.1	78
MW-15	MW-15 Q3-07	09/26/2007	50 U	5 U	188	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	13	10 U	169	NA	0.795	55.1	0.0655	9.4	81.1
MW-15	MW-15 Q4-07	12/27/2007	50 U	5 U	208	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	163	NA	0.02 U	53.5	0.0505	8.98	66.8
MW-15	MW-15 Q1-08	03/27/2008	50 U	5 U	163	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	11.8	10 U	149	NA	0.02 U	51.3	0.0369	9.38	57
MW-15	MW-15 Q2-08	06/25/2008	50 U	5 U	178	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	160	NA	0.024	52.8	0.0375	9.12	62.2
MW-15	MW-15 Q3-08	09/24/2008	50 U	5 U	193	5 U	5 U	5 U	10 U	10 U	10 U	NA	20 U	5 U	10 U	5 U	15	10 U	151	NA	0.02 U	51.3	0.04	9.02	61.7
MW-15	MW-15 Q4-08	12/17/2008	50 U	5 U	151	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	11	10 U	145	NA	0.02 U	49.4	0.0273	8.38	59
MW-15	MW-15 Q1-09	03/20/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	158	NA	0.02 U	53.2	0.0342	9.01	57.2
MW-15	MW-15 Q2-09	06/24/2009	50 U	5 U	198	5 U	5 U	5 U	10 U	19	2 U	NA	20 U	5 U	10 U	5 U	14	10 U	160	NA	0.02 U	53	0.0409	8.86	66.5
MW-15	MW-15 Q3-09	09/24/2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	159	NA	0.02 U	52.5	0.0343	8.87	65.5
MW-15	MW-15 Q4-09	12/18/2009	50 U	5 U	194	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	14.2	10 U	161	NA	0.02 U	53.8	0.0331	8.86	62.1
MW-15	MW-15 Q1-10	03/30/2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	159	NA	0.02 U	52.9	0.0327	8.78	58.2
MW-15	MW-15 Q2-10	06/23/2010	50 U	5 U	186	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	16	10 U	159	NA	0.02 U	50.3	0.036	8.76	52.6
MW-15	MW-15 Q3-10	09/29/2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	161	NA	0.0214	53.9	0.0299	8.9	55.3

TABLE D4
SUMMARY OF METALS GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date (Parameter)	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Calcium (mg/L)	Cyanide (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Sodium (mg/L)
Downgradient Wells Continued																									
MW-15	MW-15 Q4-10	12/15/2010	50 U	5 U	166	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	15	10 U	154	NA	0.023	51.3	0.0297	8.57	55
MW-15	MW-15 Q1-2011	03/24/2011	50 U	5 U	198	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	10 U	10 U	5 U	15.4	10 U	163	NA	0.02 U	51.5	0.0472	8.56	63.8
MW-16	MW-16 Q3-05	09/01/2005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	213	NA	NA	NA	NA	17.2	21.8
MW-16	MW-16 Q2-06	06/21/2006	50 U	5 U	88.8	5 U	5 U	7.2	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	20	15	119	NA	0.313	51.9	0.0345	7.8	23.6
MW-16	MW-16 Q3(Sept)-06	09/21/2006	50 U	5 U	85.6	5 U	5 U	5 U	10 U	10 U	2 U	NA	20 U	5 U	10 U	5 U	19	10 U	119	NA	2.04	51.8	0.0275	7.97	23.5

Notes:

Only samples that were tested for at least one metal analyte appear in this Table. See Table D.1 for a complete analytical schedule by sample.

U Analyte was not detected at the given reporting limit.

NA Not analyzed

TABLE D5
SUMMARY OF VOLATILE ORGANIC CONSTITUENT GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter Sample Date	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Benzene (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	Chloromethane (µg/L)	cis-1,2-Dichloroethene (µg/L)	p-Isopropyltoluene (p-Cymene) (µg/L)	Dichlorodifluoromethane (µg/L)	iso-Propylbenzene (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl chloride (µg/L)	Xylene (meta & para) (µg/L)	Xylene (ortho) (µg/L)	Xylene (total) (µg/L)
Upgradient Wells																					
MW-05	MW-5 Q1-93	03/30/1993	NA	NA	NA	0.5 U	1 U	NA	NA	NA	NA	NA	NA	5.3	0.5 U	0.5 U	0.5 U	0.2 U	NA	NA	0.5 U
MW-05	MW-5 Q2-93	04/13/1993	NA	NA	NA	0.5 U	1 U	NA	NA	NA	NA	NA	NA	7.1	0.5 U	2.6	0.5 U	0.2 U	NA	NA	0.5 U
MW-05	MW-5 Q2(Jun)-93	06/14/1993	NA	NA	NA	0.5 U	1 U	NA	NA	NA	NA	NA	NA	6.5	0.5 U	4	0.5 U	0.2 U	NA	NA	0.5 U
MW-05	MW-5 Q3-93	09/01/1993	NA	NA	NA	0.5 U	1 U	NA	NA	NA	NA	NA	NA	5.5	0.5 U	3.7	0.5 U	0.2 U	NA	NA	0.5 U
MW-05	MW-5 Q3-94	08/01/1994	0.5 U	NA	NA	0.5 U	0.5 U	1.3	NA	0.5 U	NA	NA	NA	5.6	0.5 U	3.4	0.6	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q3(Sept)-94	09/01/1994	0.5 U	NA	NA	0.5 U	0.5 U	1	NA	0.5 U	NA	NA	NA	4.2	0.5 U	2.6	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q4(Nov)-94	11/01/1994	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	NA	NA	4.2	0.5 U	0.5 U	0.6	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q4(Dec)-94	12/01/1994	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	NA	NA	3.83	0.5 U	2.39	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q1-95	01/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	NA	NA	3.7	0.5 U	2.4	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q1(Feb)-95	02/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q4(Dec)-95	12/20/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	2	1 U	1	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q2-96	05/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	3	1 U	2	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q3-96	09/01/1996	1 U	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	3	1 U	2	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q4-96	10/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	3	1 U	2	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q2-97	06/24/1997	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	3	1	2	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q3-97	09/11/1997	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	3	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q4-97	11/25/1997	0.5 U	NA	NA	0.5 U	0.5 U	0.8	NA	0.5 U	NA	NA	NA	3	0.5 U	2.5	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q1-98	03/25/1998	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	3	1 U	2	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q3-98	09/21/1998	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	3	1 U	3	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q4-98	12/30/1998	0.5 U	NA	NA	0.5 U	0.5 U	0.7	NA	0.5 U	NA	NA	NA	2.3	0.5 U	2.7	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q1-99	03/03/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	2	1 U	2	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q2-99	06/14/1999	0.5 U	NA	NA	0.5 U	0.5 U	0.8	NA	0.5 U	NA	NA	NA	2.5	0.5 U	2.8	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q1-00	03/15/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	2	0.6 U	3	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q3-00	09/27/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1.9	1 U	2.8	1 U	1 U	NA	NA	1 U
MW-05	MW-5 Q3-01	09/06/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.87	NA	0.5 U	NA	NA	NA	1.8	0.5 U	3.4	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q4-01	12/14/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.83	NA	0.5 U	NA	NA	NA	1.8	0.5 U	3.1	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q1-02	03/27/2002	0.5 U	NA	NA	0.5 U	0.5 U	0.84	NA	0.5 U	NA	NA	NA	1.7	0.5 U	3.2	0.5 U	0.5 U	NA	NA	0.5 U
MW-05	MW-5 Q2-04	06/17/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.75	NA	0.5 U	NA	0.5 U	NA	1.3	0.5 U	2.8	0.5 U	0.5 U	NA	NA	NA
MW-07	MW-7 Q3-98	07/01/1998	NA	NA	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	1.26	NA	0.5 UJ	NA	NA	NA	NA	NA
MW-07	MW-7 Q1-01	01/31/2001	0.5 U	NA	NA	NA	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA	NA	NA
MW-07	MW-7 Q3-10	07/15/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-07	MW-7 Q4-10	11/03/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-07	SLF-MW-07-GW-110510	11/05/2010	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	NA
MW-07	SLF-MW-07-GW-021011	02/10/2011	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	NA
MW-09	MW-9 Q1-93	03/30/1993	0.5 U	NA	NA	NA	1 U	0.5 U	NA	0.5 U	NA	NA	NA	3.6	NA	0.5 U	0.5 U	0.2 U	NA	NA	NA
MW-09	MW-9 Q2-93	04/13/1993	0.5 U	NA	NA	NA	1 U	1.5	NA	0.5 U	NA	NA	NA	4.1	NA	2.6	0.5 U	0.2 U	NA	NA	NA
MW-09	MW-9 Q2(Jun)-93	06/14/1993	0.5 U	NA	NA	NA	1 U	0.2 U	NA	0.5 U	NA	NA	NA	2.3	NA	1.7	0.5 U	0.2 U	NA	NA	NA
MW-09	MW-9 Q3-93	08/31/1993	0.5 U	NA	NA	NA	1 U	1.3	NA	0.5 U	NA	NA	NA	3.1	NA	2.3	0.5 U	0.2 U	NA	NA	NA
MW-09	MW-9 Q3(Sept)-93	09/01/1993	0.5 U	NA	NA	NA	1 U	1.3	NA	0.5 U	NA	NA	NA	3.1	NA	2.3	0.5 U	0.2 U	NA	NA	NA
MW-09	MW-9 Q1-98	02/01/1998	NA	NA	NA	NA	NA	1.05	NA	NA	NA	NA	NA	1.8	NA	2.5	NA	NA	NA	NA	NA

TABLE D5
SUMMARY OF VOLATILE ORGANIC CONSTITUENT GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Benzene (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	Chloromethane (µg/L)	cis-1,2-Dichloroethene (µg/L)	p-Isopropyltoluene (p-Cymene) (µg/L)	Dichlorodifluoromethane (µg/L)	iso-Propylbenzene (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl chloride (µg/L)	Xylene (meta & para) (µg/L)	Xylene (ortho) (µg/L)	Xylene (total) (µg/L)
Upgradient Wells Continued																					
MW-09	MW-9 Q2-98	07/01/1998	NA	NA	NA	NA	NA	0.5 UJ	NA	NA	NA	NA	NA	1.6	NA	3.2	NA	NA	NA	NA	NA
MW-09	MW-9 Q1-02	01/31/2002	0.5 U	NA	NA	NA	0.5 U	1.2	NA	0.5 U	NA	NA	NA	0.9	NA	4	0.5 U	0.5 U	NA	NA	NA
MW-09	MW-9 Q3-10	07/15/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.87	0.5 U	0.5 U	NA	0.5 U	NA	0.62	0.5 U	1.5	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-09	SLF-MW-09-GW-110410	11/04/2010	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.63	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.53	1 U	1.1	0.2 U	0.2 U	0.4 U	0.2 U	NA
MW-09	MW-9 Q4-10	11/04/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.77	0.5 U	0.5 U	NA	0.5 U	NA	0.54	0.5 U	1.4	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-09	SLF-MW-09-GW-021011	02/10/2011	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.72	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.49	1 U	1.2	0.2 U	0.2 U	0.4 U	0.2 U	NA
MW-10	MW-10 Q1-98	02/01/1998	NA	NA	NA	NA	NA	2.04	NA	NA	NA	NA	NA	0.5 UJ	NA	0.5 UJ	NA	NA	NA	NA	NA
MW-10	MW-10 Q3-98	07/01/1998	NA	NA	NA	NA	NA	1.49	NA	NA	NA	NA	NA	0.5 UJ	NA	0.5 UJ	NA	NA	NA	NA	NA
MW-10	MW-10 Q1-02	03/27/2002	0.5 U	NA	NA	NA	0.5 U	1.7	NA	0.5 U	NA	NA	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	NA	NA	NA
MW-10	MW-10 Q3-10	07/15/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.7	0.5 U	0.5 U	NA	0.5 U	NA	0.52	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-10	MW-10 Q4-10	11/04/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.2	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-10	SLF-MW-10-GW-110410	11/04/2010	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1.1	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.39	1 U	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	NA
MW-10	SLF-MW-10-GW-021011	02/10/2011	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1.5	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.49	1 U	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	NA
MW-12	MW-12 Q1-95	03/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	2.2	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q3-95	07/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	0.7	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q3(Sept)-95	09/20/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q4t-95	10/30/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q4(Dec)-95	12/20/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q1-96	02/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q2-96	05/29/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q2(Jun)-96	06/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q3-96	09/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q4-96	10/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q1-97	03/24/1997	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q2-97	06/24/1997	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q4-97	11/25/1997	0.5 U	NA	NA	0.5 U	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.6	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q1-98	03/25/1998	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q3-98	09/21/1998	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q4-98	12/30/1998	0.5 U	NA	NA	0.5 U	0.5 U	0.5	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q1-99	03/03/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q2-99	06/14/1999	0.5 U	NA	NA	0.5 U	0.5 U	0.5	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q3-99	09/22/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q4-99	12/09/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q1-00	03/15/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q2-00	06/21/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q3-00	09/27/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-12	MW-12 Q4-00	12/05/2000	0.5 U	NA	NA	0.5 U	0.5 U	0.54	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q1-01	03/27/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.56	NA	0.5 U	NA	NA	NA	0.51	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q2-01	06/27/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.54	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q3-01	09/06/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.61	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U

TABLE D5
SUMMARY OF VOLATILE ORGANIC CONSTITUENT GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Benzene (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	Chloromethane (µg/L)	cis-1,2-Dichloroethene (µg/L)	p-Isopropyltoluene (p-Cymene) (µg/L)	Dichlorodifluoromethane (µg/L)	iso-Propylbenzene (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl chloride (µg/L)	Xylene (meta & para) (µg/L)	Xylene (ortho) (µg/L)	Xylene (total) (µg/L)
Upgradient Wells Continued																					
MW-12	MW-12 Q4-01	12/14/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.61	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q1-02	03/27/2002	0.5 U	NA	NA	0.5 U	0.5 U	0.63	NA	0.5 U	NA	NA	NA	0.5	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q2-02	06/13/2002	0.5 U	NA	NA	0.5 U	0.5 U	0.5	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q3-02	09/18/2002	1 U	NA	NA	0.5 U	1 U	1 U	NA	1 U	NA	1 U	NA	1 U	0.5 U	1 U	1 U	1 U	NA	NA	0.5 U
MW-12	MW-12 Q4-02	12/17/2002	0.5 U	NA	NA	0.5 U	0.5 U	0.59	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q1-03	03/26/2003	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q2-03	06/26/2003	0.5 U	NA	NA	0.5 U	0.5 U	0.53	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.97	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q3-03	09/25/2003	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q4-03	12/18/2003	0.5 U	NA	NA	0.5 U	0.5 U	0.5	NA	0.5 U	NA	0.5 U	NA	0.58	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q1-04	03/17/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.57	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q2-04	06/17/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.56	NA	0.5 U	NA	0.5 U	NA	0.5	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q3-04	09/30/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.56	NA	0.5 U	NA	0.5 U	NA	0.52	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q4-04	12/15/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.54	NA	0.5 U	NA	0.5 U	NA	0.55	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q1-05	03/31/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.58	0.5 U	0.5 U	NA	0.5 U	NA	0.52	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-12	MW-12 Q2-05	06/23/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.52	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-12	MW-12 Q3-05	09/29/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-12	MW-12 Q1-06	03/30/2006	0.5 U	NA	NA	0.5 U	0.5 U	0.51	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q2-06	06/21/2006	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12	MW-12 Q3-06	09/21/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-12	MW-12 Q3-07	09/26/2007	NA	NA	NA	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	0.5 U	NA	NA	NA	NA	NA	0.5 U
MW-12b	MW-12b Q3-08	09/24/2008	0.5 U	NA	NA	0.5 U	0.5 U	0.75	NA	0.5 U	NA	0.5 U	NA	0.9	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12b	MW-12b Q4-08	12/17/2008	0.5 U	NA	NA	0.5 U	0.5 U	0.78	NA	0.5 U	NA	0.5 U	NA	0.72	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12b	MW-12b Q1-09	03/20/2009	0.5 U	NA	NA	0.5 U	0.5 U	0.73	NA	0.5 U	NA	0.5 U	NA	0.81	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12b	MW-12b Q2-09	06/24/2009	0.5 U	NA	NA	0.5 U	0.5 U	0.89	NA	0.5 U	NA	0.5 U	NA	0.73	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12b	MW-12b Q3-09	09/24/2009	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	0.5 U	NA	0.69	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12b	MW-12b Q4-09	12/18/2009	0.5 U	NA	NA	0.5 U	0.5 U	0.88	NA	0.5 U	NA	0.5 U	NA	0.67	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12b	MW-12b Q2-10	06/23/2010	0.5 U	NA	NA	0.5 U	0.5 U	0.68	NA	0.5 U	NA	0.5 U	NA	0.61	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12b	MW-12b Q3-10	09/29/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.93	0.5 U	0.5 U	NA	0.5 U	NA	0.77	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-12b	MW-12b Q4-10	12/15/2010	0.5 U	NA	NA	0.5 U	0.5 U	0.65	NA	0.5 U	NA	0.5 U	NA	0.65	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-12b	MW-12b Q1-2011	03/24/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.83	0.5 U	0.5 U	NA	0.5 U	NA	0.62	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Downgradient Wells																					
MW-01	MW-1 Q3-94	08/01/1994	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	NA	NA	0.9	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q3(Sept)-94	09/01/1994	0.5 U	NA	NA	0.5 U	0.5 U	1	NA	0.5 U	NA	NA	NA	0.9	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q4(Nov)-94	11/01/1994	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	NA	NA	0.8	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q4(Dec)-94	12/01/1994	0.5 U	NA	NA	0.5 U	0.5 U	0.91	NA	0.5 U	NA	NA	NA	0.78	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q1-95	01/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	NA	NA	0.8	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q1(Feb)-95	02/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q3-95	07/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	NA	NA	0.8	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q1(Sep)-95	09/20/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q4-95	12/18/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U

TABLE D5
SUMMARY OF VOLATILE ORGANIC CONSTITUENT GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date (Parameter)	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Benzene (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	Chloromethane (µg/L)	cis-1,2-Dichloroethene (µg/L)	p-Isopropyltoluene (p-Cymene) (µg/L)	Dichlorodifluoromethane (µg/L)	iso-Propylbenzene (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl chloride (µg/L)	Xylene (meta & para) (µg/L)	Xylene (ortho) (µg/L)	Xylene (total) (µg/L)
Downgradient Wells Continued																					
MW-01	MW-1 Q1-96	02/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q2-96	05/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q3-96	09/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q4-96	10/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q2-97	06/24/1997	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q3-97	09/11/1997	1 U	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q4-97	11/25/1997	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	NA	NA	0.8	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q1-98	03/25/1998	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q2-98	06/29/1998	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q3-98	09/21/1998	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q1-99	03/03/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q2-99	06/14/1999	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	NA	NA	0.8	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q3-99	09/22/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q4-99	12/09/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q1-00	03/15/2000	1 U	NA	NA	1 U	1 U	0.9 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q2-00	06/21/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q3-00	09/27/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-01	MW-1 Q4-00	12/05/2000	0.5 U	NA	NA	0.5 U	0.5 U	0.76	NA	0.5 U	NA	NA	NA	0.64	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q1-01	03/27/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.77	NA	0.5 U	NA	NA	NA	0.66	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-01	MW-1 Q2-01	06/27/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.78	NA	0.5 U	NA	NA	NA	0.66	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
Well #2	MW-13 Q4-02	12/17/2002	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.79	0.5 U	0.5 U	NA	NA	NA	0.67	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-03	MW-3 Q3-94	08/01/1994	NA	NA	NA	0.6	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.6	2.2	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q3(Sept)-94	09/01/1994	NA	NA	NA	0.5 U	0.5 U	0.7	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q4(Nov)-94	11/01/1994	NA	NA	NA	0.5 U	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q4(Dec)-94	12/01/1994	NA	NA	NA	0.5 U	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q1-95	01/01/1995	NA	NA	NA	0.5 U	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q1(Feb)-95	02/01/1995	NA	NA	NA	0.5 U	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q3-95	07/01/1995	NA	NA	NA	0.5 U	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q3(Sept)-95	09/20/1995	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q4-95	12/18/1995	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q1-96 Dup	02/01/1996	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q1-96	02/01/1996	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q2-96	05/01/1996	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q3-96	09/01/1996	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q4-96	10/01/1996	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q2-97	06/24/1997	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q3-97	09/11/1997	NA	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q1-98	03/25/1998	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q2-98	06/29/1998	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q3-98	09/21/1998	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U

TABLE D5
SUMMARY OF VOLATILE ORGANIC CONSTITUENT GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Benzene (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	Chloromethane (µg/L)	cis-1,2-Dichloroethene (µg/L)	p-Isopropyltoluene (p-Cymene) (µg/L)	Dichlorodifluoromethane (µg/L)	iso-Propylbenzene (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl chloride (µg/L)	Xylene (meta & para) (µg/L)	Xylene (ortho) (µg/L)	Xylene (total) (µg/L)
Downgradient Wells Continued																					
MW-03	MW-3 Q4-98	12/30/1998	NA	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q1-99	03/03/1999	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q2-99	06/14/1999	NA	NA	NA	0.5 U	0.5 U	0.6	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q3-99	09/22/1999	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q4-99	12/09/1999	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q1-00	03/15/2000	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q2-00	06/21/2000	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q3-00	09/27/2000	NA	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-03	MW-3 Q4-00	12/05/2000	NA	NA	NA	0.5 U	0.5 U	0.56	NA	0.5 U	NA	NA	NA	0.63	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q1-01	03/27/2001	NA	NA	NA	0.5 U	0.5 U	0.51	NA	0.5 U	NA	NA	NA	0.75	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-03	MW-3 Q2-01	06/27/2001	NA	NA	NA	0.5 U	0.5 U	0.5	NA	0.5 U	NA	NA	NA	0.72	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-95	03/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	1	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.8	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-95 Dup	03/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	NA	NA	0.6	0.5 U	0.5 U	0.8	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-95	07/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	1	NA	0.5 U	NA	NA	NA	0.8	0.5 U	0.5 U	1	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-95 Dup	07/01/1995	0.5 U	NA	NA	0.5 U	0.5 U	1	NA	0.5 U	NA	NA	NA	0.8	0.5 U	0.5 U	1	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3(Sept)-95	09/20/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q3(Sept)-95 Dup	09/20/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q4-95	10/30/1995	1 U	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	1	1 U	1 U	1	1 U	NA	NA	1 U
MW-11	MW-11 Q4-95 Dup	10/30/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q4(Dec)-95	12/18/1995	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q1-96	02/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q2-96	05/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q2(Jun)-96	06/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q3-96	09/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q4-96	10/01/1996	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q1-97	03/24/1997	1 U	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q2-97	06/24/1997	1 U	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q4-97	11/25/1997	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	NA	NA	0.9	0.5 U	0.5 U	1	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-98	03/25/1998	1 U	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q2-98	06/29/1998	1 U	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q3-98	09/21/1998	1 U	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q4-98	12/30/1998	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	NA	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-99	03/03/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q2-99	06/14/1999	0.5 U	NA	NA	0.5 U	0.5 U	0.8	NA	0.5 U	NA	NA	NA	2.3	0.5 U	2.8	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-99	09/22/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q4-99	12/09/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q1-00	03/15/2000	1 U	NA	NA	1 U	1 U	1	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q2-00	06/21/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q3-00	09/27/2000	1 U	NA	NA	1 U	1 U	1.1	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-11	MW-11 Q4-00	12/05/2000	0.5 U	NA	NA	0.5 U	0.5 U	0.98	NA	0.5 U	NA	NA	NA	0.64	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U

TABLE D5
SUMMARY OF VOLATILE ORGANIC CONSTITUENT GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Benzene (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	Chloromethane (µg/L)	cis-1,2-Dichloroethene (µg/L)	p-Isopropyltoluene (p-Cymene) (µg/L)	Dichlorodifluoromethane (µg/L)	iso-Propylbenzene (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl chloride (µg/L)	Xylene (meta & para) (µg/L)	Xylene (ortho) (µg/L)	Xylene (total) (µg/L)
Downgradient Wells Continued																					
MW-11	MW-11 Q1-01	03/27/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.98	NA	0.5 U	NA	NA	NA	0.68	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q2-01	06/27/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.99	NA	0.5 U	NA	NA	NA	0.69	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-01	09/06/2001	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	NA	NA	0.75	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q4-01	12/14/2001	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	NA	NA	0.73	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-02	03/27/2002	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	NA	NA	0.78	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q2-02	06/13/2002	0.5 U	NA	NA	0.5 U	0.5 U	0.97	NA	0.5 U	NA	NA	NA	0.67	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-02	09/18/2002	1 U	NA	NA	0.5 U	1 U	1.1	NA	1 U	NA	1 U	NA	1 U	0.5 U	1 U	1 U	1 U	NA	NA	0.5 U
MW-11	MW-11 Q4-02	12/17/2002	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	1 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-03	03/26/2003	0.5 U	NA	NA	0.5 U	0.5 U	0.94	NA	0.5 U	NA	0.5 U	NA	0.63	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q2-03	06/26/2003	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	0.64	NA	0.82	1.1	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-03	09/25/2003	0.5 U	NA	NA	0.5 U	0.5 U	1	NA	0.5 U	NA	0.56	NA	0.71	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q4-03	12/18/2003	0.5 U	NA	NA	0.5 U	0.5 U	1	NA	0.5 U	NA	0.75	NA	0.87	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-04	03/17/2004	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	0.8	NA	0.75	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q2-04	06/17/2004	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	0.8	NA	0.75	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-04	09/30/2004	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.71	NA	0.84	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q4-04	12/15/2004	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	0.63	NA	0.85	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-05	03/31/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.3	0.5 U	0.5 U	NA	0.8	NA	0.84	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-11	MW-11 Q2-05	06/23/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.1	0.5 U	0.5 U	NA	0.77	NA	0.81	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-11	MW-11 Q3-05	09/29/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.2	0.5 U	0.5 U	NA	0.5 U	NA	0.88	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-11	MW-11 Q4-05	12/14/2005	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.76	NA	0.93	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-06	03/30/2006	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.94	NA	0.91	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q2-06	06/21/2006	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.8	NA	1.1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-06	09/21/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.2	0.5 U	0.5 U	NA	0.84	NA	0.87	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-11	MW-11 Q4-06	12/28/2006	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.93	NA	0.81	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-07	03/22/2007	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.72	NA	0.78	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q2-07	06/28/2007	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.69	NA	0.93	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-07	09/26/2007	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	0.69	NA	0.9	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q4-07	12/27/2007	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.63	NA	0.93	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-08	03/27/2008	0.5 U	NA	NA	0.5 U	0.5 U	1.3	NA	0.5 U	NA	0.92	NA	1.1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q2-08	06/25/2008	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	0.8	NA	1.1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-08	09/24/2008	0.5 U	NA	NA	0.5 U	0.5 U	1.1	NA	0.5 U	NA	0.76	NA	1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q4-08	12/17/2008	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.83	NA	0.99	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-09	03/20/2009	0.5 U	NA	NA	0.5 U	0.5 U	1.2	NA	0.5 U	NA	0.52	NA	1.1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q2-09	06/24/2009	0.5 U	NA	NA	0.5 U	0.5 U	1.3	NA	0.5 U	NA	0.5 U	NA	0.98	0.69	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-09	09/24/2009	0.5 U	NA	NA	0.5 U	0.5 U	1.3	NA	0.5 U	NA	0.55	NA	0.91	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q4-09	12/18/2009	0.5 U	NA	NA	0.5 U	0.5 U	1.4	NA	0.5 U	NA	0.5 U	NA	1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q1-10	03/30/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.3	0.5 U	0.5 U	NA	0.52	NA	1.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-11	MW-11 Q2-10	06/23/2010	0.5 U	NA	NA	0.5 U	0.5 U	1	NA	0.5 U	NA	0.5 U	NA	0.85	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-11	MW-11 Q3-10	09/29/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.5	0.5 U	0.5 U	NA	0.5 U	NA	1.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-11	MW-11 Q4-10	12/15/2010	0.5 U	NA	NA	0.5 U	0.5 U	0.98	NA	0.5 U	NA	0.5 U	NA	0.94	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U

TABLE D5
SUMMARY OF VOLATILE ORGANIC CONSTITUENT GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Sample Date	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Benzene (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	Chloromethane (µg/L)	cis-1,2-Dichloroethene (µg/L)	p-Isopropyltoluene (p-Cymene) (µg/L)	Dichlorodifluoromethane (µg/L)	iso-Propylbenzene (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl chloride (µg/L)	Xylene (meta & para) (µg/L)	Xylene (ortho) (µg/L)	Xylene (total) (µg/L)
Downgradient Wells Continued																					
MW-11	MW-11 Q1-2011	03/24/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.2	0.5 U	0.5 U	NA	0.5 U	NA	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-14	MW-14 Q3-99	09/22/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-14	MW-14 Q4-99	12/09/1999	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-14	MW-14 Q1-00	03/15/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-14	MW-14 Q2-00	06/21/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-14	MW-14 Q3-00	09/27/2000	1 U	NA	NA	1 U	1 U	1 U	NA	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
MW-14	MW-14 Q4-00	12/05/2000	0.5 U	NA	NA	0.5 U	0.5 U	0.9	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-01	03/27/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.56	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q2-01	06/27/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.79	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q3-01	09/06/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.82	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q4-01	12/14/2001	0.5 U	NA	NA	0.5 U	0.5 U	0.85	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-02	03/27/2002	0.5 U	NA	NA	0.5 U	0.5 U	0.76	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q2-02	06/13/2002	0.5 U	NA	NA	0.5 U	0.5 U	0.66	NA	0.5 U	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q3-02	09/18/2002	1 U	NA	NA	0.5 U	1 U	1 U	NA	1 U	NA	1 U	NA	1 U	0.5 U	1 U	1 U	1 U	NA	NA	0.5 U
MW-14	MW-14 Q4-02	12/17/2002	0.5 U	NA	NA	0.5 U	0.5 U	1 U	NA	0.5 U	NA	1.6	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-03	03/26/2003	0.5 U	NA	NA	0.5 U	0.5 U	0.68	NA	0.5 U	NA	1.2	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q2-03	06/26/2003	0.5 U	NA	NA	0.5 U	0.5 U	0.76	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.61	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q3-03	09/25/2003	0.5 U	NA	NA	0.5 U	0.5 U	0.67	NA	0.5 U	NA	1.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q4-03	12/18/2003	0.5 U	NA	NA	0.5 U	0.5 U	0.82	NA	0.5 U	NA	1.9	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-04	03/17/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.82	NA	0.5 U	NA	1.7	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q2-04	06/17/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.63	NA	0.5 U	NA	1.3	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q3-04	09/30/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.76	NA	0.5 U	NA	1.4	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q4-04	12/15/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.7	NA	0.5 U	NA	1.2	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-05	03/31/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.78	0.5 U	0.5 U	NA	1	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-14	MW-14 Q2-05	06/23/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-14	MW-14 Q3-05	09/29/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.57	0.5 U	0.5 U	NA	0.83	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-14	MW-14 Q4-05	12/14/2005	0.5 U	NA	NA	0.5 U	0.5 U	0.63	NA	0.5 U	NA	0.94	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-06	03/30/2006	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.58	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q3-06	09/21/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5	0.5 U	0.5 U	NA	0.86	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-14	MW-14 Q4-06	12/28/2006	0.5 U	NA	NA	0.5 U	0.5 U	0.65	NA	0.5 U	NA	1.7	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-07	03/22/2007	0.5 U	NA	NA	0.5 U	0.5 U	0.56	NA	0.5 U	NA	0.85	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q2-07	06/28/2007	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q3-07	09/26/2007	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q4-07	12/27/2007	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-08	03/27/2008	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.74	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q2-08	06/25/2008	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	1	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q3-08	09/24/2008	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.74	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q4-08	12/17/2008	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.53	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-09	03/20/2009	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.68	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q2-09	06/24/2009	0.5 U	NA	NA	0.5 U	0.5 U	0.52	NA	0.5 U	NA	0.91	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U

TABLE D5
SUMMARY OF VOLATILE ORGANIC CONSTITUENT GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Benzene (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	Chloromethane (µg/L)	cis-1,2-Dichloroethene (µg/L)	p-Isopropyltoluene (p-Cymene) (µg/L)	Dichlorodifluoromethane (µg/L)	iso-Propylbenzene (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl chloride (µg/L)	Xylene (meta & para) (µg/L)	Xylene (ortho) (µg/L)	Xylene (total) (µg/L)
Downgradient Wells Continued																					
MW-14	MW-14 Q3-09	09/24/2009	0.5 U	NA	NA	0.5 U	0.5 U	0.65	NA	0.5 U	NA	1.4	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q4-09	12/18/2009	0.5 U	NA	NA	0.5 U	0.5 U	0.61	NA	0.5 U	NA	0.88	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-10	03/30/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.61	0.5 U	0.5 U	NA	1.3	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-14	MW-14 Q2-10	06/23/2010	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.53	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q3-10	09/29/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.76	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-14	MW-14 Q4-10	12/15/2010	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	1.1	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
MW-14	MW-14 Q1-2011	03/24/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55	0.5 U	0.5 U	NA	0.71	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
MW-15	MW-15 Q3-01	09/06/2001	7.6	NA	NA	0.5 U	1.7	0.5 U	NA	9.2	NA	NA	NA	11	0.5 U	3.8	1.6	1.4	NA	NA	0.5 U
MW-15	MW-15 Q4-01	12/14/2001	5.8	NA	NA	0.5 U	1.2	0.5 U	NA	8.1	NA	NA	NA	9.2	0.5 U	3.4	1.4	2.1	NA	NA	0.5 U
MW-15	MW-15 Q1-02	03/27/2002	5.8	NA	NA	0.5 U	1.4	0.5 U	NA	8.1	NA	NA	NA	8.6	0.5 U	3.1	1.3	2.8	NA	NA	0.5 U
MW-15	MW-15 Q2-02	06/13/2002	5.5	NA	NA	0.5 U	1.5	0.5 U	NA	8.5	NA	NA	NA	9.4	0.5 U	3	1	3.4	NA	NA	0.5 U
MW-15	MW-15 Q3-02	09/18/2002	6.2	NA	NA	0.5 U	1.5	1 U	NA	8.9	NA	9.4	NA	9.5	0.5 U	3.5	1	3.7	NA	NA	0.5 U
MW-15	MW-15 Q4-02	12/17/2002	6.1	NA	NA	0.5 U	1.4	1 U	NA	8.8	NA	13	NA	9.9	0.5 U	3.7	1.4	3.3	NA	NA	0.5 U
MW-15	MW-15 Q1-03	03/26/2003	4.8	NA	NA	0.5 U	1.1	0.5 U	NA	6.8	NA	10	NA	7.4	0.5 U	2.8	1.1	2.4	NA	NA	0.5 U
MW-15	MW-15 Q2-03	06/26/2003	5.2	NA	NA	0.5 U	1.2	0.5 U	NA	8.4	NA	11	NA	9.5	0.5 U	3.3	1.2	2.7	NA	NA	0.5 U
MW-15	MW-15 Q3-03	09/25/2003	5.9	NA	NA	0.5 U	1.4	0.5 U	NA	9.4	NA	10	NA	9.2	0.5 U	3.4	1.1	3.8	NA	NA	0.5 U
MW-15	MW-15 Q4-03	12/18/2003	5.1	NA	NA	0.5 U	1.1	0.5 U	NA	8.6	NA	11	NA	9.9	0.5 U	3	1	2.8	NA	NA	0.5 U
MW-15	MW-15 Q1-04	03/17/2004	4.5	NA	NA	0.5 U	0.78	0.5 U	NA	7.7	NA	9.9	NA	6.7	0.68	2.6	0.97	1.8	NA	NA	0.5 U
MW-15	MW-15 Q2-04	06/17/2004	4.6	NA	NA	0.5 U	1.9	0.5 U	NA	7.5	NA	11	NA	7	0.5 U	2.5	1	2.3	NA	NA	0.5 U
MW-15	MW-15 Q3-04	09/30/2004	4.5	NA	NA	0.5 U	0.78	0.5 U	NA	8	NA	8.4	NA	7.5	0.5 U	2.7	1.2	1.9	NA	NA	0.5 U
MW-15	MW-15 Q4-04	12/15/2004	4.1	NA	NA	0.5 U	0.74	0.5 U	NA	7.7	NA	7.6	NA	7.6	0.5 U	2.5	1.1	1.9	NA	NA	0.5 U
MW-15	MW-15 Q1-05	03/31/2005	5.6	0.5 U	0.5 U	0.5 U	1.2	0.5 U	0.5 U	8.9	NA	9.4	NA	8.6	0.5 U	3	1.1	3.1	0.5 U	0.5 U	NA
MW-15	MW-15 Q2-05	06/23/2005	4.9	0.5 U	0.5 U	0.5 U	0.93	0.5 U	0.5 U	8.3	NA	8.2	NA	7.5	0.5 U	2.7	1.1	2.4	0.5 U	0.5 U	NA
MW-15	MW-15 Q3-05	09/29/2005	5.5	0.5 U	0.5 U	0.5 U	0.85	0.5 U	0.5 U	11	NA	7	NA	7	0.5 U	3	1.1	2.1	0.5 U	0.5 U	NA
MW-15	MW-15 Q4-05	12/14/2005	4.5	NA	NA	0.5 U	0.74	0.5 U	NA	8.6	NA	6.7	NA	6.9	0.5 U	2.5	1.3	1.6	NA	NA	0.5 U
MW-15	MW-15 Q1-06	03/30/2006	4.6	NA	NA	0.5 U	0.67	0.5 U	NA	7.9	NA	6.6	NA	6.5	0.5 U	2.4	1.2	1.6	NA	NA	0.5 U
MW-15	MW-15 Q2-06	06/21/2006	4.1	NA	NA	0.5 U	0.69	0.5 U	NA	7.5	NA	5.9	NA	6.5	0.5 U	2.1	1.1	1.6	NA	NA	0.5 U
MW-15	MW-15 Q3(Sept)-06	09/21/2006	6.3	0.5 U	0.5 U	0.5 U	1	0.5 U	0.5 U	12	NA	3.8	NA	7.9	0.5 U	3	0.5 U	3	0.5 U	0.5 U	NA
MW-15	MW-15 Q4-06	12/28/2006	4.3	NA	NA	0.5 U	0.61	0.5 U	NA	8.6	NA	0.57 U	NA	6.3	0.5 U	2.1	0.69	1.9	NA	NA	0.5 U
MW-15	MW-15 Q1-07	03/22/2007	4.4	NA	NA	0.5 U	0.57	0.5 U	NA	8.7	NA	4.3	NA	5.6	0.5 U	2.2	1	1.5	NA	NA	0.5 U
MW-15	MW-15 Q2-07	06/28/2007	3.7	NA	NA	0.5 U	0.5 U	0.5 U	NA	8	NA	5.3	NA	6.1	0.5 U	2.1	1.2	1.3	NA	NA	0.5 U
MW-15	MW-15 Q3-07	09/26/2007	5.4	NA	NA	0.5 U	0.66	0.5 U	NA	12	NA	4	NA	6.9	0.5 U	2.5	0.56	2	NA	NA	0.5 U
MW-15	MW-15 Q4-07	12/27/2007	3.9	NA	NA	0.5 U	0.64	0.5 U	NA	8.7	NA	4.1	NA	5.5	0.5 U	2	1.1	1.6	NA	NA	0.5 U
MW-15	MW-15 Q1-08	03/27/2008	3.7	NA	NA	0.5 U	0.5 U	0.5 U	NA	8.8	NA	4.8	NA	6.4	0.5 U	2.2	1.1	1.2	NA	NA	0.5 U
MW-15	MW-15 Q2-08	06/25/2008	3.1	NA	NA	0.5 U	0.5 U	0.5 U	NA	7.3	NA	5.4	NA	5.5	0.5 U	1.9	1.1	0.96	NA	NA	0.5 U
MW-15	MW-15 Q3-08	09/24/2008	3.2	NA	NA	0.5 U	0.5 U	0.5 U	NA	7.8	NA	4.1	NA	6	0.5 U	1.7	1.1	1.1	NA	NA	0.5 U
MW-15	MW-15 Q4-08	12/17/2008	3.3	NA	NA	0.5 U	0.5 U	0.5 U	NA	8.8	NA	5.2	NA	4.9	0.5 U	1.9	0.84	1.1	NA	NA	0.5 U
MW-15	MW-15 Q1-09	03/20/2009	3	NA	NA	0.5 U	0.5 U	0.5 U	NA	8.1	NA	3.9	NA	5.6	0.5 U	1.9	1.1	0.8	NA	NA	0.5 U
MW-15	MW-15 Q2-09	06/24/2009	3.6	NA	NA	0.5 U	0.5 U	0.5 U	NA	8.5	NA	3.5	NA	5.1	0.5 U	1.9	0.9	0.95	NA	NA	0.5 U
MW-15	MW-15 Q3-09	09/24/2009	2.9	NA	NA	0.5 U	0.5 U	0.5 U	NA	7.1	NA	4.1	NA	4.5	0.5 U	1.7	1.1	0.68	NA	NA	0.5 U

TABLE D5
SUMMARY OF VOLATILE ORGANIC CONSTITUENT GROUNDWATER DATA
City of Walla Walla Sudbury Road Landfill

Location	Sample ID	Parameter / Sample Date	1,1-Dichloroethane (µg/L)	1,2-Dichloroethane (µg/L)	1,2-Dichloropropane (µg/L)	Benzene (µg/L)	Chloroethane (µg/L)	Chloroform (µg/L)	Chloromethane (µg/L)	cis-1,2-Dichloroethene (µg/L)	p-Isopropyltoluene (p-Cymene) (µg/L)	Dichlorodifluoromethane (µg/L)	iso-Propylbenzene (µg/L)	Tetrachloroethene (µg/L)	Toluene (µg/L)	Trichloroethene (µg/L)	Trichlorofluoromethane (µg/L)	Vinyl chloride (µg/L)	Xylene (meta & para) (µg/L)	Xylene (ortho) (µg/L)	Xylene (total) (µg/L)
Downgradient Wells Continued																					
MW-15	MW-15 Q4-09	12/18/2009	3.3	NA	NA	0.5 U	0.5 U	0.5 U	NA	8.1	NA	3.6	NA	4.8	0.5 U	1.8	0.92	0.9	NA	NA	0.5 U
MW-15	MW-15 Q1-10	03/30/2010	2.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6.5	NA	3.6	NA	5	0.5 U	1.6	1.1	0.66	0.5 U	0.5 U	NA
MW-15	MW-15 Q2-10	06/23/2010	2.4	NA	NA	0.5 U	0.5 U	0.5 U	NA	6.7	NA	2.4	NA	4	0.5 U	1.5	0.72	0.55	NA	NA	0.5 U
MW-15	MW-15 Q3-10	09/29/2010	3.3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	8.9	NA	3.3	NA	5.1	0.5 U	1.9	0.89	0.84	0.5 U	0.5 U	NA
MW-15	MW-15 Q4-10	12/15/2010	2.4	NA	NA	0.5 U	0.5 U	0.5 U	NA	7.2	NA	3.1	NA	4.3	0.5 U	1.4	0.79	0.76	NA	NA	0.5 U
MW-15	MW-15 Q1-2011	03/24/2011	3.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	9.4	NA	2.6	NA	4.6	0.5 U	1.7	0.65	0.77	0.5 U	0.5 U	NA
MW-16	MW-16 Q3-05	09/01/2005	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	5 U	1 U	1.61	1 U	1 U	1 U	1 U	0.2 U	2 U	1 U	NA
MW-16	MW-16 Q2-06	06/21/2006	0.5 U	NA	NA	0.5 U	0.5 U	0.54	NA	0.5 U	NA	0.74	NA	0.52	0.5 U	0.5 U	1.8	0.5 U	NA	NA	0.5 U
MW-16	MW-16 Q3(Sept)-06	09/21/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.63	NA	0.5 U	0.5 U	0.5 U	1.4	0.5 U	0.5 U	0.5 U	NA
MW-16	MW-16 Q1-2011	03/24/2011	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.57	0.5 U	0.5 U	NA	0.54	NA	0.64	0.5 U	0.5 U	0.74	0.5 U	0.5 U	0.5 U	NA
Residential Wells																					
Camp	Camp Q1-05	03/31/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.74	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Camp	Camp Q2-05	06/23/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.67	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Camp	Camp Q3-05	09/29/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.73	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Camp	Camp Q3-06	09/21/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.76	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Camp	Camp Q2-09	06/24/2009	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Kinman	Kinman Q1-05	03/31/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Kinman	Kinman Q2-05	06/23/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Small	Small 061302	06/13/2002	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	NA	1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
Small	Small 062602	06/26/2002	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	NA	1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
Small	Small Q1-04	03/17/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	NA	0.99	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
Small	Small Q3-04	09/30/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.52	NA	0.5 U	NA	0.5 U	NA	1.1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
Small	Small Q4-04	12/15/2004	0.5 U	NA	NA	0.5 U	0.5 U	0.51	NA	0.5 U	NA	0.5 U	NA	1.1	0.5 U	0.5 U	0.5 U	0.5 U	NA	NA	0.5 U
Small	Small Q1-05	03/31/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55	0.5 U	0.5 U	NA	0.5 U	NA	1.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Small	Small Q3-05	09/29/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54	0.5 U	0.5 U	NA	0.5 U	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Small	Small Q3-06	09/21/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.51	0.5 U	0.5 U	NA	0.5 U	NA	1.2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Small	Small Q2-09	06/24/2009	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.56	0.5 U	0.5 U	NA	0.5 U	NA	1.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Small	Small Q3-10	09/29/2010	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.62	0.5 U	0.5 U	NA	0.5 U	NA	1.5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA

Notes:

Only VOC analytes that had at least one detection, or are a chemical of concern are appear in this Table. See Table D.5 for the list of the VOC analytes that were 100% non-detects and their reporting limit range.

Only samples that were tested for at least one VOC Analyte appear in this Table. See Table D.1 for an complete Analytical Schedule by sample.

J Analyte was detected, the result is an estimated value.
U Analyte was not detected at the given reporting limit.
UJ Analyte was not detected, and the given reporting limit is an estimated value.
NA Not analyzed

TABLE D6
SUMMARY OF NON-DETECTED VOLATILE ORGANIC CONSTITUENTS IN GROUNDWATER
City of Walla Walla Sudbury Road Landfill

Parameter	Unit	No. of Results	No. of Non-Detects	Percent of Non-Detects	Minimum Non-Detect Value	Maximum Non-Detect Value
Gasoline Range Hydrocarbons	µg/L	3	3	100.00%	100	100
1,1,1,2-Tetrachloroethane	µg/L	63	63	100.00%	0.2	1
1,1,1-Trichloroethane	µg/L	63	63	100.00%	0.2	1
1,1,2,2-Tetrachloroethane	µg/L	63	63	100.00%	0.2	1
1,1,2-Trichloroethane	µg/L	63	63	100.00%	0.2	1
1,1-Dichloroethene	µg/L	93	93	100.00%	0.2	1
1,1-Dichloropropene	µg/L	14	14	100.00%	0.2	1
1,2,3-Trichlorobenzene	µg/L	14	14	100.00%	0.2	1
1,2,3-Trichloropropane	µg/L	63	63	100.00%	0.2	1
1,2,4-Trichlorobenzene	µg/L	14	14	100.00%	0.2	1
1,2,4-Trimethylbenzene	µg/L	14	14	100.00%	0.2	1
1,2-Dibromo-3-chloropropane	µg/L	63	63	100.00%	1	5
1,2-Dibromoethane	µg/L	63	63	100.00%	0.2	2
1,2-Dichlorobenzene	µg/L	63	63	100.00%	0.2	1
1,3,5-Trimethylbenzene	µg/L	14	14	100.00%	0.2	1
1,3-Dichlorobenzene	µg/L	14	14	100.00%	0.2	1
1,3-Dichloropropane	µg/L	14	14	100.00%	0.2	1
1,4-Dichlorobenzene	µg/L	63	63	100.00%	0.2	1
2,2-Dichloropropane	µg/L	14	14	100.00%	0.2	1
2-Chloroethyl vinyl ether	µg/L	6	6	100.00%	1	1
2-Chlorotoluene	µg/L	14	14	100.00%	0.2	1
2-Hexanone	µg/L	63	63	100.00%	2	20
4-Chlorotoluene	µg/L	14	14	100.00%	0.2	1
Acetone	µg/L	63	63	100.00%	5	25
Acrylonitrile	µg/L	49	49	100.00%	5	5
Bromobenzene	µg/L	14	14	100.00%	0.2	1
Bromochloromethane	µg/L	63	63	100.00%	0.2	1
Bromodichloromethane	µg/L	63	63	100.00%	0.2	1
Bromoform	µg/L	63	63	100.00%	0.5	1
Bromomethane	µg/L	63	63	100.00%	0.2	5
Carbon disulfide	µg/L	63	63	100.00%	0.2	1
Carbon tetrachloride	µg/L	63	63	100.00%	0.2	1
Chlorobenzene	µg/L	63	63	100.00%	0.2	1
Chloromethane	µg/L	63	63	100.00%	0.5	5
cis-1,3-Dichloropropene	µg/L	63	63	100.00%	0.2	1
cis-1,4-Dichloro-2-butene	µg/L	48	48	100.00%	10	10
Dibromochloromethane	µg/L	63	63	100.00%	0.2	1
Dibromomethane	µg/L	63	63	100.00%	0.2	1
Dichloromethane	µg/L	63	63	100.00%	1	10
Ethylbenzene	µg/L	63	63	100.00%	0.2	1
Hexachlorobutadiene	µg/L	14	14	100.00%	0.2	1
Iodomethane	µg/L	55	55	100.00%	1	5
Methyl ethyl ketone	µg/L	63	63	100.00%	5	20
Methyl iso butyl ketone	µg/L	63	63	100.00%	1	20
Methyl-Tert-Butyl Ether	µg/L	12	12	100.00%	0.2	1
Naphthalene	µg/L	14	14	100.00%	1	2
n-Butylbenzene	µg/L	14	14	100.00%	0.2	1
n-Propylbenzene	µg/L	14	14	100.00%	0.2	1
p-Isopropyltoluene (p-Cymene)	µg/L	14	14	100.00%	0.2	5
sec-Butylbenzene	µg/L	14	14	100.00%	0.2	1
Styrene	µg/L	63	63	100.00%	0.2	1
tert-Butylbenzene	µg/L	14	14	100.00%	0.2	1
trans-1,2-Dichloroethene	µg/L	63	63	100.00%	0.2	1
trans-1,3-Dichloropropene	µg/L	63	63	100.00%	0.2	1
trans-1,4-Dichloro-2-butene	µg/L	63	63	100.00%	10	10
Vinyl acetate	µg/L	55	55	100.00%	2	5
Xylene (meta & para)	µg/L	63	63	100.00%	0.4	2
Xylene (total)	µg/L	277	277	100.00%	0.5	1

APPENDIX E

Sudbury Road Landfill
Sampling and Analysis Plan

Schwyn Environmental Services

Sampling and Analysis Plan
for
Sudbury Road Landfill Remedial Action
Walla Walla, Washington

December 28, 2011

Prepared for:

City of Walla Walla

Prepared by:

Schwyn Environmental Services

4621 South Custer
Spokane, WA 99223
(509) 448-3187

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LIST OF ABBREVIATIONS AND ACRONYMS

AO	Agreed Order No. 8456
ARARs	Applicable or relevant and appropriate requirements
CH_4	Methane
City	City of Walla Walla, Washington
CO_2	Carbon dioxide
COC	Chain of custody
DGPS	Differential Global Positioning System
DQO	Data Quality Objective
Ecology	Washington State Department of Ecology
EM	Electromagnetic
gal/ft^3	Gallons per cubic foot
GPS	Global Positioning System
HASP	Health and Safety Plan
HHWF	Household Hazardous Waste Facility
LFG	Landfill gas
MAG	Magnetic
MDL	Method detection limit
MRL	Method reporting level
MS/MSD	Matrix spike/matrix spike duplicate
MSW	Municipal solid waste
MTCA	Washington State Model Toxics Control Act
PARCC	Precision, accuracy, representativeness, completeness, and comparability
O_2	Oxygen
PID	Photo ionization detector
PLP	Potentially liable party
PQL	Practical quantitation limit
PVC	Polyvinyl chloride
QA	Quality assurance
QC	Quality control
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RPD	Relative percent difference

SAP	Sampling and Analysis Plan
Site	Sudbury Road Landfill
Schwyn	Schwyn Environmental Services, LLC
SM	Standard Method
TDS	Total dissolved solids
TOC	Total organic carbon
µg/L	Micrograms per liter
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
VOA	Volatile organic analysis
VOC	Volatile organic compound
WAC	Washington Administrative Code

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP), prepared by Schwyn Environmental Services, LLC (Schwyn), describes procedures for conducting field activities and laboratory analyses during the Remedial Investigation (RI) at the City of Walla Walla (City) Sudbury Road Landfill (Site) located in Walla Walla, Washington. The RI is being conducted pursuant to Agreed Order No. 8456 (AO). The primary objective of this plan is to provide field and laboratory procedures that will maximize accuracy, reproducibility, and comparability of data between sampling events.

This SAP is organized as follows:

- Section 1 summarizes general information for the Site;
- Section 2 presents the Field and Laboratory Procedures;
- Section 3 presents the Quality Assurance (QA) procedures;
- Section 4 identifies the Health and Safety requirements; and
- Section 5 describes the Reporting submittals.

1.1 PURPOSE AND OBJECTIVES

In March 2010, the Washington State Department of Ecology (Ecology) submitted a Potentially Liable Person (PLP) Status Letter to the City (Ecology 2010). The City and Ecology subsequently initiated the AO, effective May 26, 2011. The AO stipulated the scope of work and schedule for the preparation of the Remedial Investigation/Feasibility Study (RI/FS). The first task of the AO is to prepare a Work Plan for the RI to supplement existing data and determine the nature and extent of contamination at the Site. The objective of the Work Plan is to identify the specific tasks and scope of work to complete the RI. This SAP pertains to the RI field and laboratory tasks that will be completed to assess the source location, transport mechanism(s), and the extent of contamination. This SAP, along with the accompanying Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP), were prepared to fulfill Task 1 of the required Scope of Work presented in Exhibit D of the AO.

1.2 SITE DESCRIPTION

According to the AO, the Site is referred to as the Sudbury Road Landfill and is generally located at 414 Sudbury Road, Walla Walla, Washington 99362, about 4 miles west of the City and ½ mile north of Highway 12, in the southwest quarter of Section 14, southeast quarter of section 15, northeast quarter of Section 22, and northwest quarter of Section 23, Township 7 North, Range 35 East, Willamette Meridian (Figure 1). The landfill area itself is approximately 125 acres in size and is located within the western portion of an 828.86-acre City-owned parcel of land zoned and used for various waste management purposes (Figure 2). The Site is designated by Ecology as Facility No. 4446540.

1.3 BASIS FOR RI SCOPE

The RI Scope of Work is based on an evaluation of all existing data obtained during previous RI work and compliance monitoring data collected from the Site. These data were utilized to formulate a preliminary conceptual model of the Site, establish data gaps, and to formulate a work plan to complete the RI. The basis for the RI Scope of Work is detailed in the RI Work Plan. The field program that will be used to close the data gaps and the technical approach for each program including the sampling strategy, locations, methods, and procedures, are presented in the following sections of this SAP.

2.0 FIELD AND LABORATORY PROCEDURES

This section describes the sampling strategy and procedures (sample location, collection methods, and laboratory analyses) that will be used during the RI for the Site. The exploration locations are shown on Figure 3.

The following field programs will be conducted to complete the RI:

- Geophysical Survey: A geophysical survey will be performed to assess the limit of the solid waste in Areas 1, 2, and 5.
- Test Pit Program: A test pit program will be conducted to collect samples for soil characteristic (geotechnical) analysis and to evaluate the soil cover thickness over Areas 1 and 5. Test pits may also be excavated to verify the limits of the municipal solid waste (MSW) indicated by the geophysical survey.
- Soil Boring Program: Five borings will be drilled to assess the vertical extent of the MSW in Area 1 (one boring), Area 2 (one boring), and in the northern trench of Area 5 (three borings). The Area 2 boring may be installed using a backhoe if test pit studies indicate that the backhoe sampling method would be more efficient.
- Groundwater Monitoring Well Program: Fourteen groundwater monitoring wells will be installed as follows:
  - One monitoring well will be installed adjacent to GW-5. The well will be sampled and monitored to distinguish groundwater quality at the Area 5/Area 6 boundary and to assess the interaction of landfill gas (LFG) on groundwater.
  - Two monitoring wells will be installed along the north drainage ditch to verify Geoprobe sampling data and the groundwater quality at Area 5/Area 6 boundary.
  - One monitoring well will be installed adjacent to Area 1 to assess the impact of the area-wide groundwater contamination on the Site and the interaction of LFG with groundwater at the southeast corner of the Site.
  - Two shallow and two deep off-property monitoring wells will be installed approximately 350 feet and 700 feet southwest (hydraulically downgradient) of MW-15. The wells will be sampled and monitored to assess downgradient groundwater quality in the lateral and vertical groundwater flow regimes.
  - One monitoring well will be installed in the former railroad right-of-way and one monitoring well will be installed northwest of Area 5 on the Camp property to assess the extent of contamination in the first encountered aquifer to the north and northwest of MW-15.
  - One deeper monitoring well will be installed adjacent to MW-15 with the screened section set midway between the MW-3 and MW-15 screens. The well will be identified as MW-15D. The well will be installed with 4-inch diameter casing so that pumping tests can be conducted. The well will provide information about the vertical components of groundwater flow and contamination, hydraulic continuity between MW-3 and MW-15, and aquifer parameters.
  - One monitoring well will be installed between MW-15 and MW-16 to assess groundwater quality in the first encountered aquifer downgradient of Area 5.
  - One monitoring well will be installed south of Area 5 and west of Area 6 to assess groundwater quality in the first encountered aquifer downgradient of Area 6.

- Soil Sampling Program: Soil samples will be collected and analyzed as follows:
  - One soil sample will be collected in each boring that is drilled through the MSW. The sample will be collected from a depth approximately 5 feet below the bottom of the waste (total of six soil samples). The samples will be analyzed for volatile organic compounds (VOCs).
  - Two soil samples will be collected from the test pits and analyzed by a soils testing laboratory for permeability, grain size distribution, soil moisture content, moisture-density relationship (Proctor test), and the soil hydraulic conductivity. The analyses will be used to characterize the geotechnical nature of the landfill cover soils.
  - Soil samples will be collected for geologic logging purposes from all subsurface explorations.
- Well Rehabilitation: The following rehabilitation tasks will be conducted to revitalize wells that have not been used in an extended period of time and to provide a means for consistent monitoring procedures between the wells:
  - The existing submersible pump in Monitoring Well MW-5 will be removed and the well will be developed. A dedicated Grundfos RediFlo2 electric submersible sampling pump will be installed for future sample collection purposes.
  - The existing submersible pump in Monitoring Well MW-9 will be removed and a dedicated Grundfos RediFlo2 sampling pump will be installed for future sample collection purposes.
  - One monitoring well will be installed to replace MW-14. A dedicated Grundfos RediFlo2 electric submersible sampling pump will be installed in the well for future sample collection purposes. MW-14 will be decommissioned consistent with applicable state regulation.

- Groundwater Monitoring Program:
  - Groundwater samples will be collected for laboratory analysis of WAC 173-351-990 Appendix III parameters from site wells MW-11, MW-14b, and MW-15 during the first sampling event. The data will be reviewed and the sampling plan will be modified to incorporate detected constituents that exceed MTCA screening levels.
  - Groundwater samples will be collected for laboratory analysis as follows from site wells (MW-11, MW-12b, MW-14b, MW-15, MW-16), upgradient wells (MW-5, MW-9, MW-10, MW-12b), domestic wells (Small, Camp, Kinman, Schmidt), and each new monitoring wells installed during the RI.
    - The site well samples and samples from all new monitoring wells will be analyzed for VOCs and conventional chemistry constituents.
    - Samples collected from the upgradient and domestic wells will be analyzed for VOCs only.
    - Field parameters will be measured in each well sampled.
  - Depth-to-groundwater will be measured in each groundwater monitoring well, including MW-7.
- Compliance Groundwater Monitoring Program Data Incorporation: Compliance Groundwater Monitoring is a requirement of WAC 173-351. Compliance Groundwater Monitoring data will be incorporated into the groundwater database established for the RI. Compliance monitoring procedures will be conducted in accordance with the Solid Waste Operating Permit and are not addressed in this SAP.

- Aquifer Testing Program: Aquifer testing will be conducted to determine a sustainable pumping rate, specific yield, transmissivity, hydraulic conductivity, and storage coefficient of the first encountered aquifer beneath the landfill. The aquifer testing will also be conducted to assess the hydraulic connection between the hydrostratigraphic zones screened in MW-3 and MW-15.
- Landfill Gas Program: The following LFG program will be conducted to evaluate gas migration and occurrence, identify gas characteristics, determine the effectiveness of the existing gas extraction system, identify the potential for impacts to groundwater, and assess the potential for vapor intrusion in the site structure of concern (Household Hazardous Waste Facility [HHWF]):
  - Six gas monitoring wells will be installed at the perimeters of the waste cells and adjacent to structures to assess potential gas migration.
  - One gas monitoring well will be installed and monitored in Area 1. The gas well will be installed in boring SB-22 to assess gas characteristics.
  - LFG field measurements (methane, carbon dioxide, and oxygen) will be collected from the new and existing gas wells to establish the baseline conditions in the vicinity of the refuse areas and at the perimeter of the landfill during four monitoring events.
  - LFG field measurements will be collected from Area 2 using a barhole probe survey to monitor LFG generation and migration potential.
  - LFG samples will be collected for laboratory analysis of VOCs from gas Monitoring Wells GW-5, GW-6, GW-7S, GW-7D, GW-8, GW-9, GW-11, and GW-12 to assess the potential LFG impact to groundwater during one sampling event.
  - The potential LFG migration to the HHWF will be evaluated by collecting a VOC sample from gas Monitoring Well GW-10. Additional testing will be performed within the structure if the testing indicates the potential for LFG to enter the building. Vapor intrusion modeling will be conducted if interior testing results exceed soil gas screening levels.
  - An operational evaluation of the existing gas extraction system will be conducted to determine if the system is effectively removing gas from Area 6 and preventing outward migration of gas. The evaluation will include collection of LFG pressures, flow, and gas characteristics in the Area 6 and surrounding LFG monitoring wells, along with the operating parameters of the flare station and existing Area 6 LFG extraction wells. Based on the preliminary evaluations, supplemental radius of influence testing may be conducted if methane is observed consistently above 2% in gas Monitoring Wells GW-7S, GW-7D, or GW-8. Installation of additional gas observation wells may be required at 50- and 100-foot spacing to perform the influence testing. These wells would be installed following at least one round of monitoring of the new LFG monitoring wells.

The procedures for each of these field programs are described in the following sections.

2.1 GEOPHYSICAL SURVEY

A geophysical evaluation will be conducted to evaluate the limits of the MSW in Areas 1, 2, and 5. The horizontal extents of the buried debris will be evaluated with the combined use of electromagnetic (EM) and magnetic (MAG) techniques.

EM data will be acquired using a Geonics EM-31 (or similar) terrain conductivity meter. Both quadrature (conductivity) and in-phase data will be recorded. The instrument will be run in the "continuous" sampling mode, recording the EM response at 0.2-second intervals (approximately 1 foot). Use of a nominal line spacing of 20 feet is anticipated.

The MAG survey will be conducted using a Geometrics G858G cesium magnetometer/ gradiometer (or similar instrument). The instrument will be run in the "continuous" sampling mode, recording the magnetic field at 0.1- or 0.2-second intervals (approximately 0.5 or 1 feet). Use of a nominal line spacing of 20 feet is anticipated.

Location data will be acquired simultaneously with the MAG and EM-31 data using a Trimble AG132 Differential Global Positioning System (DGPS). The system provides visual feedback to the operator to assure an "on-line" course and that the survey area is covered uniformly. The system is a real time DGPS using the Omnistar satellite subscription service or a Coast Guard beacon for the differential correction. The DGPS system has "sub-meter" accuracy; hence positions are generally good to ±1–2 feet, but may be off by 2–3 feet. Interpreted locations of buried debris will be tied into the site coordinate system and plotted on a base map.

2.2 SUBSURFACE EXPLORATION PROCEDURES

Subsurface conditions will be explored through the excavation of test pits or by drilling borings. Groundwater monitoring wells and LFG monitoring wells may be constructed in the borings for future groundwater and LFG monitoring. This section describes the exploration and monitoring point construction procedures.

2.2.1 UTILITY LOCATE

Prior to conducting the subsurface exploration program each monitoring point will be checked for the presence of underground utilities by a utility location company. Exploration locations may be moved to a limited degree if underground or aboveground utility locations, and/or site operational constraints, are present.

2.2.2 TEST PITS

A test pit program will be conducted to log the soil cover thickness above the MSW in Area 1 and Area 5. Test pits may also be used to calibrate and/or verify the results of the geophysical survey. The test pits will also be utilized for soil sample collection to assess the geotechnical characteristics of the cover soil.

A backhoe or track-mounted excavator will be used to excavate the test pits. Each test pit will be excavated from the surface to the level of the first encountered MSW. The depth to MSW from ground surface will be measured and recorded. Soil excavated from each pit will be placed back in the test pit and lightly compacted with the backhoe or excavator. A stake will be placed in the center of the test pit to mark its location for subsequent surveying. Figure 3 provides the approximate locations of the test pits.

2.2.3 DRILLING AND WELL CONSTRUCTION PROCEDURES

2.2.3.1 Drilling Procedures

A drilling program will be conducted to evaluate the soil, groundwater, and LFG characteristics in the vicinity of the landfill. Explorations include 5 soil borings, 14 monitoring wells, and 7 LFG monitoring wells. The boring locations are shown on Figure 3. Drilling, boring abandonment, and well construction will be performed in accordance with Chapter 173-160 of the Washington Administrative Code (WAC), Minimum Standards for Construction and Maintenance of Wells. Exploration logs will be completed for each boring and include descriptions of the soil lithology consistent with the Unified Soil Classification System (USCS), MSW observations, photoionization detector (PID) values, water level measurements, sample locations, and drilling action.

The borings will be advanced with sonic or air rotary (TUBEX) equipment. Boring diameters will be commensurate with the drilling objectives (i.e., soil boring, 2-inch diameter monitoring well, 4-inch diameter monitoring well, or LFG monitoring well). Soil samples will be collected while drilling and lithologic descriptions will be prepared from the soil samples. All down-hole drilling equipment will be decontaminated prior to use and between drilling locations as described in Section 2.10. All residuals collected during drilling or sampling will be handled and disposed of following the procedures described in Section 2.11.

2.2.3.2 Groundwater Monitoring Well Construction

Groundwater monitoring wells will be constructed with flush threaded, 2-inch diameter Schedule 40 polyvinyl chloride (PVC) screen and riser pipe. The monitoring well screens for shallow wells (installed at the water table) will be 15 feet in length, and set with the screen section approximately 5 feet above and 10 feet below the water table. The monitoring well screens for the deeper wells will be installed with a 5-foot screen section set approximately 30 feet below the water table. Each well will be constructed with 0.010-inch machine slotted PVC pipe and a flush threaded end cap will be installed at the bottom of each screen. Number 10/20, washed, rounded sand will be packed around the screens to a minimum of 2 feet above the screened section. The sandpack will be capped with a bentonite seal to within 1.5 feet of the surface. Each monitoring well will be completed with a flush or aboveground locking protective cover. Aboveground completion will be surrounded with three steel protective bollards.

Monitoring Well MW-15D will be constructed for the purposes of future groundwater monitoring and to conduct pumping tests. The well will be constructed with flush threaded, 4-inch diameter, Schedule 40 PVC screen and riser pipe. The well will be constructed with a 10-foot screen section set approximately 30 feet below the water table. The screen will consist of 0.020-inch machine slotted PVC pipe and a flush threaded end cap will be installed at the bottom of the screen. Number 10/20, washed, rounded sand will be packed around the screen to a minimum of 2 feet above the screened section. The sandpack will be capped with a bentonite seal to within 1.5 feet of the surface. The monitoring well will be completed with a flush or aboveground locking protective cover. Aboveground completions will be surrounded with three steel protective bollards.

Each groundwater monitoring well will be developed using surging, bailing, or pumping techniques. Development will continue until at least 5 to 10 casing volumes have been removed and turbidity of the purge water is visibly low. All well development information will be recorded on a Well Development Record form.

2.2.3.3 Landfill Gas Monitoring Well Construction

Seven LFG monitoring wells will be installed to complement the existing gas monitoring system. Each boring will be advanced with sonic or air rotary (TUBEX) equipment. Each LFG well shall consist of a ¾-inch diameter PVC casing with a 5 foot screen section installed in the boring. The screen sections shall be placed at the following approximate locations:

- GW-7D: 1 foot above the high water table elevation;
- GW-7S: 15 feet above the screen in Well GW-7D;
- GW-8, and GW-9: 10 to 15 feet below ground surface;
- GW-10: 5 to 10 feet below ground surface;
- GW-11: 3 feet above the bottom of the MSW; and
- GW-12: 25 to 30 feet below ground surface.

A filter pack will be installed around each screen, extending from the bottom of the end cap to about 1 foot above the screen for each of the gas wells except for GW-11 and GW-12. In those wells the filter pack will extend for the length of the MSW. Filter pack material will consist of commercially prepared, pre-sized, and pre-washed rounded free-flowing pea-gravel. The filter pack will be carefully poured down the annulus between the probe casing and the drill casing, as the casing is slowly withdrawn. During filter pack placement, the distribution and depth of the filter pack will be monitored with a weighted tape.

The annular space above the filter pack will be filled with bentonite chips to about 1 foot below the surface. An aboveground steel monument will be cemented in place at the surface to a depth of at least 1-foot. The monument and concrete will be slightly raised at ground surface and the concrete sloped away from the monument to divert rainfall away from the monument. Each probe will be labeled to indicate the screen depth (shallow or deep), and will be capped with a threaded or slip cap.

2.2.3.4 Boring and Well Decommissioning Procedures

All soil borings that are not converted to groundwater or gas monitoring wells, and existing groundwater monitoring well MW-14 will be decommissioned in accordance with Chapter 173-160 of the

Washington Administrative Code (WAC), Minimum Standards for Construction and Maintenance of Wells. Each soil boring will be filled with bentonite chips and hydrated with water as the drill casing is removed from the ground. Monitoring well MW-14 was installed in accordance with current regulation and will be decommissioned by filling the casing from bottom to surface with bentonite.

2.3 SOIL SAMPLING

Potential soil contamination is expected to be limited to soils beneath the solid waste disposal areas or in soils impacted by contaminated groundwater. Therefore, for the most part, chemical analysis of soil samples will be limited to the one sample collected from beneath the MSW in Area 1, one soil sample collected beneath the MSW in Area 2, and the three samples collected from beneath the MSW in Area 5. Each sample will be collected approximately 5 feet below the bottom of the MSW or above the water table. Soil samples will also be collected, on an as-needed basis, for lithologic evaluation. The specific depth intervals from which samples will be submitted for laboratory analysis will be based on field observations (i.e., a sample will be collected from a depth interval where soil discoloration, PID results, or odor are identified).

2.3.1 SAMPLE DESIGNATION

The prefix “TP-” will precede all test pit soil sample numbers. Each test pit location will be numbered, and each soil sample will receive a suffix denoting the approximate depth from which it was collected. For example, TP-1-2 represents the soil sample collected from TP-1 from 2 feet below ground level.

Soil sample numbers collected from designated soil borings, groundwater monitoring wells, and gas monitoring wells will be preceded with the prefix “SB-”, “MW-”, or “GW-”, respectively. Each soil sample will receive a suffix denoting the approximate depth from which it was collected. Boring numbers will begin with SB-19, groundwater monitoring wells numbers will begin with MW-17, and gas monitoring well numbers will begin with GW-7, so they will not be confused with previous site exploration points.

Groundwater samples will be labeled with the soil boring or monitoring well prefix and a date suffix. The date suffix will include the month and year. For example, MW-17-0712 will represent the water sample collected from MW-17 in July 2012.

LFG samples will be labeled with the gas monitoring well prefix and a date suffix. The date suffix will include the month and year. For example, GW-7-0712 will represent the gas sample collected from GW-7 in July 2012.

QA samples will be submitted blind (i.e., not identified as QA samples) to the laboratory. The QA samples will be given a fictitious sample name (e.g., for a non-existent sampling location) and time.

2.3.2 SOIL SAMPLE LOCATIONS

As described in the RI Work Plan, specific sampling locations have been selected to identify the source and extent of contamination. The following sampling points are specifically identified for collection of soil samples for laboratory analysis:

- One boring will be drilled through the MSW in Area 1 and a soil sample will be collected approximately 5 feet below the MSW.
- One boring or test pit will be drilled/excavated through the MSW in Area 2 and a soil sample will be collected approximately 5 feet below the MSW.
- Three borings will be drilled through the MSW in Area 5 and soil samples will be collected approximately 5 feet below the MSW.

The sample locations associated with each area are shown on Figure 3.

2.3.3 SAMPLE COLLECTION METHODS

Grab samples will be collected for soil and geologic characterization purposes. During drilling activities, soil samples collected for laboratory analysis using air rotary drilling methods will be collected with a split spoon sampler, if possible. Soil samples may be collected from the sonic core material, when drilling situations prevent the use of a split spoon sampler. Soil samples will not be collected for laboratory analysis from the cuttings retrieved using the air rotary method. Specific methods for soil sample collection are described below.

2.3.3.1 Grab Samples

Soil grab samples obtained from the test pits will be obtained from material collected with the backhoe bucket. The soil material will be collected from the center of the bucket to assure that a sample representative of the selected soil interval is obtained.

Soil grab samples will also be collected at the surface of each subsurface exploration point, and from drill cuttings. These soils will be used for geotechnical analysis and lithologic descriptions only.

2.3.3.2 Split Spoon Sampling

Soil samples obtained by conventional drilling methods will be collected using a 2.5- to 3.5-inch diameter split spoon sampler whenever, possible. The split spoon sampler will be attached to a drive hammer, lowered to the target depth, and driven into the native soil ahead of the drill bit. Upon retrieval the split spoon will be opened and the soil will be field-screened and packaged for transportation and analysis as described in Section 2.3.5.

2.3.3.3 Sonic Core Samples

The Sonic drilling method employs the use of high-frequency, resonant energy to first advance a 20-foot long, 4.25-inch diameter core barrel into the subsurface formation. A larger diameter drill casing (6.625-inch outside diameter) is then used to over-drill the core barrel and case the formation. The casing prevents formation collapse and allows the core barrel to be removed to the surface for soil sample removal. A disadvantage of the technology is the use of water to cool the drill string when the outer casing is drilled to depth over the core barrel. Water is not applied directly to the inside of the core barrel; however, the high pressure water injection process can penetrate the core through the drill string joints and wet the soil sample inside. The water does, however; cool the core barrel so the VOCs are not vaporized from the soil. Water used in the drilling process will be obtained from a potable water source.

At surface, the soil contents from within the core barrel are extruded into long, clear plastic bags, providing a continuous section of the penetrated formation. The soil sample liner will be sliced open for lithologic evaluation of the soil core by the geologist, and when desired, soil sample collection for laboratory analysis. A portable PID will be used to assess the presence or absence of total VOCs in the soil at approximately 5-foot intervals. Select soil samples may be collected for laboratory analysis based on PID measurements and visual/olfactory evaluation of the soil. Each sample selected for laboratory analysis will be packaged for transportation as described in Section 2.3.5.

2.3.4 SAMPLE DEPTH INTERVALS

Soil samples will be collected from all borings drilled. The samples will be collected at the surface (grab sample), and attempted at a minimum of 10-foot intervals within the vadose zone. Collection of soil samples below the water table shall be attempted; however, the sampling sequence may be dictated by drilling conditions. Soil samples will also be collected approximately 5 feet below the MSW in borings that penetrate the MSW.

2.3.5 SOIL SAMPLE SCREENING AND PACKAGING

After collection, the soil samples will be observed for the presence of contamination, and then field-screened using a PID. An examination for discoloration, odor, and the presence of sheen or non-aqueous phase liquid (NAPL) will then be made and the observations will be recorded on the Log of Exploration form. A portion of the soil sample will be placed in a sealed container (e.g., plastic reclosable bag or foil-topped plastic or glass container) and allowed to equilibrate to ambient air temperature for a minimum of 10 minutes. A PID reading will then be measured from a small puncture in the sample container and recorded on the Log of Exploration form. The presence of any odor will also be documented.

Once the field screening has been completed, the soil sample will be classified in accordance with the USCS and recorded on the Log of Exploration form. A portion of the soil sample representing the specified depth interval will be placed in a decontaminated stainless-steel bowl and homogenized using a stainless-steel spoon. Larger-sized material (gravel greater than about ¼- to ½-inch in diameter) may be removed by hand sorting. The sample will then be transferred to the appropriate sample container, labeled, and placed in a chilled cooler for transport to the laboratory. Any samples to be analyzed for VOCs will not be placed in a bowl for homogenization. Instead, the samples will be collected immediately in accordance with U.S. Environmental Protection Agency (USEPA) Method 5035A Closed System Analysis for VOCs directly from the soil sample.

The Log of Exploration form will also be used to document the following information: sampling depths, sampling methods, sample recoveries, soil types, any stratification observed, any evidence of contamination as indicated through visual observation and the use of a PID, groundwater conditions, and other pertinent information. Soil sample data may also be documented on a Soil Sample Collection form. To preserve sample integrity, sample handling and documentation will be conducted in accordance with the procedures described in Sections 2.6 and 2.7.

2.4 GROUNDWATER SAMPLING PROCEDURES

Groundwater samples will be collected for laboratory analyses from existing and new groundwater monitoring wells. This section describes the procedures for sampling groundwater from the monitoring wells.

2.4.1 SAMPLING LOCATIONS

Groundwater samples will be collected for laboratory analysis from the following wells:

- Site Wells: MW-11, MW-12b, MW-14b, MW-15, and MW-16;
- New Wells: MW-15D, MW-17, MW-18, MW-19, MW-20, MW-21S, MW-21D, MW-22S, MW-22D, MW-23, MW-24, and MW-25;
- Upgradient Wells: MW-5, MW-9, MW-10, and MW-12b; and
- Domestic Wells: Small, Camp, Kinman, and Schmidt.

The domestic and upgradient well sampling locations are shown on Figure 2. The site and new well sampling locations are shown on Figure 3.

2.4.2 MONITORING PROGRAM

The groundwater monitoring program will include the measurement of depth-to-water in each monitoring well and collection of groundwater samples from the specified sampling locations. In addition, depth-to-groundwater measurements will also be collected during each monitoring event in MW-7. Depth-to-groundwater will most likely not be measured in the domestic wells.

2.4.3 MONITORING FREQUENCY

Eight groundwater monitoring events will be conducted for the RI during a one-year period. Each groundwater monitoring event will be conducted between 30 and 45 days apart until the program is complete.

2.4.4 MONITORING WELL SAMPLE COLLECTION METHODS

Groundwater samples will be collected from the monitoring wells with dedicated (preferable) or portable (less likely) groundwater sampling pumps. The following procedures will be used to collect groundwater samples from the site, new, and upgradient groundwater monitoring wells:

- Before sampling, depth-to-water will be measured to the nearest 0.01 feet and recorded on the sample collection form. From this, the water column height in the well will be calculated.
- Specific conductivity, pH, and temperature meters will be calibrated according to manufacturer's specifications at the beginning of each sample day. Calibration data will be recorded in a log maintained for each instrument. The meters will be calibrated with solutions buffered closest to known field parameters.
- Before sampling, the well will be purged using a dedicated or decontaminated portable sampling pump. The well will not be purged at a rate that allows formation water to vigorously cascade down the sides of the screen. Purging will continue until at least three casing volumes of water have been removed, the specific conductance and temperature has stabilized within 10 percent of the proceeding value, or until the well is dry. Purge volume will be calculated based on the following formula:

  1 well volume (gallons) = $\pi r^2 h$ x 7.48 gal/ft^3,
  where π = 3.14, r = inside radius of well casing in feet, h = height of water column from the bottom of the well, in feet, gal/ft^3 = gallons per cubic foot.

  - Purge data will be recorded on the sample collection form, including purge volume, time of beginning and termination of purging, and observations regarding color, turbidity, or other factors that may be important in evaluation of sample quality.
  - Purge and decontamination water will be contained and disposed of in accordance with the procedures described in Section 2.11.
- Groundwater sampling will begin immediately following purging or, if the well purges dry, as soon as enough water is available in the well for sampling. Sample data will be recorded on the sample collection form, including sample number and time collected, the observed physical characteristics of the sample (e.g., color, turbidity, etc.), field parameters (pH, specific conductance, and temperature), and other data that may be important in the evaluation of sample quality.
- On low-yielding wells, pH, temperature, and specific conductance will be measured at the beginning and end of sampling.
- Groundwater samples will be collected for all parameters using a bailer, or a dedicated or decontaminated portable groundwater sampling pump. Clean gloves will be worn when collecting each sample.
- The sample water will be discharged slowly and carefully into appropriate sample containers to minimize aeration. Volatile organic analyses (VOA) containers will be completely filled so that no head space remains. VOA sample containers will be checked for air bubbles by turning the bottle upside down and tapping it lightly to make air bubbles move to the bottom of the sample bottle. If air bubbles are observed in any of the VOA containers, the container will be topped off (once only) or a new container used. Water for major ion or dissolved metal analyses will be collected last and field filtered through a 0.45-micron, in-line, disposable filter. A note will be made on the sample label, sample collection form, and

chain-of-custody form to indicate the sample has been field filtered. Samples will be chilled on ice immediately after sample collection.

- Duplicate samples will be collected by alternately discharging the groundwater into duplicate sample bottles. Duplicate samples will be labeled with a separate sample number and the number will be noted on the sample collection form. Duplicate samples will receive a designation unrelated to the primary sample and traceable to the sample location only through sample collection forms and log notation.

All sampling will be conducted in accordance with the appropriate provisions of the project HASP.

2.4.5 Domestic Well Sample Collection Methods

Groundwater samples will be collected from the domestic wells using the exiting pumps and discharge apparatus available on the premise. The following unique procedures will be used to collect the groundwater samples from the domestic wells:

- The groundwater sample will be collected directly from the nearest spigot after the wellhead or pressure tank.
- Before sampling, the well will be purged using the existing pump for a minimum of 10 minutes. Purge data will be recorded on the sample collection form, including time of beginning and termination of purging; pH, temperature, and specific conductance measurements; and observations regarding color, turbidity, or other factors that may be important in evaluation of sample quality.
- Groundwater sampling will begin immediately following purging as described in Section 2.4.3.

2.5 LANDFILL GAS MONITORING AND SAMPLING

2.5.1 Monitoring Program

Field testing will be performed at two existing LFG wells (GW-5 and GW-6) to establish the baseline conditions in refuse areas where active LFG collection is not being performed, and three LFG wells (GW-2, GW-3, and GW-4) to establish baseline conditions within the Area 6 refuse where active LFG collection is currently being performed. Additionally, seven new LFG monitoring wells (GW-7S, GW-7D, GW-8, GW-9, GW-10, GW-11, and GW-12) will be monitored at the north, east, and west perimeters of the landfill area. The following parameters will be monitored at each gas well:

- Methane (CH_4)
- Carbon Dioxide (CO_2)
- Oxygen (O_2)
- Gas Pressure
- Barometric Pressure

Additionally the operating parameters of the flare station and 11 existing extraction wells in Area 6 will be monitored for vacuum and flow rate. Extraction well valve position will also be noted.

CH_4, CO_2, and O_2 percentages, as well as gas pressure and barometric pressure will be measured using a LandTec GEM 2000 Gas Analyzer. The instrument will be properly calibrated according to manufacturer instructions each day prior to gas monitoring activities. The gas wells will be monitored by connecting the GEM 2000 using silicone tubing and a water trap to the well head.

To ensure that representative measurements are collected, the gas wells will be purged until the CH_4, CO_2, and O_2 percentages have stabilized. To provide an adequate purge rate, purging will be conducted using the GEM 2000 (purge rate of 300 milliliters/minute [ml/min]). Purge times will be calculated for each well based on construction details.

Gas pressure and barometric pressure will be measured at the well head prior to the purging of each well. CH_4, CO_2, and O_2 percentages will be monitored every ¼ well volume purged from the respective gas well. It will be assumed that the parameters have stabilized when they vary by less than 10% for three consecutive measurements. The final recorded measurements will include the stabilized CH_4, CO_2, and O_2 percentages.

Gas monitoring will be performed every other month for a period of eight months (four monitoring events) to assess seasonal variability. If CH_4, greater than 2% is detected in GW-10, monthly monitoring may be conducted at that location.

2.5.2 Area 2 Barhole Monitoring

A barhole-probe survey will be conducted at Area 2 to evaluate the potential for LFG occurrence and migration. Five locations around the perimeter and two locations within Area 2 will be selected for monitoring. A 1-inch diameter steel casing with a 6-inch steel mesh screen will be driven at each of the seven locations to a depth of 1.5 to 2 feet with a slide hammer. Polyethylene tubing will be placed within the casing, extending from the screened zone to the surface. A GEM 2000 will be connected to the tubing and the temporary well will be monitored for CH_4, CO_2, and O_2, static pressure, and barometric pressure. A minimum of one well volume will be evacuated prior to recording measurements. The well will be purged until CH_4, CO_2, and O_2 measurements have stabilized (when they vary by less than 10% over three measurements). Measurements will be recorded at each ¼ well volume.

2.5.3 Gas Sampling Procedures

One round of gas samples will be collected from Gas Wells GW-5, GW-6, GW-7S, GW-7D, GW-8, GW-9, GW-10, GW-11 and GW-12 for laboratory analysis of VOCs. The gas samples will be collected in a specially-prepared canister (Summa canister) and analyzed for VOCs by gas chromatography/mass spectrometry in accordance with USEPA Method TO-15. Laboratory certified Summa canisters (6 liter volume), flow controllers, and Teflon Tubing will be acquired from the analytical laboratory for collection of the gas samples.

Prior to sampling the respective gas well will be purged according to the procedures discussed in the previous section until the CH_4, CO_2, and O_2 percentages have stabilized. The flow controller will then be connected to the gas well and a passive integrated sample will be collected over a 1-hour sampling period. The gas pressure of the Summa canister will be recorded prior to, during, and after the collection of the gas sample. The gas sample will be shipped to the analytical laboratory under standard chain-of-custody procedures within the 14-day hold time.

2.5.4 VACUUM RADIUS INFLUENCE TESTING

Vacuum radius influence testing of the current LFG extraction system may be conducted, based on the results of the following preliminary evaluations of the existing LFG extraction system. First the vacuum, flow rate, and valve position at each of the 11 extraction wells in Area 6 will be recorded. The pressure will then be monitored in Wells GW-2, GW-3, and GW-4 and if the measured pressure is negative, gas probe GW-8 will be monitored to determine the presence of CH_4. If CH_4 is present at levels greater than 2% in GW-8, the extraction system will be adjusted to increase the pressure and Well GW-8 will be re-monitored to determine the CH_4 concentration. If the CH_4 concentration does not drop to levels less than 2% after 3 days in GW-8 following system adjustment, influence testing will be performed to determine optimum spacing of the extraction wells.

If positive pressure is observed in GW-2, GW-3, and GW-4, the extraction system will be adjusted to increase the vacuum (negative pressure). If the system is not able to produce a negative pressure at the three wells, influence testing will be performed to determine optimum well spacing to mitigate gas migration and potential impacts to groundwater.

Influence testing also may be required in Area 1 and Area 5 if CH_4 concentrations exceed 2% in perimeter gas Wells GW-7S, GW-7D, or GW-9.

Testing will identify a radius of influence from each test well at different vacuum pressures. Gas observation wells will be needed approximately 50 feet and 100 feet from the test well. Additional wells may need to be constructed if there are no wells located close to the test well.

Each extraction well and the two observation wells will have a Pitot tube installed at the wellhead for testing pressure differential or a Magnehelic gauge will be used. One blower will be set up at the extraction well to draw a water column vacuum of 1 to 3 inches. The two or more observation wells adjacent to each extraction well will be monitored at 12-hour intervals to record the vacuum and a GEM 2000 will be used to monitor CH_4, CO_2, and O_2 in each extraction well, also at 12-hour intervals. Testing will continue for 24 hours, then the vacuum will be increased to 4 to 7 inches of water and monitoring will continue in the observation and extraction wells. The vacuum will be increased a third time to 10 inches of water after 48 hours and monitoring will continue for another 24 hours.

2.5.5 Vapor Intrusion Modeling

Well GW-10 will be located as close as possible to the foundation of the Household Hazardous Waste building to determine if LFG is present adjacent to the structure. Building monitoring for CH_4 (using a flame ionization detector) and collection of VOC samples would be conducted if $CH_4$is detected at levels greater than 5% or VOC analysis indicates the presence of LFG in Well GW-10. Subsequent under-slab testing (by coring the building slab) may also be conducted based on the interior monitoring results.

Vapor Intrusion Modeling will be performed if the Soil Gas Screening Levels for the Model Toxics Control Act (MTCA) Method C shown in Table B-1 of the *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* (Ecology 2009) are exceeded. The Johnson and Ettinger Vapor Intrusion Model or an equivalent model will be used to conduct the modeling.

2.6 SAMPLE TRANSPORTATION AND HANDLING

The transportation and handling of soil, groundwater, and gas samples will be accomplished in a manner that protects the integrity of the sample and also prevents release of hazardous substances from the samples. Samples will be kept in coolers on ice until delivery to the analytical laboratory. All samples will be logged on a chain-of-custody (COC) form that will accompany each shipment of samples to the laboratory.

2.7 SAMPLE CUSTODY AND DOCUMENTATION

The primary objective of sample custody is to create an accurate, written record that can be used to trace the possession and handling of samples so that the equality and integrity of each sample is maintained from collection until completion of all required analyses. Adequate sample custody will be achieved by means of approved field and analytical documentation. Such documentation includes the COC record that is initially completed by the sampler and is, thereafter, signed by those individuals who sequentially accept custody of the sample. A sample is in custody if at least one of the following is true:

- It is in someone's physical possession.
- It is in someone's view.
- It is secured in a locked container or otherwise sealed so that tampering will be evident.
- It is kept in a secured area, restricted to authorized personnel only.

Sample control and COC in the field and during transportation to the laboratory will be conducted in general conformance with the procedures described below:

- As few persons as possible will handle samples.

- Sample bottles will be obtained new or pre-cleaned from the laboratory performing the analyses.
- The sampler will be personally responsible for the completion of the COC record and the care and custody of samples collected until the samples are transferred to another person or dispatched properly under COC rules.
- The coolers in which the samples are shipped will be accompanied by the COC record identifying their contents. The original COC record and the laboratory copy will accompany the shipment (sealed inside the shipping container). The other copy will be retained by the responsible party.
- Coolers will be sealed with strapping tape for shipment to the laboratory. The method of shipment, name of courier, and other pertinent information will be entered in the "remarks" section of the COC record and traffic report.

When samples are transferred, the individuals relinquishing and receiving the samples will sign the COC form and record the date and time of transfer. The sample collector will sign the form in the first signature space. Each person taking custody will observe whether the shipping container is correctly sealed and in the same condition as noted by the previous custodian. Any deviations in the procedure will be noted on the appropriate section of the COC record.

All documentation and other project records will be safeguarded to prevent loss, damage, or alteration. If an error is made on a document, the necessary corrections will be made by drawing a single line through the error, and entering the correct information. The erroneous information will not be obliterated. Corrections will be initialed and dated and, if necessary, a footnote explaining the correction will be included. Errors will be corrected by the person who made the entry, whenever possible.

2.8 CHEMICAL ANALYSES

This section describes the chemical analyses to be conducted on the soil, groundwater, and gas samples collected at the subject property. Laboratory analyses will be performed by an Ecology-accredited laboratory, accredited for appropriate parameters and media, in accordance with Chapter 173-50 WAC (Ecology 2002).

2.8.1 SOIL SAMPLES

Soil samples selected for laboratory analysis will be analyzed for VOCs using USEPA Method 8260.

2.8.2 GROUNDWATER SAMPLES

The site well samples and samples from all new monitoring wells will be analyzed for VOCs, and the following conventional chemistry constituents: calcium, sodium, magnesium, potassium, sulfate, chloride, manganese, iron, ammonia, nitrate, alkalinity, total organic carbon (TOC), and total dissolved solids (TDS). Samples collected from the upgradient and domestic wells will be analyzed for VOCs. The laboratory analytical methods are as follows:

- Standard VOCs will be analyzed by USEPA Method 8260. Wells that show no detectable levels of vinyl chloride at the standard method reporting level (MRL) of 0.5 micrograms per liter (µg/L) will be analyzed by USEPA Method 8260 SIM to reach an MRL of 0.02 µg/L.
- Total calcium, iron, manganese, magnesium, potassium, and sodium will be analyzed by USEPA Method 6010C.
- Chloride, nitrate, and sulfate will be analyzed by Standard Method (SM) 300.0.
- Alkalinity will be analyzed by SM 2320B.
- Ammonia will be analyzed by SM 4500.
- TOC will be analyzed by USEPA Method 415.1.
- TDS will be analyzed by SM 2540C.

During the first groundwater monitoring event, groundwater samples collected from site wells MW-11, MW-14b, and MW-15 will be analyzed for WAC 173-350-990 Appendix III parameters. The sampling and analysis plan for subsequent sampling events will be modified to incorporate detected Appendix III constituents that exceed a MTCA screening level. The laboratory analytical methods are as follows:

- Dissolved metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, tin, vanadium, and zinc) will be analyzed by USEPA Method 6010C.
- Total mercury will be analyzed by USEPA Method 7470A.
- Organochlorine pesticides will be analyzed by USEPA Method 8081A.
- PCBs (Aroclors) will be analyzed by USEPA Method 8082.
- Organophosphorus compounds will be analyzed by USEPA Method 8141A.
- Chlorinated herbicides will be analyzed by USEPA Method 8151A.
- VOCs will be analyzed by USEPA Method 8260C.
- Semivolatile organic compounds will be analyzed by USEPA Method 8270D.
- Total cyanide and sulfide will be analyzed by SM 4500.

2.8.3 LANDFILL GAS SAMPLES

LFG samples will be analyzed by the laboratory for VOCs by USEPA Method TO-15.

2.9 AQUIFER TESTING

Aquifer testing will be conducted to determine a sustainable pumping rate, specific yield, transmissivity, hydraulic conductivity, and storage coefficient of the first encountered aquifer beneath the landfill. The aquifer testing will also be conducted to assess the hydraulic connection between the hydrostratigraphic zones screened in MW-3 and MW-15. Aquifer testing will consist of four parts:

1. Baseline water-level survey;
2. Step-discharge pumping tests;
3. 24-hour constant-discharge pumping test, and
4. Water-level recovery test.

Monitoring Well MW-15D will be used as the extraction well. Monitoring Wells MW-15 and MW-3 (at a minimum) will be used as water-level observation wells.

The water levels in the wells will be measured with pressure transducers. The pressure transducer measurements will be recorded with a data logger at logarithmic time intervals during the duration of the tests. Water discharges will be pumped into the leachate evaporation ponds for disposal.

2.10 EQUIPMENT DECONTAMINATION

The decontamination procedures described below are to be used by field personnel to clean drilling, sampling, and related field equipment. Deviation from these procedures must be documented in field records.

2.10.1 SAMPLING EQUIPMENT

All sampling equipment used (i.e., stainless-steel bowls, stainless-steel spoons, etc.) will be cleaned using a three-step process, as follows:

1. Scrub surfaces of equipment that would be in contact with the sample with brushes using an Alconox solution.
2. Rinse and scrub equipment with clean tap water.
3. Rinse equipment a final time with deionized water to remove tap water impurities.

Decontamination of the reusable sampling devices will occur between the collection of each sample. Decontamination of sampling equipment that is suspected to have come into contact with free-phase liquid or that contains a visible sheen will be scrubbed with Simple-Green (or other appropriate solvent or multi-purpose cleaner) prior to cleaning by the above described procedures. In addition to these decontamination processes, any sampling or monitoring equipment used in a domestic well will be rinsed in a bleach solution.

2.10.2 DRILLING RIG

The drilling equipment that are used downhole, or that come in contact with material and equipment going downhole, will be cleaned by high-pressure wash before use, between each exploration point, and at the completion of the project.

2.11 RESIDUAL WASTE MANAGEMENT

This section describes the waste management of the soil, purge water, and decontamination water generated during this investigation.

2.11.1 SOIL CUTTINGS

Soil cuttings generated from Areas 1, 2, or 5 and from off-site agricultural areas will be placed in 55-gallon drums or other containers and disposed of in the active solid waste disposal area (Area 7). Soil cuttings generated from boring locations outside of the waste disposal areas may be deposited on the ground near the boring or disposed of in Area 7.

2.11.2 WELL DEVELOPMENT, PURGE, AND DECONTAMINATION WATER

Purge and well development water from upgradient and domestic wells will be discharged to the ground surface. Additionally, any well that has historical analytical data showing constituent concentrations less than the MTCA Method A or B screening levels will be discharged to the ground surface.

The following waters generated during the project will be stored in 55-gallon drums stationed at each well head pending a review of the laboratory analytical results:

- New downgradient or off site well development, purge, and decontamination water.
- Purge water from site, downgradient or off –site wells that have constituent concentrations greater than the MTCA Method A or B screening levels.

Waters that have constituent concentrations greater than the MTCA Method A or B screening levels will be disposed of in the landfill's leachate evaporation pond. Based on at least two sets of laboratory analytical results, waters that have constituent concentrations less than the MTCA screening levels may be discharged to the ground surface and the drums may be removed from the well head area. The City may also opt to discharge the waters directly into the leachate evaporation pond prior to the receipt and evaluation of the analytical results. The water will be transported by the City using available equipment from the landfill, or by a contractor employed by the City.

2.12 SURVEYING

Site features will be surveyed by a registered surveyor and tied into the existing site benchmark. Each boring or test pit location will be surveyed for ground surface elevations to the nearest 0.1 feet, and horizontal position to the nearest 1.0 feet.

The top of each monitoring well PVC casing will be surveyed for horizontal (plus or minus 1.0 foot) and vertical (plus or minus 0.01 feet) control. A small notch will be filed into the well casing rim indicating the surveyed point. Vertical surveys will be of third-order accuracy. The horizontal datum will be the Washington State Plane Coordinate System. The vertical datum will be the site-specific Landfill

Datum with a conversion to National Geodetic Vertical Datum of 1988 provided. The Site specific Landfill Datum is based on an elevation of 832.13 on the brass monument located near the southwest corner of the landfill (established in 1994).

3.0 QUALITY ASSURANCE PROJECT PLAN

This QAPP establishes quality control (QC) procedures and QA criteria to meet the Data Quality Objectives (DQOs) set forth for the soil, groundwater, and landfill gas sampling to be conducted as described in Section 2. This QAPP was developed in accordance with the Ecology *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* (Ecology 2004).

3.1 LABORATORY DATA QUALITY OBJECTIVES

The DQOs for the field activities described in Section 2 are to obtain the type and quantity of data in a manner such that the data are of sufficient quality to meet project objectives, as well as to maximize accuracy, reproducibility, and comparability of data between sampling events. The quality of the field sampling methods and laboratory data will be assessed using the principle data quality indicators of precision, accuracy, representativeness, completeness, and comparability (PARCC) as defined in Ecology and USEPA guidance (Ecology 2004, USEPA 1998). Data quality assurance criteria are described below and presented in Table 1.

The quality of analytical data generated is assessed by the frequency and type of internal QC checks developed for analysis type. Laboratory results will be evaluated by reviewing results for analyses of method blanks, matrix spikes, duplicate samples, laboratory control samples, calibrations, performance evaluation samples, and interference checks as specified by the specific analytical methods.

3.1.1 PRECISION

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average values. Analytical precision is measured through matrix spike/matrix spike duplicate (MS/MSD) samples for organic analysis and through laboratory duplicate samples for inorganic analyses.

Analytical precision measurements will be carried out on project-specific samples at a minimum frequency of one per laboratory analysis group of approximately 20 samples, as practical. Laboratory precision will be evaluated against quantitative relative percent difference (RPD) performance criteria, presented in Table 1.

Field precision during groundwater and air sampling will be evaluated by the collection of field duplicates in groundwater and air at a minimum frequency of one per laboratory analysis group or 1 duplicate in 20 samples (5%). As stated in Section 2.3.5, VOC soil sampling will be conducted in accordance with USEPA Method 5035A, with soil samples collected with a corer directly from the split spoon sampler or sonic core. This method is used to prevent of loss of VOCs via volatilization during soil homogenization that would be performed for collection and analysis of other compounds. Therefore, as the soil samples are not homogenized to truly access field precision and sample heterogeneity, a modified quality control approach will be used to evaluate field precision in soil. During sampling, the soil collected in the split spoon will be visually inspected. If the soil sampling interval appears to be homogenous across the sample interval, two VOC sample cores (approximately 5 grams of soil) will be collected adjacent to one another to assess the precision between the two locations. If the soil appears heterogeneous across the sample interval (e.g., different soil types, staining, etc.), then a laboratory duplicate will be requested for the specific sample batch. There are no performance criteria for field precision, as it is an inherent function of the media sampled Therefore, data will not be qualified based solely on field duplicate precision.

Precision measurements can be affected by the nearness of a chemical concentration to the method detection limit, where the percent error (expressed as RPD) increases. Therefore, precision criteria will be used to evaluate data only when analyte concentrations are greater than five times the laboratory quantitation limit. The equations used to express precision are as follows:

$$\mathrm{RPD} = \frac{(\mathrm{C}_1 - \mathrm{C}_2) \times 100\%}{(\mathrm{C}_1 + \mathrm{C}_2)/2}$$

Where:

RPD = relative percent difference

C_1 = larger of the two observed values

C_2 = smaller of the two observed values

3.1.2 ACCURACY

Accuracy is an expression of the degree to which a measured or computed value represents the true value. Field accuracy is controlled by adherence to sample collection procedures outlined in earlier sections of this document.

Analytical accuracy may be assessed by analyzing “spiked” samples with known standards (surrogates, laboratory control samples, and/or matrix spike) and measuring the percent recovery. Accuracy measurements on matrix spike samples will be carried out at a minimum frequency of 1 in 20 samples per matrix analyzed. Because MS/MSDs measure the effects of potential matrix interferences of a specific matrix, the laboratory will perform MS/MSDs only on samples from this investigation and not from other projects. Surrogate recoveries will be determined for every sample analyzed for organics.

Laboratory accuracy will be evaluated against quantitative laboratory control sample, matrix spike, and surrogate spike recovery using limits from Table 2 for each applicable analyte. Accuracy can be expressed as a percentage of the true or reference value, or as a percent recovery in those analyses where reference materials are not available and spiked samples are analyzed. The equation used to express accuracy is as follow:

$$\%R = \frac{(S - U) \times 100\%}{Csa}$$

Where:

%R = percent recovery

S = measured concentration in the spiked aliquot

U = measured concentration in the unspiked aliquot

C_{sa} = actual concentration of spike added

3.1.3 REPRESENTATIVENESS

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Care will be taken in the design of the sampling program to ensure sample locations are selected properly, sufficient numbers of samples are collected to accurately reflect conditions at the location(s), and samples are representative of the sampling location(s). A sufficient volume of sample will be collected at each sampling location to minimize bias or errors associated with sample particle size and heterogeneity.

3.1.4 COMPARABILITY

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another, either older or younger, set of data or data generated by another laboratory. In order to insure results are comparable, samples will be analyzed using standard USEPA methods and protocols as described in *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (USEPA 2007). Calibration and reference standards will be traceable to certified standards and standard data reporting formats will be employed. Data will also be reviewed to verify that precision and accuracy criteria have been achieved and, if not, that data have been appropriately qualified.

3.1.5 COMPLETENESS

Completeness is a measure of the amount of data that is determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

$$C = \frac{Na \times 100}{N}$$

Where:

C = completeness

Na = number of acceptable data points

N = total number of data points

The data quality objective for completeness for all components of this project is 95%. Data that have been qualified as estimated because the quality control criteria were not met will be considered valid for the purpose of assessing completeness. Data that have been qualified as rejected will not be considered valid for the purpose of assessing completeness.

3.2 LABORATORY ANALYSIS AND TESTING

Soil, groundwater, and landfill gas samples will be analyzed for the constituent groups identified above in Section 2.8. Analytical methods and requirements are presented in Tables 2 and 3. Table 3 includes sample size requirements, container type, preservation method, and holding times for the soil, groundwater, and landfill gas analytes. Table 2 includes analytical methods, method detection limits (MDLs), and reporting limits (also referred to as Practical Quantitation Limits [PQLs]). Standard Ecology and USEPA sample preparation, cleanup, and analytical methods will be used for all chemical analyses. The laboratory internal QAPP and standard operating procedures will provide data quality procedures at a level sufficient to meet the analytical DQOs, discussed above in Section 3.1.

3.2.1 DETECTION LIMITS

The analytical methods identified in this Work Plan result in the lowest analytically achievable MDLs and PQLs for groundwater and landfill gas. The lowest analytically achievable limits were selected in order to meet conservative MTCA Method B Cleanup Levels for groundwater and indoor air. For a smaller group of groundwater and landfill gas analytes, however, even the most sensitive laboratory methodologies will be unable to achieve MTCA Method B limits. The selected analytical method for VOCs for the soil analysis results in standard, normally accepted, MDLs and PQLs. The method for soil has been selected in order to identify source areas within the landfill and therefore ultra low-level reporting limits are not required. Table 2 presents the target reporting limits and the project data quality assurance criteria for each analytical method as performed by TestAmerica Analytical Testing Corporation. These reporting limits are goals only, insofar as instances may arise where high sample concentrations, non-homogeneity of samples, or matrix interferences preclude achieving the desired reporting limit and associated QC criteria. In such instances, the laboratory will report the reason for any deviation from these reporting limits.

3.3 QUALITY CONTROL SAMPLING

Sampling procedures for this investigation are described in detail in Section 2.0 of this document. Field and laboratory quality control procedures for the sampling are described in detail below.

3.3.1 FIELD QUALITY CONTROL SAMPLES

To measure if any cross contamination has occurred, trip blanks will be included in each cooler with samples being analyzed for VOCs to ensure the sample containers do not contribute to any detected analyte concentrations and to identify any artifacts of improper sample handling, storage, or shipping.

Although validation guidelines have not been established by USEPA for field quality control samples, the analysis of these samples is useful in identifying possible problems resulting from sample collection or sample processing in the field. All field quality control samples will be documented in the field logbook and verified by the QA Manager, or designee.

3.3.2 LABORATORY QUALITY CONTROL PROCEDURES

3.3.2.1 Laboratory Quality Control Criteria

Results of the QC samples from each sample delivery group will be reviewed by the analyst immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine whether control limits have been exceeded. If control limits are exceeded in the sample group, the Project Manager will be contacted immediately, and corrective actions (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples.

All primary chemical standards and standard solutions used in this project will be traceable to documented, reliable, commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities identified in the standard will be documented.

The following sections summarize the procedures that will be used to assess data quality throughout sample analysis.

3.3.2.2 Initial and Continuing Calibration

Multipoint initial calibration will be performed on each instrument at the start of the project, after each major interruption to the analytical instrument, and when any ongoing calibration does not meet control criteria. Ongoing calibration will be performed daily for organic analyses and with every sample batch for conventional parameters (when applicable) to track instrument performance.

Instrument blanks or continuing calibration blanks provide information on the stability of the baseline established. Continuing calibration blanks will be analyzed immediately prior to continuing calibration verification at a frequency of one continuing calibration blank for every 10 samples analyzed at the instrument for inorganic analyses and every 12 hours for organic analyses. If the ongoing calibration is out of control, the analysis must come to a halt until the source of the control failure is eliminated or reduced to meet control specifications. All project samples analyzed while instrument calibration was out of control will be reanalyzed.

3.3.2.3 Laboratory Duplicates

Analytical duplicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical duplicates are subsamples of the original sample that are prepared and analyzed as a separate sample. A minimum of 1 duplicate will be analyzed per sample group or for every 20 samples, whichever is more frequent.

3.3.2.4 Matrix Spikes and Matrix Spike Duplicates

Analysis of MS samples provides information on the extraction efficiency of the method on the sample matrix. By performing MSD analyses, information on the precision of the method is also provided for organic analyses. A minimum of 1 MS/MSD will be analyzed for every sample group or for every 20 samples, whichever is more frequent. MS/MSD analyses will be performed on project-specific samples (i.e., using samples from other projects is not permitted).

3.3.2.5 Laboratory Control Samples

A laboratory control sample is a method blank sample carried throughout the same process as the samples to be analyzed, with a known amount of standard added. The blank spike compound recovery assesses analytical accuracy in the absence of any sample heterogeneity or matrix effects

3.3.2.6 Surrogate Spikes

All project samples analyzed for organic compounds will be spiked with appropriate surrogate compounds as defined in the analytical methods. Surrogate recoveries will be reported by the laboratories; however, no sample result will be corrected for recovery using these values.

3.3.2.7 Method Blanks

Method blanks are analyzed to assess possible laboratory contamination at all stages of sample preparation and analysis. A minimum of 1 method blank will be analyzed for every extraction batch or for every 20 samples (10 samples for conventional parameters), whichever is more frequent.

3.4 DATA REDUCTION, VALIDATION AND MANAGEMENT

Initial data reduction, evaluation, and reporting at the laboratory will be carried out as described in the appropriate analytical protocols and the laboratory's QA Manual. QC data resulting from methods and procedures described in this document will also be reported.

3.4.1 DATA REDUCTION AND LABORATORY REPORTING

The laboratory will be responsible for internal checks on data reporting and will correct errors identified during the QA review. Close contact will be maintained with the laboratories to resolve any QC problems in a timely manner. The analytical laboratories will be required, where applicable, to report the following:

- **Project/Case Narrative.** This summary, in the form of a cover letter, will discuss problems, if any, encountered during any aspect of analysis. This summary should discuss, but not be limited to, QC, sample transport/shipment, sample storage, and analytical difficulties. Any problems encountered (actual or perceived) and their resolutions will be documented in as much detail as necessary.
- **Sample Identification.** Records will be produced that clearly match all blind duplicate QA samples with laboratory sample identification.
- **Chain-of-Custody Records.** Legible copies of the custody forms will be provided as part of the data package. This documentation will include the time of receipt and condition of each sample received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented.
- **Sample Results.** The data package will summarize the results for each sample analyzed. The summary will include the following information when applicable:
    - Field sample identification code and the corresponding laboratory identification code:
        - Sample matrix
        - Date of sample extraction
        - Date and time of analysis
        - Weight and/or volume used for analysis
        - Final dilution volumes or concentration factor for the sample
        - Percent moisture in solid samples
        - Identification of the instrument used for analysis
        - Method reporting and quantitation limits
    - Analytical results reported with reporting units identified
    - All data qualifiers and their definitions
    - Electronic data deliverables
- **Quality Assurance/Quality Control Summaries.** This section will contain the results of all QA/QC procedures. Each QA/QC sample analysis will be documented with the same information required for the sample results (refer to above). No recovery or blank corrections will be made by the laboratory. The required summaries are listed below; additional information may be requested.
- **Method Blank Analysis.** The method blank analyses associated with each sample and the concentration of all compounds of interest identified in these blanks will be reported.
- **Surrogate Spike Recovery.** All surrogate spike recovery data for organic compounds will be reported. The name and concentration of all compounds added, percent recoveries, and range of recoveries will be listed.
- **Matrix Spike Recovery.** All matrix spike recovery data for metals and organic compounds will be reported. The name and concentration of all compounds added, percent recoveries, and range of recoveries will be listed. The RPD for all duplicate analyses will be reported.
- **Matrix Duplicate.** The RPD for all matrix duplicate analyses will be reported.
- **Blind Duplicates.** Blind duplicates will be reported in the same format as any other sample. RPDs will be calculated for duplicate samples and evaluated as part of the data quality review.

3.4.2 DATA VALIDATION

Schwyn will review the laboratory reports for internal consistency, transmittal errors, laboratory protocols, and for adherence to the data quality objectives as specified in this QAPP. A Level 1/Tier 1 Compliance Screening data validation will be performed on analytical data and will include the following:

- Verification that the required analytical methods have been utilized.
- Evaluation of package completeness.
- Verification that sample numbers and analyses match those requested on the COC Record.
- Review of method-specified preservation and sample holding times.
- Verification that the required detection limits and reporting limits have been achieved.
- Verification that the field duplicates, matrix spikes/matrix spike duplicates, and laboratory control samples were analyzed at the proper frequency.
- Verification of analytical precision and accuracy via replicate analysis and analyte recovery values.
- Verification that the surrogate compound analyses have been performed and meet QC criteria.
- Verification that the laboratory method blanks are free of contaminants.

Data validation will be based on the QC criteria as recommended in the methods identified in this QAPP and in the National Functional Guidelines for Inorganic and Organic Data Review (USEPA 2004 and 2008).

Data usability, conformance with the DQOs, and any deviations that may have affected the quality of the data, as well as the basis for application of qualifiers will be included in the final reporting of the data. Any required corrective actions based on the evaluation of the analytical data will be determined by the laboratory Project Manager in consultation with the Schwyn Data Validator, and may include qualification of the data or rejection of the data.

3.4.3 DATA MANAGEMENT

All data will be entered into a database used to store and query environmental chemistry results. The database will be used to store and query data as needed, and provide data to Ecology in their Environmental Information Management system. Data sets entered in Sanitas For Groundwater format that are used in the RI evaluation process will also be provided to Ecology. Field data will be entered into the database. Analytical laboratory data will be received in an electronic data deliverable format suitable for importation into the database. Both laboratory data qualifiers and external data validation qualifiers are stored in the database. The database is managed and stored in on-site and off-site servers and is subject to electronic backup.

4.0 HEALTH AND SAFETY PLAN

A HASP for implementation of field activities described in the Work Plan and this SAP is provided in Appendix E1 of this SAP. All Schwyn employees will follow the procedures described in the HASP. All subcontractors will either adopt this HASP or prepare their own HASP that is at least as protective as this plan.

5.0 REPORTING

A draft RI report will be prepared after all investigation phases of the RI are complete and the field and laboratory data are compiled and validated. The documentation will consolidate and incorporate data generated during each phase of the investigation. The report will describe general facility information, site history, RI activities, and geologic and hydrogeologic conditions; identify site-specific applicable or relevant and appropriate requirements (ARARs); and make a preliminary determination of indicator hazardous substances, the nature and extent of contamination including exposure pathways and identification of preliminary cleanup levels, points of compliance, and contaminant fate and transport.

The RI Report will be presented in draft format to Ecology for review and comment. A Final RI Report will be prepared, pursuant to discussion of comments between Ecology and the City.

6.0 REFERENCES

Washington State Department of Ecology (Ecology). 2010. *Notice of Potential Liability Under the Model Toxics Control Act for the Release of Hazardous Substances at the Sudbury Road Landfill, 414 Sudbury Road, Walla Walla, WA 99362, Facility 4446540*. Letter from the Washington State Department of Ecology Waste 2 Resources Program to Mr. Craig Sivley, City of Walla Walla Public Works Director. 29 March.

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———. 2004. *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies.* Publication No. 04-03-030. Washington State Department of Ecology. July.

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U.S. Environmental Protection Agency (USEPA). 2008. *USEPA Contract Laboratory Program, National Functional Guidelines for Organic Data Review*. EPA-540/R-99/008. October.

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———. 2004. *USEPA National Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.* OSWER 9240.1-45, EPA 540-R-04-004. Office of Superfund Remediation and Technology Innovation (OSRTI). Washington, D.C. October.

———. 1998. *Guidance on Quality Assurance Project Plans*. EPA QA/G-5. United States Environmental Protection Agency, Office of Research and Development. EPA/600/R-98/018. February.

TABLE 1
DATA QUALITY ASSURANCE CRITERIA
City of Walla Walla Sudbury Road Landfill

Parameter	Matrix	Units	Reporting Limit/PQL[1]	Precision	Accuracy	Completeness	Reference
Soil Samples							
Volatile Organic Compounds	Soil	µg/kg	8 - 40	±30%	±50%	95%	USEPA Method 8260B
Groundwater Samples							
Volatile Organic Compounds	Water	µg/L	0.02 - 6	±20%	±50%	95%	USEPA Method 8260B-Low-Level
Chloride, Nitrate, Sulfate	Water	mg/L	0.5 – 0.8	±20%	±10%	95%	USEPA 300.0
Calcium, Iron, Magnesium, Manganese, Potassium, Sodium	Water	mg/L	0.01-1.0	±20%	±15%	95%	USEPA 6010
Alkalinity	Water	mg/L	4.0	±20%	±10%	95%	USEPA 2320B
Ammonia	Water	mg/L	3.0	±25%	±25%	95%	SM4500 NH3 C
Total Organic Carbon	Water	mg/L	1.0	±20%	±15%	95%	USEPA 415.1
Total Dissolved Solids	Water	mg/L	25	±20%	±20%	95%	SM2540C
Total dissolved gas - methane, ethane, ethene	Water	µg/L	1.1	±30%	±25%	95%	RSK 175
Appendix III Groundwater Samples							
Total Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Thallium Tin, Vanadium, Zinc,	Water	µg/L	0.02 – 20	±20%	±25%	95%	USEPA 6010
Total Mercury	Water	µg/L	0.2	±20%	±25%	95%	USEPA 7470A
Total Cyanide	Water	mg/L	0.01	±20%	±15%	95%	SM 4500 CN-E
Total Sulfide	Water	mg/L	0.05	±20%	±25%	95%	SM 4500 S2-D
Organochlorine Pesticides	Water	µg/L	0.01 – 0.5	±30%	±90%	95%	USEPA 8081
Polychlorinated Biphenyls (PCBs) - Aroclors	Water	µg/L	0.2 – 0.4	±30%	±50%	95%	USEPA 8082
Organophosphorus Compounds	Water	µg/L	0.2 – 1.0	±30%	±60%	95%	USEPA 8141
Chlorinated Herbicides	Water	µg/L	0.2 – 0.4	±30%	±80%	95%	USEPA 8151

TABLE 1
DATA QUALITY ASSURANCE CRITERIA
City of Walla Walla Sudbury Road Landfill

Parameter	Matrix	Units	Reporting Limit/PQL[1]	Precision	Accuracy	Completeness	Reference
Volatile Organic Compounds	Water	µg/L	0.5 – 100.0	±30%	±70%	95%	USEPA 8260B
Semivolatile Organic Compounds	Water	µg/L	10 – 100.0	±30%	±70%	95%	USEPA 8270
Air Samples							
Volatile Organic Compounds	Air	Ppb v/v	0.2 – 5.0	±25%	±30%	95%	USEPA TO15
Fixed Gases - Methane, Ethane, Ethene	Air	ppmv	20	±25%	±30%	95%	ASTM D1945
Total Gaseous non-methane organics	Air	ppm-c	6	±30%	±30%	95%	USEPA 25C

Notes:
1) All reporting limits shown are method Practical Quantitation Limits (PQLs) from TestAmerica, Spokane, WA, or Columbia Analytical Services, Kelso WA.
ASTM = American Society for Testing and Materials
NA = Not Applicable
USEPA = United States Environmental Protection Agency

TABLE 2
ANALYTICAL METHODS, DETECTION AND REPORTING LIMITS
City of Walla Walla Sudbury Road Landfill

Parameter	Analytical Method	Detection Limit[1]	Reporting Limit (PQL)[1]
Soil Samples			
Volatile Organic Compounds[2]	USEPA Method 8260B	3.0 - 66 µg/kg	8 - 400 µg/kg
Chloroethane	USEPA Method 8260B	100 µg/kg	400 µg/kg
Chloroform	USEPA Method 8260B	10 µg/kg	40 µg/kg
1,1-Dichloroethane	USEPA Method 8260B	10 µg/kg	40 µg/kg
cis-1,2-Dichloroethene	USEPA Method 8260B	10 µg/kg	40 µg/kg
Dichlorodifluoromethane	USEPA Method 8260B	10 µg/kg	40 µg/kg
Tetrachloroethene	USEPA Method 8260B	5.0 µg/kg	20 µg/kg
Toluene	USEPA Method 8260B	10 µg/kg	40 µg/kg
Trichloroethene	USEPA Method 8260B	4.0 µg/kg	16 µg/kg
Trichlorofluoromethane	USEPA Method 8260B	10 µg/kg	40 µg/kg
Vinyl chloride	USEPA Method 8260B	2.0 µg/kg	8 µg/kg
Groundwater Samples			
Volatile Organic Compounds[2]	USEPA Method 8260B Low-Level	0.025 - 2.5 µg/L	0.02 – 6 µg/L
Chloroethane	USEPA Method 8260B Low-Level	0.075 µg/L	0.25 µg/L
Chloroform	USEPA Method 8260B Low-Level	0.03 µg/L	0.10 µg/L
1,1-Dichloroethane	USEPA Method 8260B Low-Level	0.025 µg/L	0.10 µg/L
cis-1,2-Dichloroethene	USEPA Method 8260B Low-Level	0.025 µg/L	0.10 µg/L
Dichlorodifluoromethane	USEPA Method 8260B Low-Level	0.1 µg/L	0.40 µg/L
Tetrachloroethene	USEPA Method 8260B Low-Level	0.025 µg/L	0.10 µg/L
Toluene	USEPA Method 8260B Low-Level	0.025 µg/L	0.10 µg/L
Trichloroethene	USEPA Method 8260B Low-Level	0.025 µg/L	0.10 µg/L
Trichlorofluoromethane	USEPA Method 8260B Low-Level	0.025 µg/L	0.10 µg/L
Vinyl chloride	USEPA Method 8260B Low-Level	0.013 µg/L	0.02 µg/L
Chloride	USEPA 300.0	0.500 µg/L	0.8 µg/L
Nitrate	USEPA 300.0	0.250 µg/L	0.5 µg/L
Sulfate	USEPA 300.0	0.400 µg/L	0.5 µg/L
pH	SM 4500 H+B	NA	NA
Conductivity	USEPA 120.1	0.312 mg/L	1.0 mg/L
Calcium	USEPA 6010	0.3 mg/L	1.0 mg/L
Iron	USEPA 6010	0.02 mg/L	0.03 mg/L
Magnesium	USEPA 6010	0.084 mg/L	0.5 mg/L
Manganese	USEPA 6010	0.003 mg/L	0.01 mg/L
Potassium	USEPA 6010	0.5 mg/L	1.0 mg/L
Sodium	USEPA 6010	0.360 mg/L	0.5 mg/L
Alkalinity	SM 2320B	1.68 mg/L	4.0 mg/L
Ammonia	SM 4500 NH3 C	2.0 mg/L	3.0 mg/L

TABLE 2
ANALYTICAL METHODS, DETECTION AND REPORTING LIMITS
City of Walla Walla Sudbury Road Landfill

Parameter	Analytical Method	Detection Limit[1]	Reporting Limit (PQL)[1]
Groundwater Samples			
Total Organic Carbon	USEPA 415.1	0.032 mg/L	1.0 mg/L
Total Dissolved Solids	SM2540C	13 mg/L	25 mg/L
Total dissolved gas - methane, ethane, ethene	RSK 175	0.55 µg/L	1.1 µg/L
Appendix III Groundwater Samples			
Total Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Thallium Tin, Vanadium, Zinc,	USEPA 6010	0.09 - 5 µg/L	0.02 – 20 µg/L
Total Mercury	USEPA 7470A	0.02 µg/L	0.2 µg/L
Total Cyanide	SM 4500 CN-E	0.003 mg/L	0.01 mg/L
Total Sulfide	SM 4500 S2-D	0.02 mg/L	0.05 mg/L
Organochlorine Pesticides	USEPA 8081	0.00039 - 0.2 µg/L	0.01 – 0.5 µg/L
Polychlorinated Biphenyls (PCBs) - Aroclors	USEPA 8082	0.49 µg/L	0.2 – 0.4 µg/L
Organophosphorus Compounds	USEPA 8141	0.049 - 0.03 µg/L	0.2 – 1.0 µg/L
Chlorinated Herbicides	USEPA 8151	0.049 - 0.058 µg/L	0.2 – 0.4 µg/L
Volatile Organic Compounds	USEPA 8260B	0.032 - 7.3 µg/L	0.5 – 100.0 µg/L
Semivolatile Organic Compounds	USEPA 8270	0.26 - 9.3 µg/L	10 – 100.0 µg/L
Air Samples			
Volatile Organic Compounds	USEPA TO15	0.011 – 0.066 ppb v/v	0.2 – 5.0 ppb v/v
Acetone	USEPA TO15	0.045 ppb v/v	5.0 ppb v/v
Carbon Disulfide	USEPA TO15	0.066 ppb v/v	0.50 ppb v/v
Chloroethane	USEPA TO15	0.016 ppb v/v	0.50 ppb v/v
Chloroform	USEPA TO15	0.031 ppb v/v	0.20 ppb v/v
1,1-Dichloroethane	USEPA TO15	0.035 ppb v/v	0.20 ppb v/v
1,2-Dichloroethane	USEPA TO15	0.031 ppb v/v	0.20 ppb v/v
1,1-Dichloroethene	USEPA TO15	0.035 ppb v/v	0.20 ppb v/v
cis-1,2-Dichloroethene	USEPA TO15	0.014 ppb v/v	0.20 ppb v/v
Dichlorofluoromethane	USEPA TO15	0.038 ppb v/v	0.50 ppb v/v
1,2-Dichloropropane	USEPA TO15	0.014 ppb v/v	0.20 ppb v/v
Ethylbenzene	USEPA TO15	0.022 ppb v/v	0.20 ppb v/v
Methylene chloride	USEPA TO15	0.013 ppb v/v	0.50 ppb v/v
Styrene	USEPA TO15	0.030 ppb v/v	0.20 ppb v/v
Tetrachloroethene	USEPA TO15	0.011 ppb v/v	0.20 ppb v/v
Trichloroethene	USEPA TO15	0.030 ppb v/v	0.20 ppb v/v
Trichlorofluoromethane	USEPA TO15	0.034 ppb v/v	0.20 ppb v/v
Toluene	USEPA TO15	0.018 ppb v/v	0.20 ppb v/v

TABLE 2
ANALYTICAL METHODS, DETECTION AND REPORTING LIMITS
City of Walla Walla Sudbury Road Landfill

Parameter	Analytical Method	Detection Limit[1]	Reporting Limit (PQL)[1]
Vinyl Chloride	USEPA TO15	0.029 ppb v/v	0.20 ppb v/v
m,p -Xylenes	USEPA TO15	0.048 ppb v/v	0.50 ppb v/v
o-Xylene	USEPA TO15	0.022 ppb v/v	0.20 ppb v/v
Fixed Gases - Methane, Ethane, Ethene	ASTM D1945	20 ppmv	20 ppmv
Total Gaseous non-methane organics	USEPA 25C	3 ppm-c	6 ppm-c

Notes:
1) All reporting limits shown are method Practical Quantitation Limits (PQLs) from TestAmerica or Columbia Analytical Services.
2) For soil and groundwater, detection and reporting limits are presented for the individual VOCs identified in the work plan as PCOCs or indicator compounds. A range of detection and reporting limits are presented for remaining VOCs to be analyzed for in the full analytical suite by TestAmerica, Spokane, Washington.

ASTM = American Society for Testing and Materials
USEPA = United States Environmental Protection Agency
ppm-c = parts per million carbon
PQL = Practical Quantitation Limit
ppb v/v = parts per billion volume to volume
ppmv = parts per million by volume

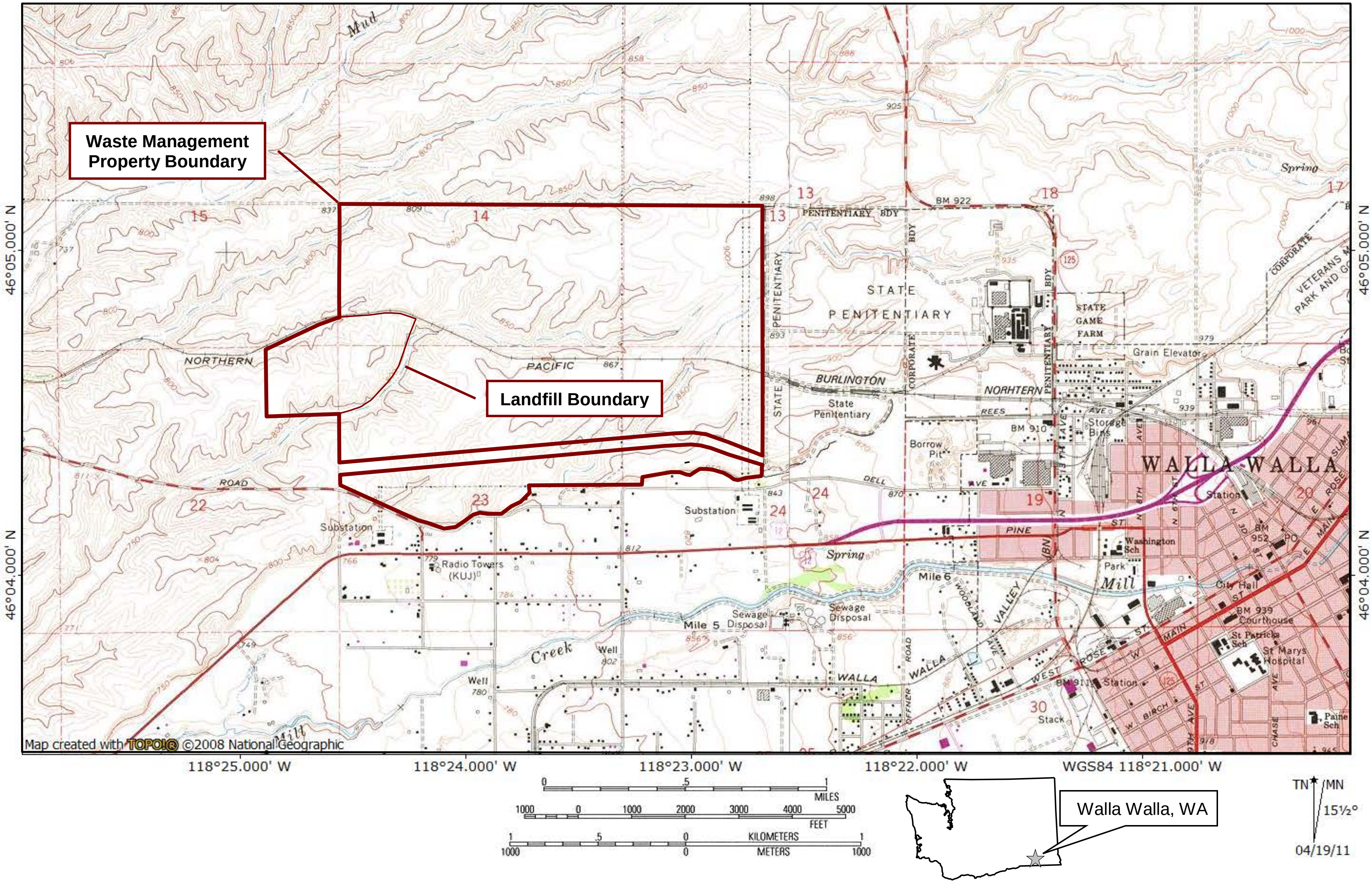
TABLE 3
ANALYTICAL REQUIREMENTS
City of Walla Walla Sudbury Road Landfill

Analyses	Method	Bottle Type	Preservative	Holding Time
Soil Samples				
Volatile Organic Compounds[1,2]	USEPA 8260B	(3) 40-mL VOA vials	Methanol, cool to 6ºC	14 days to analyze
Groundwater Samples				
Volatile Organic Compounds[2]	USEPA 8260B Low-Level	(3) 40 mL VOA vials	HCl, cool to 6°C	14 days to analyze
Nitrate	USEPA 300.0	(1) 500 mL HDPE	None, cool to 6°C	48 hours to analyze
Chloride, Sulfate	USEPA 300.0	(1) 500 mL HDPE	None, cool to 6°C	28 days to analyze
Calcium, Iron, Magnesium, Manganese, Potassium, Sodium	USEPA 6010	(1) 500 mL HDPE	HNO3 to pH <2, cool to 6°C	180 days to analyze
Alkalinity	SM 2320B	(1) 500 mL HDPE	None, cool to 6°C	14 days to analyze
Ammonia	SM 4500 NH3 C	500 mL HDPE	H2SO4 to pH <2, cool to 6°C	28 days to analyze
Total Organic Carbon	USEPA 415.1	(1) 250 mL amber glass	H2SO4 to pH <2, cool to 6°C	28 days to analyze
Total Dissolved Solids	SM 2540C	(1) 500 mL HDPE	None, cool to 6°C	7 days to analyze
Total dissolved gas - methane, ethane, ethene	RSK 175	(3) 40 mL VOA vial	None, cool to 6°C	14 days to analyze
Appendix III Groundwater Samples				
Total Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Nickel, Selenium, Thallium Tin, Vanadium, Zinc,	USEPA 6010C	(1) 500 mL HDPE	HNO3 to pH <2, cool to 6°C	180 days to analyze
Total Mercury	USEPA 7470A	(1) 500 mL HDPE	HNO3 to pH <2, cool to 6°C	28 days to analyze
Total Cyanide	SM 4500 CN-E	(1) 250 mL Plastic	NaOH to pH <2, cool to 6°C	14 days to analyze
Total Sulfide	SM 4500 S2-D	(1) 500 mL Plastic	Zinc Acetate/NaOH to pH >9, cool to 6°C	7 days to analyze
Organochlorine Pesticides	USEPA 8081A	(1) 1L Amber Glass	None, cool to 6°C	7 days to analyze
Polychlorinated Biphenyls (PCBs) - Aroclors	USEPA 8082	(1) 1L Amber Glass	None, cool to 6°C	7 days to analyze
Organophosphorus Compounds	USEPA 8141A	(1) 1L Amber Glass	None, cool to 6°C	7 days to analyze
Chlorinated Herbicides	USEPA 8151	(1) 1L Amber Glass	None, cool to 6°C	7 days to analyze
Volatile Organic Compounds	USEPA 8260B	(3) 40 mL VOA Vial	HCl, cool to 6°C	14 days to analyze
Semivolatile Organic Compounds	USEPA 8270	(1) 1L Amber Glass	None, cool to 6°C	7 days to analyze

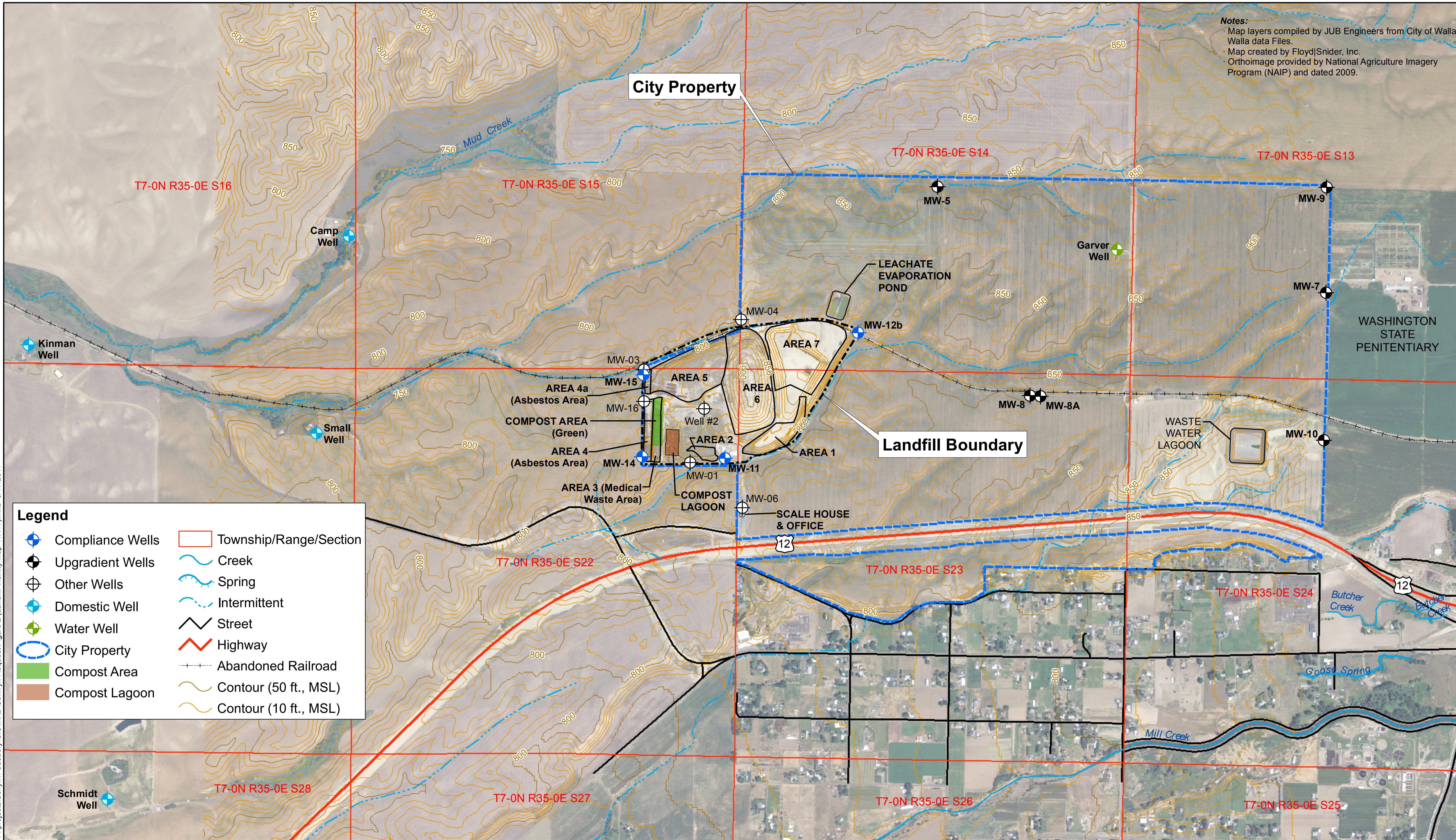
TABLE 3
ANALYTICAL REQUIREMENTS
City of Walla Walla Sudbury Road Landfill

Analyses	Method	Bottle Type	Preservative	Holding Time
Air Samples				
Volatile Organic Compounds	USEPA TO15	Tedlar Bag or Summa Canister	Ambient temperature	72 hours for Tedlar bag, 30 days for Summa Canister
Fixed Gases - Methane, Ethane, Ethene	ASTM D1945	Tedlar Bag or Summa Canister	Ambient temperature	72 hours for Tedlar bag, 30 days for Summa Canister
Total Gaseous non-methane organics	USEPA 25C	Tedlar Bag or Summa Canister	Ambient temperature	72 hours for Tedlar bag, 30 days for Summa Canister

Notes:
1) 1 Soil samples for volatile organic compound analyses collected using USEPA Method 5035A with a soil Teflon corer.
2) No head space in sample container.
ASTM = American Society for Testing and Materials
USEPA = United States Environmental Protection Agency
HCl = Hydrochloric Acid
HNO3 = Nitric Acid
NaOH = Sodium Hydroxide
H2SO4 = Sulfuric Acid
HDPE = High-density polyethylene



Remedial Investigation Work Plan Sudbury Road Landfill Walla Walla, Washington	**Site Location**	Figure 1



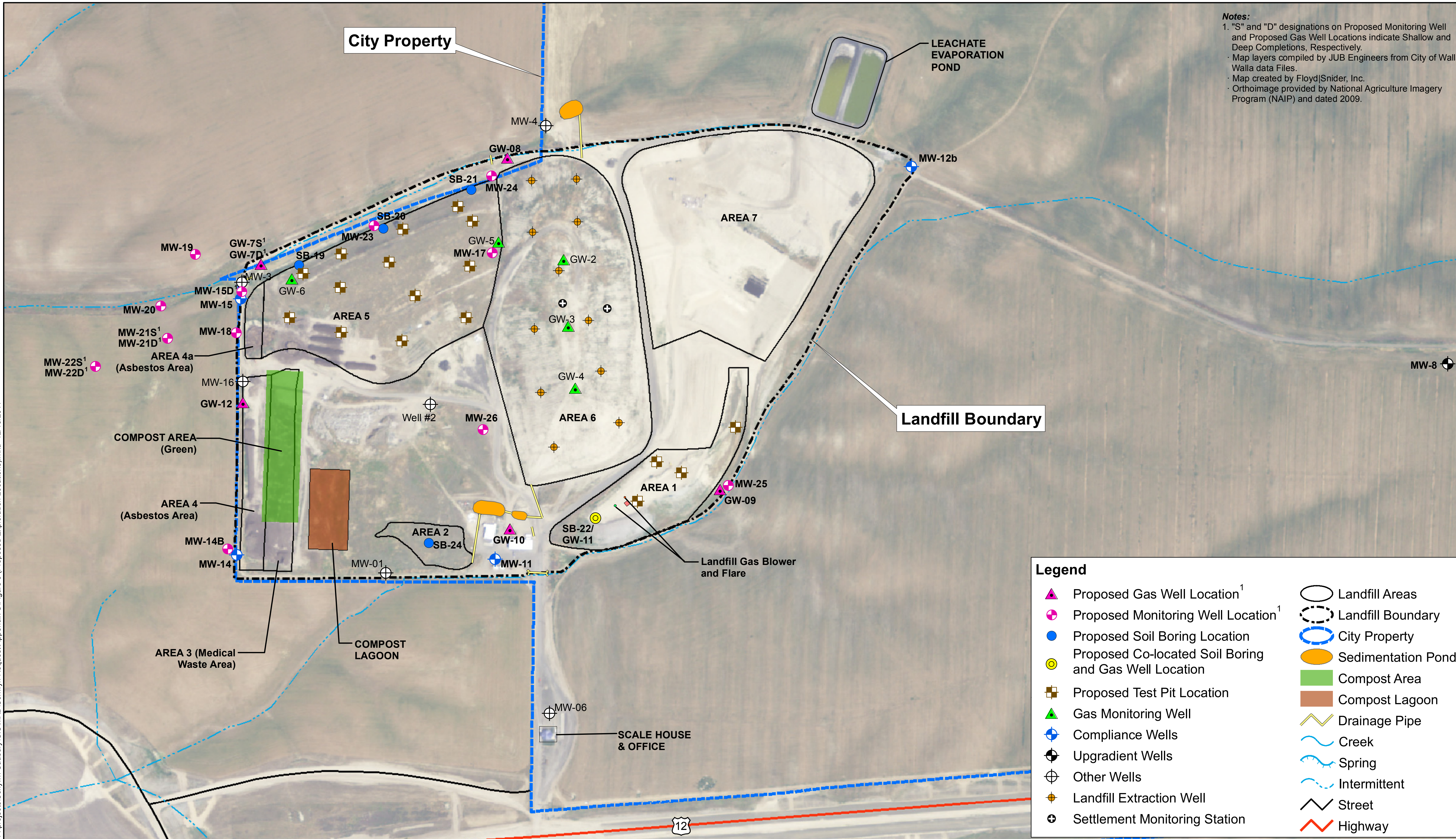
F:\projects\Schwyn-Sudbury\GIS\MXD\Schwyn Request\Figure 2 (Landfill Vicinity Map 11X17).mxd 8/17/2011

Schwyn Environmental Services

Remedial Investigation Work Plan
Sudbury Road Landfill
Walla Walla, Washington

Vicinity Map

Figure 2



Schwyn Environmental Services

Remedial Investigation Work Plan
Sudbury Road Landfill
Walla Walla, Washington

Proposed Exploration Locations

Figure 3

APPENDIX E1

Sudbury Road Landfill
Health and Safety Plan

Schwyn Environmental Services

Health and Safety Plan
for
Sudbury Road Landfill Remedial Action
Walla Walla, Washington

December 28, 2011

Prepared for:

City of Walla Walla

Prepared by:

FLOYD|SNIDER
Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101

and

Schwyn Environmental Services
4621 South Custer
Spokane, WA 99223
(509) 448-3187

Table of Contents

1.0 Plan Objectives and Applicability

Schwyn Environmental Services, LLC (Schwyn) and Floyd|Snider developed this Health and Safety Plan (HASP) to comply with the standards prescribed by the Occupational Safety and Health Act (OSHA) and the Washington Industrial Safety and Health Act (WISHA).

The purpose of this HASP is to establish protection standards and mandatory safe practices and procedures for all personnel involved with Remedial Investigation (RI) activities at the City of Walla Walla, Washington, (City) Sudbury Road Landfill (Site). The field components of the Sudbury Road Landfill RI include geophysical survey; test pit excavation and sampling; soil boring installation and sampling; groundwater monitoring well installation, development, and sampling; landfill gas well installation and sampling; groundwater sample collection; and aquifer testing at the Site and surrounding areas. This HASP assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may occur during field work activities. This plan consists of site descriptions, a summary of work activities, an identification and evaluation of chemical and physical hazards, monitoring procedures, personnel responsibilities, a description of site zones, decontamination and disposal practices, emergency procedures, and administrative requirements.

The provisions and procedures outlined by this HASP apply to all personnel on-site that are conducting work associated with the RI. Contractors, subcontractors, other oversight personnel, and all other persons involved with the field work activities described herein are required to comply with this HASP or develop and comply with their own HASP. Staff conducting field activities are required to read this HASP and indicate that they understand its contents by signing a copy of this plan.

A Health and Safety Officer (HSO) has field responsibility for ensuring that the provisions outlined herein adequately protect worker health and safety and that the procedures outlined by this HASP are properly implemented. In this capacity, the HSO will conduct regular site inspections to ensure that this HASP remains current with potentially changing site conditions. The HSO has the authority to make health and safety decisions that may not be specifically outlined in this HASP, should site conditions warrant such actions. In the event that the HSO leaves the Site while work is in progress, an alternate Site Safety Officer (SSO) will be designated. Personnel responsibilities are further described in Section 4.0.

This HASP has been reviewed by the Project Manager (PM) and the HSO prior to commencement of work activities. All personnel shall review the plan and be familiar with on-site health and safety procedures. A copy of the HASP will be on-site at all times.

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2.0 Emergency Contacts and Information

2.1 DIAL 911

In the event of any emergency, dial 911 to reach fire, police, and first aid.

2.2 HOSPITAL AND POISON CONTROL

Nearest Hospital Location and Telephone: Refer to Figure 1 below for map and directions to the hospital.	St. Mary's Hospital 401 West Poplar Street Walla Walla, WA 99362 (509) 525-3320 or (509) 522-5900
Washington Poison Control Center:	(800) 222-1222

Figure 1
Hospital Directions

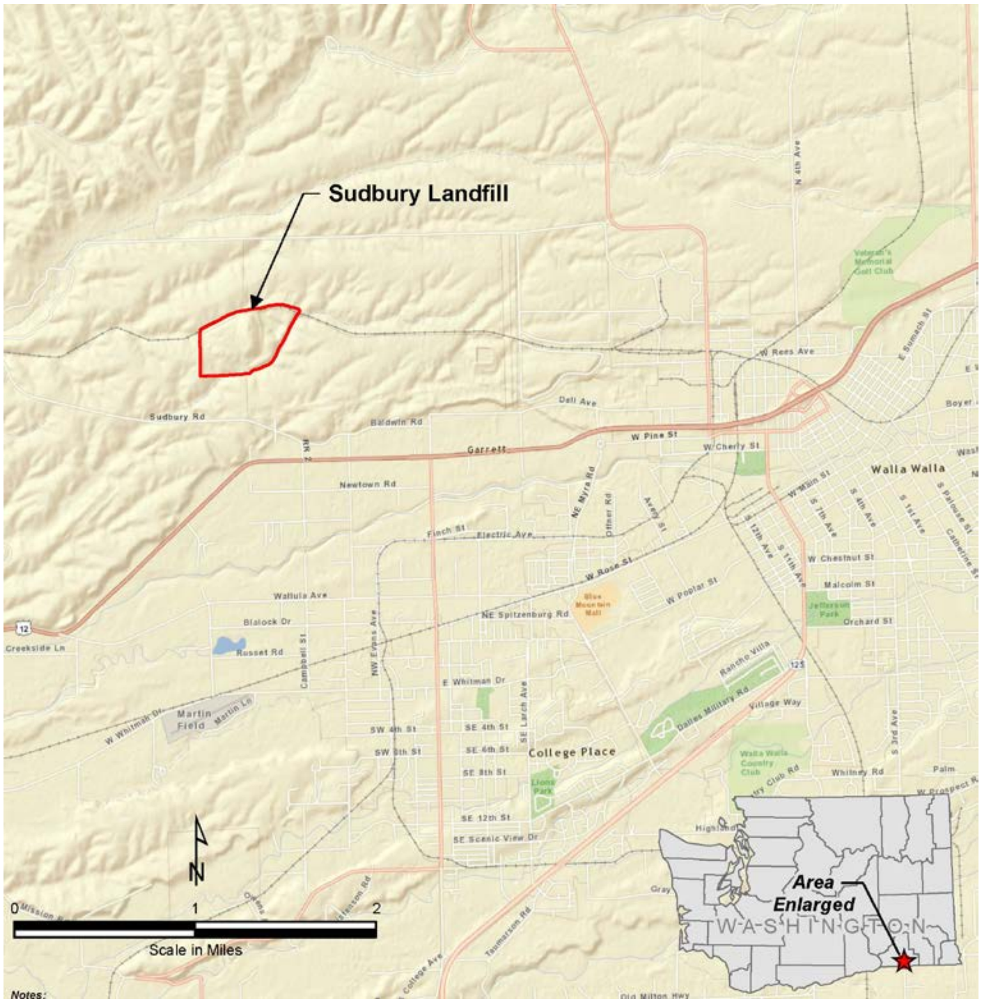
Leave Site Heading LEFT/SOUTHEAST on Sudbury Road
Turn LEFT/EAST onto US-12
Exit US-12 at 2nd Avenue, turn RIGHT/SOUTH onto 2nd Avenue
Turn into Hospital Emergency Room Entrance at 401 West Poplar Street

2.3 PROVIDE INFORMATION TO EMERGENCY PERSONNEL

All project personnel should be prepared to give the following information:

Information to Give to Emergency Personnel	
Site Location: Refer to Figure 2 below for directions and map to the Site.	Sudbury Road Landfill Site 414 Sudbury Road Walla Walla, WA 99362
Number that You are Calling from:	Look on the phone you are calling from.
Type of Accident or Type(s) of Injuries:	Describe accident and/or incident and numbers of personnel needing assistance.

Figure 2
Sudbury Road Landfill Site



2.4 EMERGENCY CONTACTS

After contacting emergency response crews as necessary, contact the PM/HSO to report the emergency. Contact other emergency contacts listed below as necessary.

Emergency Contacts:

Contact	Off-site Phone Number	On-site Phone Number
Craig Schwyn, PM and HSO	(509) 448-3187	(509) 499-6583
Dennis Rakestraw, Landfill Supervisor		(509)-524-4572
Frank Nicholson, Project Engineer		(509)-524-4510

3.0 Background Information

3.1 SITE BACKGROUND

Schwyn will conduct field investigation and data collection activities on behalf of the City at the Site located at 414 Sudbury Road in Walla Walla, Washington. The Site occupies approximately 125 acres of a currently operational landfill that is bounded to the north, west, and east by agricultural land and to the south by Highway US-12. The northern border of the landfill is defined by the abandoned 100-foot wide Burlington Northern Santa Fe railroad right-of-way.

The landfill is developed within a much larger City-owned parcel of land that was established for various waste management purposes before the development of the landfill. The westernmost 125 acres of the City property were set aside for landfill development. The landfill was opened in 1978 and designated for municipal solid waste (MSW), asbestos waste, and medical waste. MSW has been placed in five separate areas. Asbestos waste has been placed in two areas, and medical waste in one. The Site is currently owned by the City, who entered into a Remedial Investigation/Feasibility Study (RI/FS) Agreed Order (AO) for the Site with the Washington State Department of Ecology (Ecology) in May 2011.

3.2 SCOPE OF WORK

The scope of work for this field investigation and data collection activities is described in detail in the Work Plan. Schwyn will conduct the following field work activities:

- A geophysical survey will be performed to assess the limit of the solid waste in Areas 1, 2, and 5.
- Five borings will be drilled to assess the vertical extent of the MSW in Area 1 (two borings), Area 2 (one boring), and in the northern trench of Area 5 (three borings).
- Excavation of test pits will be performed to collect soil samples for soil characteristic analysis and soil cover thickness.
- Installation of soil borings, groundwater monitoring wells, and landfill gas monitoring wells with Sonic drilling equipment or Hollow-stem auger will be performed.
- Development of newly installed groundwater monitoring wells and re-development of previously installed monitoring wells will occur.
- Groundwater and landfill gas will be monitored.
- Groundwater, soil, and landfill gas samples will be collected for analysis.
- Aquifer testing will be performed.

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4.0 Primary Responsibilities and Requirements

4.1 HEALTH AND SAFETY OFFICER

The HSO will direct all personnel involved in field work at the Site. The HSO will ensure that all personnel on-site have received the required training, are familiar with the HASP, and understand the procedures to follow should an accident and/or incident occur on-site. The HSO will advise project personnel on all potential health and safety issues of the field investigation activities to be conducted at the Site. The HSO will specify required exposure monitoring to assess site health and safety conditions, modify the Site's HASP based on field assessment of health and safety accidents and/or incidents, and recommend corrective action if needed. If the HSO observes unsafe working conditions by any personnel, the HSO will suspend all work until the hazard has been addressed.

4.2 SITE SAFETY OFFICER

The SSO will be a person dedicated to assist the HSO during field work activities and occupy the role of the HSO should the HSO be off-site. The SSO will ensure that all personnel have appropriate personal protective equipment (PPE) on-site and that PPE is properly used. The SSO will assist the HSO in field observation of personnel safety. If a health or safety hazard is observed, the SSO shall suspend all work activity. The SSO will conduct on-site safety meetings before work commences. All health and safety equipment will be calibrated daily and records kept in the field logbook. The SSO may perform exposure monitoring if needed and will ensure that equipment is properly maintained.

4.3 TRAINING REQUIREMENTS

All project personnel must comply with applicable regulations specified in the Hazardous Waste Operations (HAZWOP) Chapter 296-843 of the Washington Administrative Code (WAC), administered by the Washington State Department of Labor and Industries (L&I). Project personnel will be 40-hour HAZWOP trained and maintain their training with an annual 8-hour refresher. Personnel with limited tasks and minimal exposure potential will be required to have 24-hour training and a site hazard briefing and be escorted by a trained employee. Personnel with defined tasks that do not include potential contact with disturbed site soils, waste, or groundwater, or exposures to visible dust, are not required to have any level of hazardous waste training beyond a site emergency briefing and hazard orientation by the HSO. Project personnel will fulfill the medical surveillance program requirements.

In addition to the 40-hour course and 8-hour refreshers, the HSO will have completed an 8-hour HAZWOP Supervisor training or equivalent as required by WAC 296-843-20015. At least one person on-site during field work will have current cardiopulmonary resuscitation (CPR)/First Aid certification. All field personnel will have a minimum of 3 days of hazardous materials field experience under the direction of a skilled supervisor. Documentation of all required training will be maintained in a three-ring binder, or similar, on-site and kept either in the HSO vehicle or equipment storage bin.

Additional site-specific training that covers on-site hazards, PPE requirements, use and limitations, decontamination procedures, and emergency response information as outlined in this HASP will be given by the HSO before on-site work activities begin.

5.0 Hazard Evaluation and Risk Analysis

In general, there are three broad hazard categories that may be encountered during site work: chemical exposure hazards, fire/explosion hazards, and physical hazards. Sections 5.1 through 5.3 discuss the specific hazards that fall within each of these broad categories.

5.1 CHEMICAL EXPOSURE HAZARDS

This section describes potential chemical hazards associated with test pit excavation, soil boring installation, monitoring well installation and development, landfill gas boring installation, hydraulic conductivity testing, and soil, groundwater, and landfill gas sample collection. Based on previous site investigation information, the majority of the chemicals previously detected at this Site are summarized below. Additional volatile organic compounds (VOCs) have been detected in landfill gas at the Site; however, chemicals included below are expected to be representative of hazards posed by exposure to landfill gas while conducting site activities:

- VOCs—tetrachloroethene (PCE), trichloroethene (TCE), vinyl chloride (VC), 1,1-dichloroethane (1,1-DCA), chloroform, chloroethane, cis-1,2-dichloroethene (cis-1,2-DCE), dichlorodifluoromethane (Freon-12), trichlorofluoromethane (Freon-11), and toluene in soil, groundwater, and landfill gas.
- Other potential landfill gases including carbon dioxide, methane, and hydrogen sulfide.

Human health hazards of these chemicals are presented in the table below. This information covers potential toxic effects that might occur if relatively significant acute and/or chronic exposure were to happen. This information does not mean that such effects will occur from the planned site activities. Potential routes of exposure include inhalation, dermal contact, ingestion, and eye contact. The primary exposure route of concern during site work is ingestion of contaminated water or MSW, or inhalation of landfill gas, though such exposure is considered unlikely and highly preventable. In general, the chemicals that may be encountered at this Site are not expected to be present at concentrations that could produce significant exposures. The types of planned work activities and use of monitoring procedures and protective measures will limit potential exposures at this Site. The use of appropriate PPE and decontamination practices will assist in controlling exposure through all pathways to the contaminants listed in the table below.

Chemical Hazard	DOSH Permissible Exposure Limits (8-hour TWA/STEL)	Routes of Exposure	Potential Toxic Effects
Tetrachloroethene	25 ppm/38 ppm	Inhalation, skin absorption, ingestion, skin/eye contact	Irritation to eyes, nose, and throat; nausea; flushed skin; vertigo; dizziness; incoherence; sleepiness; liver damage, cancer
Trichloroethene	50 ppm/200 ppm	Inhalation, skin absorption, ingestion, skin/eye contact	Irritation to eyes and skin; headache; vertigo; vision disturbance; fatigue; tremors/jitters; sleepiness; nausea; dermatitis; cardiac arrhythmia; paresthesia; liver injury, cancer
1,2-Dichloroethane	1 ppm/2 ppm	Inhalation, skin absorption, ingestion, skin/eye contact	Irritation to eyes; corneal opacity; central nervous system depression; nausea; dermatitis; liver, kidney, cardiovascular system damage, cancer
cis-1,2-dichloroethene	TWA: 200 ppm (790 mg/m^3)	Inhalation, skin absorption, ingestion, skin/eye contact	Irritation to eyes and respiratory system; central nervous system depression
Vinyl chloride	1 ppm/5 ppm	Inhalation, skin absorption, ingestion, skin/eye contact	Lassitude; abdominal pain; GI bleeding; enlarged liver; pallor or cyanosis of extremities, cancer
Chloroethane	TWA: 1000 ppm (2600 mg/m^3)	Inhalation, skin absorption, ingestion, skin/eye contact	Inebriation; abdominal cramps; cardiac arrhythmia; cardiac arrest; liver and kidney damage; incoordination

Chemical Hazard	DOSH Permissible Exposure Limits (8-hour TWA/STEL)	Routes of Exposure	Potential Toxic Effects
Chloroform	STEL: 2 ppm/9.78 mg/m^3	Inhalation, skin absorption, ingestion, skin/eye contact	Irritation to eyes and skin; dizziness; mental dullness; nausea; confusion; headache; lassitude; anesthesia; liver damage, cancer
Toluene	100 ppm/150 ppm	Inhalation, skin absorption, ingestion, skin/eye contact	Irritation to eyes; lassitude; euphoria; dizziness; headache; dilated pupils; anxiety; muscle fatigue; liver and kidney damage; confusion; insomnia; dermatitis
Freon-11	TWA: 1000 ppm (5600 mg/m^3)	Inhalation, skin absorption, ingestion, skin/eye contact	Dizziness; tremors; asphyxia; unconsciousness; cardiac arrhythmia; cardiac arrest; Liquid: frostbite
Freon-12	TWA: 1000 ppm (4,950 mg/mg^3)	Inhalation, skin absorption, ingestion, skin/eye contact	Dizziness; tremors; asphyxia; unconsciousness; cardiac arrhythmia; cardiac arrest; Liquid: frostbite
Carbon dioxide (CO_2)	5,000 ppm/30,000 ppm	Inhalation	Asphixia; nausea; respiratory problems; vasodilation leading to circulatory collapse
Hydrogen Sulfide (H_2S)	10 ppm/15 ppm	Inhalation	Irritation to eyes and respiratory system; apnea; coma; convulsions; eye pain; dizziness; headache; lassitude; GI distress. Most individuals can smell the “rotten egg” smell at concentrations as low as 0.005 ppm.
Methane (CH_4)	Not Established	Inhalation	Defined as an asphysiant

Chemical Hazard	DOSH Permissible Exposure Limits (8-hour TWA/STEL)	Routes of Exposure	Potential Toxic Effects
Laboratory Preservatives (HCl, MeOH, Sodium Bisulfate, HNO_3)	Not Applicable	Dermal contact, eye contact	Irritation to skin or eyes.

Abbreviations:

DOSH	Department of Health and Safety
GI	Gastro-intestinal
HCl	Hydrochloric acid
HNO_3	Nitric acid
MeOH	Methanol
mg/m3	Milligrams per cubic meter
PPE	Personal protective equipment
ppm	Parts per million
STEL	Short term exposure limit
TWA	Time-weighted average

5.2 FIRE AND EXPLOSION HAZARDS

Flammable and combustible liquid hazards may occur from fuels and lubricants brought to the property to support heavy equipment or landfill gases, such as methane, encountered during field work. When on-site storage is necessary for fuels and lubricants, such material will be stored in containers approved by the Washington State Department of Transportation (WSDOT) in a location not exposed to strike hazards and provided with secondary containment. A minimum 2-A:20-B fire extinguisher will be located within 25 feet of the storage location and where refueling occurs. Any subcontractors bringing flammable and combustible liquid hazards to the Site are responsible for providing appropriate material for containment and spill response. Transferring of flammable liquids (e.g., gasoline) will occur only after making positive metal to metal connection between the containers, which may be achieved by using a bonding strap. Storage of ignition and combustible materials will be kept away from fueling operations.

This work includes drilling in a landfill, where flammable/explosive gas such as methane may be present. Absolutely *no* open flames or spark source is allowed in the work area. This includes no lit cigarettes, lighters, matches, welding torches, or other potential sources of open flames or sparks. A minimum 2-A:20-B fire extinguisher will be located within 25 feet of the work area. Additionally, a source of ventilation such as a box fan will be kept on-site as a contingency. If air monitoring thresholds described in Section 6.1 are exceeded, ventilation will be used to ensure flammable/explosive vapors are dissipated prior to continuation of work.

5.3 PHYSICAL HAZARDS

When working in or around any hazardous or potentially hazardous substances or situations, all site personnel should plan all activities before starting any task. Site personnel shall identify health and safety hazards involved with the work planned and consult with the HSO as to how the task can be performed in the safest manner, and if personnel have any reasons for concern or uncertainty.

All field personnel will adhere to general safety rules including wearing appropriate PPE—hard hats, steel-toed boots, high-visibility vests, safety glasses, gloves, and hearing protection, as appropriate. Eating, drinking, and/or use of tobacco or cosmetics will be restricted in all work areas. Personnel will prevent splashing of liquids containing chemicals and minimize dust emissions.

The following table summarizes a variety of physical hazards that may be encountered on the Site during work activities. For convenience, these hazards have been categorized into several general groupings with recommended preventative measures.

Hazard	**Cause**	**Prevention**
Head strike	Falling and/or sharp objects, bumping hazards.	Hard hats will be worn by all personnel at all times when overhead hazards exist, such as during drilling activities and around large, heavy equipment.
Foot/ankle twist, crush, slip/trip/fall	Sharp objects, dropped objects, uneven and/or slippery surfaces.	Steel-toed boots must be worn at all times on-site while heavy equipment is present. Pay attention to footing on uneven or wet terrain and do not run. Keep work areas organized and free from unmarked trip hazards.
Hand cuts, splinters, and chemical contact	Hands or fingers pinched or crushed, chemical hazards including dermal exposure to laboratory sample preservatives. Cut or splinters from handling sharp/rough objects and tools.	Nitrile safety gloves will be worn to protect the hands from dust and chemicals. Leather or cotton outer gloves will be used when handling sharp-edged rough materials or equipment. Refer to preventive measures for mechanical hazards below.
Eye damage from flying materials, or splash hazards	Sharp objects, poor lighting, exposure due to flying debris or splashes.	Safety glasses will be worn at all times on-site. If a pressure washer is used to decontaminate heavy equipment, a face shield will be worn over safety glasses or goggles. Care will be taken during decontamination procedures, soil sampling, and groundwater sampling to avoid splashing, as well as when dropping equipment into decontamination water. Face shields may be worn over safety glasses if splashing is occurring during sampling, decontamination, well testing, or disposal.

Hazard	Cause	Prevention
Electrical hazards	Underground utilities, overhead utilities. Electrical cord hazards, such as well development pumps.	Utility locator service will be used prior to any investigation to locate all underground utilities. Visual inspection of work areas will be conducted prior to starting work. Whenever possible, avoid working under overhead high voltage lines. Make sure that no damage to extension cords occurs. If an extension cord is used, make sure it is the proper size for the load that is being served, properly rated and inspected prior to use for defects. The plug connection on each end should be of good integrity. Insulation must be intact and extend to the plugs at either end of the cord. All portable power tools will be inspected for defects before use and must either be a double-insulated design or grounded with a ground-fault circuit interrupter (GFCI).
Mechanical hazards	Heavy equipment such as drill rigs, service trucks, mowing equipment, saws, drills, etc. Conducting work in road right-of-ways (on the road shoulder).	Ensure the use of competent operators, backup alarms, regular maintenance, daily mechanical checks, and proper guards. Subcontractors will follow this HASP or supply their own HASP. All project personnel will make eye contact with operator and obtain a clear OK before approaching or working within swing radius of heavy equipment, staying clear of swing radius. Obey on-site speed limits.
Traffic hazards	Vehicle traffic and hazards when working near public right-of-ways.	When working near public access areas or on the shoulder of any roadway, orange cones and/or flagging will be placed around the work area. Safety vests will be worn at all times while conducting work. Multiple field staff will work together (buddy system) and spot traffic for each other. Avoid working with your back to traffic whenever possible. **Further detail on traffic hazards is provided in Section 5.3.4.**
Damage to hearing from noise	Machinery creating more than 85 decibels TWA, less than 115 decibels continuous noise, or peak at less than 140 decibels.	Wear earplugs or protective ear covers when a conversational level of speech is difficult to hear at a distance of 3 feet; when in doubt, a sound level meter may be used on-site to document noise exposure.

Hazard	Cause	Prevention
Strains from improper lifting	Injury due to improper lifting techniques, over-reaching/ overextend-ing, lifting overly heavy objects.	Use proper lifting techniques and mechanical devices where appropriate. The proper lifting procedure first involves testing the weight of the load by tipping it. If in doubt, ask for help. Do not attempt to lift a heavy load alone. Take a good stance and plant your feet firmly with legs apart, one foot farther back than the other. Make sure you stand on a level area with no slick spots or loose gravel. Use as much of your hands as possible, not just your fingers. Keep your back straight, almost ver-tical. Bend at the hips, holding load close to your body. Keep the weight of your body over your feet for good balance. Use large leg mus-cles to lift. Push up with one foot positioned in the rear as you start to lift. Avoid quick, jerky movements and twisting motions. Turn the forward foot and point it in the direction of the eventual movement. Never try to lift more than you are accustomed to lifting. During the transfer of monitoring well purge water to the disposal area (leachate ponds), mechanical lifting devices (drum tongs or dolly) will be used to move the drums. Lifting hazards may also be minimized by pumping from drums directly to a water truck tank, which will then transport the water to the ponds.
Cold stress	Cold temperatures and related exposure.	Workers will ensure appropriate clothing, stay dry, and take breaks in a heated environment when working in cold temperatures. **Further detail on cold stress is provided in Section 5.3.1.**
Heat exposure	High temperatures exacerbated by PPE, dehydration.	Workers will ensure adequate hydration, shade, and breaks when temperatures are elevated. **Further detail on heat stress is provided in Section 5.3.2.**
Accidents due to inadequate lighting	Improper illumination.	Work will proceed during daylight hours only, or under sufficient artificial light.

Abbreviations:

HASP Hand and Safety Plan
PPE Personal protective equipment
TWA Time-weighted average

5.3.1 Cold Stress

The majority of field work is expected to be completed in spring or summer months; however, some activities such as groundwater sampling may be conducted in winter months and exposure to cold temperatures may occur. Exposure to moderate levels of cold can cause the body's internal temperature to drop to a dangerously low level, causing hypothermia. Symptoms of hypothermia include slow, slurred speech, mental confusion, forgetfulness, memory lapses, lack of coordination, and drowsiness.

To prevent hypothermia, site personnel will stay dry and avoid exposure. Site personnel will have access to a warm, dry area, such as a vehicle, to take breaks from the cold weather and warm up. Site personnel will be encouraged to wear sufficient clothing in layers such that outer clothing is wind- and waterproof and inner layers retain warmth (wool or polypropylene), if applicable. Site personnel will keep hands and feet well protected at all times. The signs and symptoms and treatment for hypothermia are summarized below.

Signs and Symptoms

- Mild hypothermia (body temperature of 98–90° F)
  - Shivering
  - Lack of coordination, stumbling, fumbling hands
  - Slurred speech
  - Memory loss
  - Pale, cold skin
- Moderate hypothermia (body temperature of 90–86° F)
  - Shivering stops
  - Unable to walk or stand
  - Confused and irrational
- Severe hypothermia (body temperature of 86–78° F)
  - Severe muscle stiffness
  - Very sleepy or unconscious
  - Ice cold skin
  - Death

Treatment of Hypothermia—Proper Treatment Depends on the Severity of the Hypothermia

- Mild hypothermia
  - Move to warm area.
  - Stay active.

- Remove wet clothes and replace with dry clothes or blankets and cover the head.
  - Drink warm (not hot) sugary drinks.

- Moderate hypothermia
  - All of the above, plus:
    - call 911 for an ambulance.
    - cover all extremities completely.
    - place very warm objects such as hot packs or water bottles on the victim's head, neck, chest, and groin.

- Severe hypothermia
  - Call 911 for an ambulance.
  - Treat the victim very gently.
  - Do not attempt to re-warm—the victim should receive treatment in a hospital.

Frostbite

Frostbite occurs when the skin actually freezes and loses water. In severe cases, amputation of the frostbitten area may be required. While frostbite usually occurs when the temperatures are 30°F or lower, wind chill factors can allow frostbite to occur in above-freezing temperatures. Frostbite typically affects the extremities, particularly the feet and hands. Frostbite symptoms include cold, tingling, stinging, or aching feeling in the frostbitten area followed by numbness and skin discoloration from red to purple, then white or very pale. Should any of these symptoms be observed, wrap the area in soft cloth, do not rub the affected area, and seek medical assistance. Call 911 if the condition is severe.

Protective Clothing

Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. The following are recommendations for working in cold environments:

- Wear *at least three layers* of clothing.
  - An outer layer to break the wind and allow some ventilation (like Gortex or nylon).
  - A middle layer of down or wool to absorb sweat and provide insulation even when wet.
  - An inner layer of cotton or synthetic weave to allow ventilation.

- Wear a hat—up to 40 percent of body heat can be lost when the head is left exposed.

- Wear insulated boots or other footwear.

- Keep a change of dry clothing available in case work clothes become wet.
- Do not wear tight clothing—loose clothing allows better ventilation.

Work Practices

- Drinking—Drink plenty of liquids, avoiding caffeine and alcohol. It is easy to become dehydrated in cold weather.
- Work Schedule—If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold in heated vehicles.
- Buddy System—Try to work in pairs to keep an eye on each other and watch for signs of cold stress.

5.3.2 Heat Stress

To avoid heat-related illness, current regulations in WAC 296-62-095 through 296-62-09570 will be followed during all outdoor work activities. These regulations apply to any outdoor work environment from May 1 through September 30, annually, when workers are exposed to temperatures greater than 89°F when wearing breathable clothing, greater than 77°F when wearing double-layered woven clothing (such as jackets or coveralls) or greater than 52°F when wearing non-breathing clothing such as chemical resistant suits or tyvek. Schwyn will identify and evaluate temperature, humidity, and other environmental factors associated with heat-related illness including, but not limited to, the provision of rest breaks that are adjusted for environmental factors, and encourage frequent consumption of drinking water. Drinking water will be provided and made readily accessible in sufficient quantity to provide at least 1 quart per employee per hour. All personnel will be informed and trained for responding to signs or symptoms of possible heat-related illness and accessing medical aid.

Employees showing signs or demonstrating symptoms of heat-related illness must be relieved from duty and provided with a sufficient means to reduce body temperature, including rest areas or temperature-controlled environments (i.e., air conditioned vehicle). Any employee showing signs or demonstrating symptoms of heat-related illness must be carefully evaluated to determine whether it is appropriate to return to work or if medical attention is necessary.

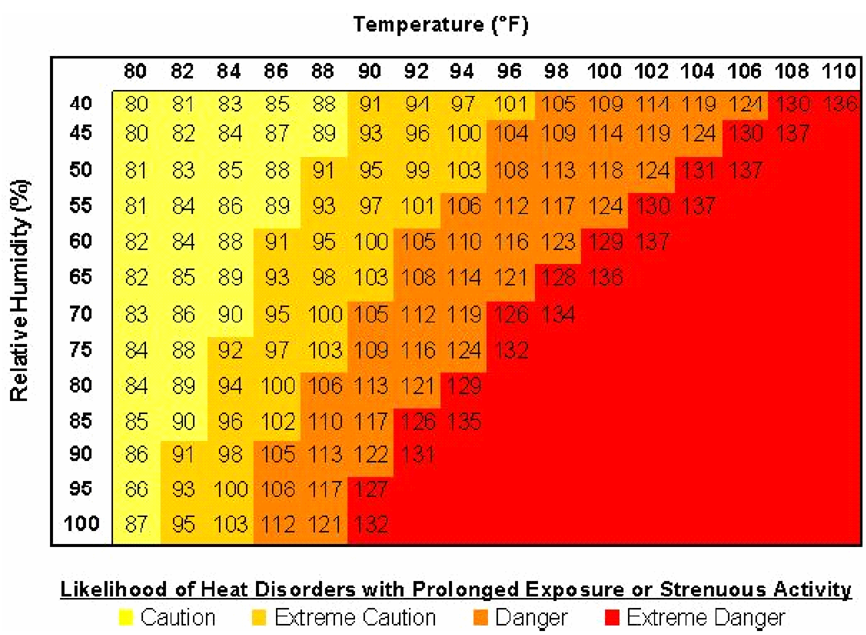
Any incidence of heat-related illness must be immediately reported to the employer directly through the HSO.

The signs, symptoms, and treatment of heat stress include the following:

Condition	**Signs/Symptoms**	**Treatment**
Heat cramps	Painful muscle spasms and heavy sweating.	Increase water intake, rest in shade/cool environment.
Heat syncope	Brief fainting and blurred vision.	Increase water intake, rest in shade/cool environment.

Dehydration	Fatigue, reduced movement, headaches.	Increase water intake, rest in shade/cool environment.
Heat exhaustion	Pale and clammy skin, possible fainting, weakness, fatigue, nausea, dizziness, heaving sweating, blurred vision, body temperature slightly elevated.	Lie down in cool environment, increase water intake, loosen clothing, and call 911 for ambulance transport if symptoms continue once in cool environment.
Heat stroke	Cessation of sweating, skin hot and dry, red face, high body temperature, unconsciousness, collapse, convulsions, confusion or erratic behavior, life threatening condition.	**Medical Emergency! Call 911** for ambulance transport. Move victim to shade and immerse in water.

If site temperatures are forecast to exceed 85°F and physically demanding site work will occur in impermeable clothing, the HSO will promptly consult with a certified industrial hygienist and a radial pulse monitoring method will be implemented to ensure that heat stress is properly managed among the affected workers. The following heat index chart indicates the relative risk of heat stress.


Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	106	117	127										
100	87	95	103	112	121	132										

5.3.3 Biohazards

Bees and other insects may be encountered during the field work tasks. Persons with allergies to bees will make the HSO aware of their allergies and will avoid areas where bees are identified. Controls such as repellents, hoods, nettings, masks, or other personal protection may be used. Report any insect bites or stings to the HSO and seek first aid, if necessary.

Site personnel will maintain a safe distance from any urban wildlife encountered, including stray dogs, raccoons, and rodents, to preclude a bite from a sick or injured animal. Personnel will be gloved and will use tools to lift covers from catch basins and monitoring wells.

5.3.4 Traffic Hazards

While performing work conducted nearby or alongside a roadway, signs, signals, and barricades should be utilized. Because signs, signals, and barricades do not always provide appropriate protection, spotters will be used to ensure traffic is monitored during work activities along active roadways. All workers will wear high visibility reflective neon orange or yellow vests.

6.0 Site Monitoring

The following sections describe site monitoring techniques and equipment that are to be used during site field activities. The HSO, or a designated alternate, is responsible for site control and monitoring activities.

6.1 SITE MONITORING

Air monitoring will be conducted during all intrusive field activities such as drilling or test pitting. The following equipment will be used to monitor air quality in the breathing zone during work activities:

Monitoring Instrument	**Calibration Frequency**	**Parameters of Interest**	**Sampling Frequency**
Photoionization detector (PID)	Daily	VOCs	During drilling activities
H_2S meter	As recommended by manufacturer	H_2S	During drilling activities
Combined gas/O_2 meter	As recommended by manufacturer	CO_2, CH_4, H_2S, O_2	During drilling activities

Abbreviations:

CH_4	Methane
CO_2	Carbon dioxide
H_2S	Hydrogen sulfide
O_2	Oxygen
VOC	Volatile organic compound

The following action levels are established to determine the appropriate level of personal protection to be used during field activities:

Instrument	**Reading in Breathing Zone**	**Action**	**Comments**
PID	5 PID units greater than background for 5 minutes	Upgrade to Level C PPE (air purifying respirator with organic vapor cartridge).	Alternatively, employ engineering controls (ventilation) or leave location and return at a later time.
PID	100 PID units greater than background for 5 minutes	Leave location pending further evaluation by HSO or SSO.	
H2S meter	Greater than	Leave location pending	

	10 ppm	further evaluation by HSO or SSO.	
Combined Gas/O2 meter	Greater than 5% by volume	Leave location pending further evaluation by HSO or SSO.	

Abbreviations:

H_2S	Hydrogen sulfide
HSO	Health and Safety Officer
O2	Oxygen
PID	Photoionization detector
PPE	Personal protective equipment
SSO	Site Safety Officer

Visual monitoring for dust will be conducted by the HSO to ensure that inhalation of contaminated soil particles does not occur. Water may be used to suppress any dust clouds generated during work activities. The concentrations of VOCs encountered at the Site are lower than the exposure limits developed by OSHA. Since the concentrations of VOCs are low, and all work will be conducted outdoors in an open-air ventilated environment, vapor concentrations are not expected to exceed allowable levels.

The HSO will visually inspect the work site at least daily to identify any new potential hazards. If new potential hazards are identified, immediate measures will be taken to eliminate or reduce the risks associated with these hazards.

7.0 Hazard Analysis by Task

The following section identifies potential hazards associated with each task listed in Section 3.2 of this HASP. Tasks have been grouped according to the types of potential hazard associated with them.

Task	Potential Hazard
Installation of soil borings, test pits, and wells; soil sampling	Exposure to landfill gas (flammable and explosive); loud noise; overhead hazards; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; dust inhalation hazards; potential dermal or eye exposure to site contaminants in groundwater and soil; fall hazards; heat and cold exposure hazards; and biological hazards.
Groundwater sampling from monitoring wells, well development, decontamination, and aquifer testing	Chemical hazards include potential dermal or eye exposure to site contaminants in groundwater. Physical hazards include slip, trip, or fall hazards; heat and cold exposure hazards; and biological hazards.
Installation of landfill gas wells, landfill gas sampling	Exposure to landfill gas (flammable and explosive); loud noise; overhead hazards; head, foot, ankle, hand, and eye hazards; electrical and mechanical hazards; lifting hazards; dust inhalation hazards; potential dermal or eye exposure to site contaminants in groundwater and soil; fall hazards; heat and cold exposure hazards; and biological hazards.
Transfer of monitoring well purge water to leachate lagoons.	Chemical hazards include potential dermal or eye exposure to site contaminants in groundwater. Physical hazards including head, foot, ankle, hand, and eye hazards; and lifting hazards.

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8.0 Personal Protective Equipment

All work involving heavy equipment, drilling, and well installation will proceed in Level D PPE, which shall include hard hat, steel-toed boots, hearing protection, eye protection, gloves, and sturdy cotton outer work clothing or removable cotton outer clothing.

All personnel will be properly fitted and trained in the use of PPE. The level of protection will be upgraded by the HSO whenever warranted by conditions present in the work area. The HSO will periodically inspect equipment such as gloves and hard hats for defects.

For all work involving potential exposure to soil, groundwater, or landfill gas, workers will wear nitrile gloves and Level D PPE.

High visibility vests will be worn during all work activities.

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9.0 Site Control and Communication

9.1 SITE CONTROL

Unauthorized personnel will not be allowed in the work areas. Access to the work site will be restricted to designated personnel. The purpose of site control is to minimize the public's potential exposure to site hazards.

Work area controls and decontamination areas will be provided to limit the potential for chemical exposure associated with site activities and transfer of contaminated media from one area of the Site to another. The support zone (SZ) for the Site includes all areas outside the work area and decontamination areas. An exclusion zone/contamination reduction zone (EZ/CRZ) and SZ will be set up for work being conducted within the limits of the Site. Only authorized personnel shall be permitted access to the EZ/CRZ. For work being conducted in public access areas, the EZ/CRZ around work locations will be demarcated with cones and/or barrier hazard tape as needed to effectively limit unauthorized access. Staff will decontaminate all equipment and gear as necessary prior to exiting the CRZ. Decontamination areas will be constructed with plastic sheeting on the ground, to reduce transport of contaminated soils from the EZ to the SZ.

9.2 COMMUNICATION

All site work will occur in teams and the primary means of communication on-site and with off-site contacts will be via cell phones. An agreed-upon system of alerting via air horns and/or vehicle horns may be used around heavy equipment to signal an emergency if shouting is ineffective.

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10.0 Decontamination

Decontamination procedures will be strictly followed to prevent off-site spread of contaminated soil or water. The HSO will assess the effectiveness of decontamination procedures by visual inspection. Refer to the Sampling Analysis Plan/Quality Assurance Project Plan (SAP/QAPP; Appendix E of the RI/FS Work Plan) for additional details.

Before eating, drinking, and use of tobacco, hands must be thoroughly washed.

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11.0 Emergency Response and Contingency Plan

This section defines the emergency action plan for the Site. It will be rehearsed with all site personnel and reviewed whenever the plan is modified or the HSO believes that site personnel are unclear about the appropriate emergency actions.

A muster point of refuge (that is clear of adjacent hazards and not located downwind of site investigation activities) will be identified by the HSO and communicated to the field team each day. In an emergency, all site personnel and visitors will evacuate to the muster point for roll call. It is important that each person on-site understand their role in an emergency, and that they remain calm and act efficiently to ensure everyone's safety.

After each emergency is resolved, the entire project team will meet and debrief on the incident—the purpose is not to fix blame, but to improve the planning and response to future emergencies. The debriefing will review the sequence of events, what was done well, and what can be improved. The debriefing will be documented in a written format. Modifications to the emergency plan will be approved by the HSO.

Reasonably foreseeable emergency situations include medical emergencies, accidental release of hazardous materials (such as gasoline or diesel) or hazardous waste, and general emergencies such as vehicle accident, fire, thunderstorm, and earthquake. Expected actions for each potential incident are outlined below.

11.1 MEDICAL EMERGENCIES

In the event of a medical emergency, the following procedures should be used:

- Stop any imminent hazard if you can safely do so.
- Remove ill, injured, or exposed person(s) from immediate danger if moving them will clearly not cause them harm and no hazards exist to the rescuers.
- Evacuate other on-site personnel to a safe place in an upwind or cross-wind direction until it is safe for work to resume.
- If serious injury or a life-threatening condition exists, call **911** for paramedics, fire department, and police.
  - o Clearly describe the location, injury, and conditions to the dispatcher. Designate a person to go to the site entrance and direct emergency equipment to the injured person(s). Provide the responders with a copy of this HASP to alert them to chemicals of potential concern.
- Trained personnel may provide first aid/cardiopulmonary resuscitation if it is necessary and safe to do so. Remove contaminated clothing and PPE only if this can be done without endangering the injured person.
- Call the HSO.
- Immediately implement steps to prevent recurrence of the accident.

Refer to Figure 1 in Section 2.2 for a map showing the nearest hospital location with phone number and address.

11.2 ACCIDENTAL RELEASE OF HAZARDOUS MATERIALS OR WASTES

1. Evacuate all on-site personnel to a safe place in an upwind direction until the HSO determines that it is safe for work to resume.
2. Instruct a designated person to contact the PM and confirm a response.
3. Contain the spill, if it is possible and can be done safely.
4. If the release is not stopped, contact 911 to alert the fire department.
5. Contact the Washington State Emergency Response Commission at 1-800-258-5990 to report the release.
6. Initiate cleanup.
7. The PM will submit a written report to Ecology in the event of a reportable release of hazardous materials or wastes.

11.3 GENERAL EMERGENCIES

In the case of fire, explosion, earthquake, or imminent hazards, work shall be halted and all on-site personnel will be immediately evacuated to a safe place. The local police/fire department shall be notified if the emergency poses a continuing hazard by calling 911.

In the event of a thunderstorm, outdoor work will be discontinued until the threat of lightning has abated.

During the incipient phase of a fire, the available fire extinguisher(s) may be used by persons trained in putting out fires, if it is safe for them to do so. Contact the fire department as soon as feasible.

11.4 EMERGENCY COMMUNICATIONS

In the case of an emergency, an air horn or car horn will be used as needed to signal the emergency. One long (5-second) blast will be given as the emergency/stop work signal. If the air horn is not working, a vehicle horn and/or overhead waving of arms will be used to signal the emergency. In any emergency, all personnel will evacuate to the designated refuge area and await further instruction.

11.5 EMERGENCY EQUIPMENT

The following minimum emergency equipment will be readily available on-site and functional at all times:

- First Aid Kit—contents approved by the HSO, including two blood borne pathogen barriers.
- Sorbent materials capable of absorbing the volume of liquids/fuels brought to the Site by Schwyn personnel.

- Portable fire extinguisher (2-A:10 B/C minimum).
- A copy of the current HASP.

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12.0 Approvals

____ ____________________

Project Manager Date

____ ____________________

Project Health & Safety Officer Date

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14.0 Signature Page

I have read this Health and Safety Plan and understand its contents. I agree to abide by its provisions and will immediately notify the HSO if site conditions or hazards not specifically designated herein are encountered.

Name (Print)	Signature	Date	Company/Affiliation