

**Operations and Maintenance Plan
for
Sudbury Road Landfill Remedial Action
Walla Walla, Washington**

April 14, 2017

Prepared for:



Prepared by:





Operations and Maintenance Plan Sudbury Road Landfill Remedial Action Walla Walla, Washington

April 14, 2017

Prepared for



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LIST OF ABBREVIATIONS AND ACRONYMS

City	City of Walla Walla, Washington
CAP	Cleanup Action Plan
CH ₄	Methane
CO ₂	Carbon Dioxide
Decree	Consent Decree 15-2-00536-8
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
EW	Extraction well
ET	Evapotranspiration
GCCS	Gas Collection and Control System
GW	Gas monitoring well
HDPE	High-density polyethylene
H:V	Horizontal to vertical
LFG	Landfill gas
MSW	Municipal solid waste
MSWLF	Municipal solid waste landfill
MTCA	Washington State Model Toxics Control Act
O&M	Operations and Maintenance
O ₂	Oxygen
Plan	Operations and Maintenance Plan
SAP	Sampling and Analysis Plan
Site	Sudbury Road Landfill
VOC	Volatile organic compound
WAC	Washington Administrative Code

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1.0 INTRODUCTION

The City of Walla Walla, Washington (City) is conducting a cleanup action pursuant to the requirements of the Model Toxics Control Act (MTCA) regulations (Chapter 173-340 WAC), final Cleanup Action Plan (CAP) prepared by the Washington State Department of Ecology (Ecology; Ecology 2015), and Consent Decree 15-2-00536-8 (Decree) at the Sudbury Road Landfill (Site) (Facility Site #4446540, Cleanup Site #2485), generally located at 414 Landfill Road, Walla Walla, Washington (Figure 1). The implementation of the cleanup action obligates the City to operate and maintain the constructed remedy until site specific cleanup levels for tetrachloroethylene and vinyl chloride in groundwater are achieved.

This Operation and Maintenance (O&M) Plan (Plan) presents the requirements to ensure effective operations, under both normal and emergency conditions of the selected cleanup action, and provide long-term protection of human health and the environment. This O&M Plan serves as the primary reference document to be used by landfill personnel and those parties responsible or contracted to perform O&M services for the landfill during the remedial action period. This Plan describes the procedures and minimum requirements for:

- Inspection and maintenance of the landfill covers and stormwater controls;
- Operation, monitoring, inspection and maintenance of the gas collection and control systems (GCCS); and
- Data management and reporting related to the O&M of the remedial action components.

This Plan should be read before and consulted during the O&M activities. Before operating or maintaining any equipment; this Plan, record drawings, specifications, and the equipment vendors' operating and maintenance instructions should be thoroughly consulted. No work of any kind should be attempted without having read the information contained in these documents. In addition, hands-on training may also be necessary before operating or maintaining equipment described in the Plan. If any discrepancies are found between the documents, the manufacturers' recommendations or instructions shall be followed. This Plan is intended to be a living document and should be reviewed routinely and updated to incorporate any discrepancies, changes in equipment, site specific conditions, permit conditions, or applicable regulations.

1.1 RESPONSIBILITIES AND CONTACT INFORMATION

General responsibilities and facility contact information for the landfill are described as follows, subject to revisions as applicable.

Solid Waste Supervisor:

David Jensen
City of Walla Walla:
Sudbury Road Landfill
414 Landfill Road
Walla Walla, Washington 99362
(509) 527-4591
Email: djensen@wallawallawa.gov

Landfill HHW Technician:

Jay Yonkers
City of Walla Walla:
Sudbury Road Landfill
414 Landfill Road
Walla Walla, Washington 99362
(509) 527-4591
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Remedial Action Coordinator:

Frank Nicholson, P.E.
City of Walla Walla
55 Moore Street
Walla Walla Washington 99362
(509) 524-4510
Email: fnicholson@wallawallawa.gov

Washington State Dept. Of Ecology:

Marni Solheim
Waste 2 Resources Program
4601 N. Monroe
Spokane, Washington 99205
(509) 329-3564
Email: marni.solheim@ecy.wa.gov

1.2 OVERVIEW OF THE CLEANUP ACTION

1.2.1 COMPONENTS

The cleanup action was selected and determined by Ecology to comply with the MTCA requirements in WAC 173-340-360. The requirements of the selected cleanup action are presented in the final CAP and made part of the Decree. The selected cleanup action includes both constructed and non-constructed components.

1.2.1.1 Constructed Components of the Cleanup Action

The construction components of the selected cleanup action for the Site consist of:

- Landfill cap improvement using an evapotranspiration (ET) cover over Areas 2 and 5, including grading design to route stormwater runoff away from the refuse areas.
- Stormwater controls:
 - A cast-in-place concrete channel constructed through the north drainage ditch along the north side of Area 5.
 - Erosion control berms constructed on Area 5 to control surface runoff.
 - Diversion of run-on from the southwest side of Area 5 using an elevated soil berm and roadway constructed north of the compost facility to prohibit stormwater generated south of Area 5 from flowing north onto Area 5.
- Active landfill gas (LFG) extraction from Areas 1, 2, and 5 using two new extraction wells in Area 1, one new extraction well in Area 2, and seven new extraction wells in Area 5. The extraction wells are connected via lateral piping to a header pipe that conveys the LFG

to the existing Area 6 header network and flare station for destruction. The all-encompassing system is referred to herein as the gas collection and control system (GCCS).

- Decommissioning of one LFG vent from Area 5. The vent was decommissioned during the remedy construction and no further operation or maintenance is required.

The as-built details for the constructed aspects of the cleanup action are provided in the Construction Quality Assurance Certification Report (Schwyn 2017).

All of the constructed remedial action components (see Figure 2), except the operation of the GCCS, are passive. The GCCS is operated on a daily basis by landfill personnel, and serviced regularly by CB&I Environment and Infrastructure, Inc (CB&I). The O&M Manual for the operation, maintenance, inspection, and reporting of the GCCS was prepared by CB&I, and the GCCS O&M Manual is presented in Appendix A.

1.2.1.2 Non-Constructed Components of the Cleanup Action

Non-constructed aspects of the cleanup action include long-term compliance monitoring, institutional controls, and reporting. The general details for the non-constructed aspects of the cleanup action are provided in the Engineering Design Report (Schwyn 2016). The detailed requirements for the compliance monitoring program are presented in the Sampling and Analysis Plan presented in Appendix A of the Engineering Design Report. Compliance monitoring includes:

- Groundwater sampling and analysis;
- Field monitoring of LFG;
- GCCS inspection;
- Landfill cover inspection; and
- Stormwater system inspection.

Compliance monitoring and operation of the GCCS will be conducted for a minimum period of 5 years after completing the construction of the remedy and for at least 2 years after conditions have stabilized or improved, and groundwater cleanup levels are met. The compliance monitoring and GCCS operation activities will revert to the requirements of the Municipal Solid Waste Landfill (MSWLF) Permit when the objectives of the cleanup action have been met and regulatory approval to discontinue the cleanup action is received.

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2.0 COMPLIANCE MONITORING

Compliance monitoring will be conducted in accordance with WAC 173-340-410 and the Sampling and Analysis Plan (SAP) presented in Appendix A of the EDR. The following sections describe the monitoring and inspection requirements for the landfill to ensure that the remedy is effective and provides long-term protection of human health and the environment.

Compliance monitoring will include routine inspections, non-routine inspections, and system maintenance and repair. Routine inspections will be performed at least quarterly to assess the general operating conditions of the remedial action systems. Non-routine visual inspections of the remedial action systems will be conducted within 24-hours following a major rain event (defined as a 10-year, 24-hour storm event measured at the Walla Walla Airport). Maintenance will be conducted on an as needed basis to prevent the need for repair. Repair will be conducted when a system is not functioning as designed. A general schedule of the routine inspections, non-routine inspections, and system maintenance and repair is provided on Table 1.

Compliance monitoring of the cleanup action systems will be conducted as a complement to the existing landfill monitoring programs that are performed in accordance with the MSWLF Permit. When the confirmational monitoring of groundwater is completed (a minimum of five years after completing construction and when conditions have stabilized or improved and cleanup levels in groundwater are achieved for a two year period), the corrective action compliance monitoring program will revert to the requirements of the MSWLF Permit.

2.1 GROUNDWATER MONITORING

2.1.1 GENERAL OPERATING PROCEDURES

The goal of groundwater monitoring is to confirm that the cleanup action is working to reduce tetrachloroethene and vinyl chloride concentrations in groundwater at the conditional point of compliance. Compliance groundwater monitoring for the cleanup action will be conducted as a complement to the existing landfill detection and assessment monitoring program that is performed in accordance with the MSWLF Permit.

Groundwater monitoring consists of the collection and analysis of volatile organic constituent (VOC) samples on a quarterly schedule from monitoring wells MW-11, MW-12b, MW-14b, MW-15, MW-19 and MW-20 (Figure 2). The samples are collected from the monitoring wells using dedicated groundwater sampling pumps following the procedures described in the SAP (EDR Appendix A). The samples are submitted for analysis to an Ecology-accredited laboratory. Quality control and assurance procedures are performed in accordance with the SAP.

2.1.2 INSPECTION, MAINTENANCE, AND REPORTING

Routine inspection of the monitoring wells and testing of the dedicated groundwater sampling pumps will be conducted during each quarterly monitoring event. Annually, at a minimum, the following conditions will be observed and documented:

- Appearance and overall condition of the monitoring well protective casings, including any cracking of the concrete surface or settlement around the well;
- Condition of each wellhead, including evidence of cracked casing or leakage into the well casing;
- Appearance and condition of the protective bollards;
- Pump condition at surface including tubing and electrical connection; and
- Pump and variable pump controller operation.

Well and pump maintenance and repairs will be implemented in accordance with the manufacturer's recommendations or on an as-needed basis. Annually, an inspection log will be completed on the Well Inspection Form provided in Appendix B. The inspection form and a summary of any maintenance or repairs will be provided in the annual compliance monitoring summary report.

2.2 LANDFILL GAS

LFG monitoring will be conducted during the active compliance groundwater monitoring period of the remedial action. LFG monitoring will be conducted at the landfill perimeter using existing gas monitoring wells (GW-7S, GW-7D, GW-8, GW-9, GW-10, and GW-12) and within Areas 1 and 5 using GW-5, GW-6 and GW-11 (Figure 2). LFG monitoring for the cleanup action will be conducted as a complement to the LFG monitoring program that is performed in accordance with the MSWLF Permit. When the cleanup action objectives have been achieved the LFG monitoring will revert to the requirements of the MSWLF Permit.

The following parameters will be monitored at each gas well:

- Methane (CH₄);
- Carbon Dioxide (CO₂); and
- Oxygen (O₂).

The LFG Monitoring requirements include:

1. Review barometric pressure trend and conduct the monitoring when the pressure is dropping or stable.
2. Calibrate gas meter.
3. Connect meter to well head and turn on pump.
4. Document gas qualities until stable and record stabilized gas qualities.
5. Notify GCCS manager if any reading is greater than 2% CH₄ by volume.

2.2.1 INSPECTION, MAINTENANCE, AND REPORTING

Routine inspection of the LFG monitoring wells will be conducted during each quarterly monitoring event. Annually, at a minimum, the following conditions will be observed and documented:

- Appearance and overall condition of the monitoring probe protective casings, including any cracking of the concrete surface or settlement around the well; and
- Condition of each wellhead, including evidence of cracked casing or leakage into or out of the well casing.

LFG probe maintenance and repairs will be implemented in accordance with the manufacturer's recommendations or on an as-needed basis. Annually, an inspection log will be completed on the Well Inspection Form provided in Appendix B. The inspection form and a summary of any maintenance or repairs will be provided in the annual compliance monitoring summary report.

2.3 LANDFILL GAS EXTRACTION AND CONTROL SYSTEM

Inspection of the GCCS will be conducted during each GCCS operation monitoring and adjustment event (conducted to balance the extraction, collection and conveyance systems). Detailed operation and maintenance of the GCCS is provided in Appendix A.

2.4 LANDFILL COVER

An ET cover was constructed over Area 2 and Area 5 using a 4.8-foot-thick layer of native soils loosely compacted at 85 percent of maximum compaction. The surface grades were constructed with relatively flat faces that blend into existing contours. The steepest slopes on Area 2 and 5 were approximately 3H:1V. A small retaining wall composed of ecology blocks was constructed along the south edge of Area 2 to retain the cover soil without covering the south landfill perimeter road.

2.4.1 INSPECTION

Routine and non-routine landfill cover inspection, maintenance and repair procedures will be conducted to preserve the intended function of the ET covers. Routine inspections will be conducted annually. Non-routine inspections will be conducted after significant storm events. At a minimum, the following cover conditions will be observed and documented:

- Appearance and condition of the vegetation;
- Vegetation stress or death due to LFG;
- Deposition of eroded soil at the toe of steep slopes;
- Soil erosion;
- Rills or cracks in the cover;
- Changes in the surface slope and settlement of waste;
- Intrusion by humans or animals;

- Holes of any kind that allow surface runoff to enter the MSW directly;
- Wildlife trails created on the cover; and
- Damage by vehicles or maintenance machines.

2.4.2 MAINTENANCE

Maintenance will be performed within 10 working days of discovering minor erosion (less than 4 inches of soil disturbance over a 100-square-foot area). Maintenance will be performed by re-grading the surface by hand or mechanical device using surrounding soil cover material. The area will then be re-seeded in accordance with the prevailing seed mix recommendations. If vegetation becomes sparse (less than one plant per 10 square feet of surface area) the cover will be reseeded and a tackifier applied in accordance with the prevailing recommendations.

2.4.3 REPAIRS

Where erosion is greater than 4 inches, the cover will be repaired by using soil obtained from the on-site borrow area. The soil will be placed in accordance with the technical specifications prepared as part of the remedial action construction design documents and re-seeded using the seed mix and tackifier under prevailing recommendations.

If settlement causes depressions where surface water to ponds the cover will be repaired as follows:

1. Expose the soil beneath the cover material.
2. Place soil obtained from the on-site borrow area to fill the depression, such that the surrounding repair area has a minimum slope of 2 percent flowing away from the settled area. The soil shall be placed in accordance with the technical specifications prepared as part of the remedial action construction design documents.
3. Apply seed mix and tackifier using prevailing recommendations to the impacted soil area.
4. Document the location of the repaired area and monitor for further settlement. .

Vegetative stress can be caused by low moisture conditions or oxygen depletion. Oxygen depletion can result from LFG migration into the vegetative root zone. If vegetative stress is noted, test the soil for the presence of landfill gas using a portable gas meter. If LFG is detected, local gas collection systems shall be modified to prevent the LFG migration or the soil cover thickness shall be enhanced to stop the LFG migration. Modification to the LFG collection systems shall be performed in accordance with the operating procedures described in the GCCS O&M Manual (Appendix A). Any soil thickness enhancement shall be placed in accordance with the technical specifications prepared as part of the remedial action construction design documents (JUB 2016) and re-seeded using the seed mix and tackifier under prevailing recommendations.

2.4.4 REPORTING

Inspection, maintenance and repairs of the landfill covers will be conducted as a complement to the work that is performed in accordance with the MSWLF Permit. Annually, an inspection log will be completed on the Landfill Cover Inspection Form provided in Appendix B. The inspection form and a summary of any maintenance or repairs will be provided in the annual compliance monitoring summary report.

2.5 STORMWATER CONTROLS

Stormwater controls were constructed on the north, west, and south sides of Area 5. The stormwater controls included reconstruction of the north drainage ditch channel, construction of erosion control berms, and construction of features to prevent stormwater run-on to Area 5 from the south.

The cast-in-place concrete channel was constructed in the location of the preexisting stormwater channel (“North Drainage Ditch”) along the north side of Area 5. The concrete channel was constructed with a slope of 0.7% toward the west. The east end of the channel is sloped for equipment access and the cross-sectional shape of the ditch is rectangular (5 feet wide by 1 foot deep) to allow a typical skid steer to be driven within the ditch. A strip of geomembrane is bolted to the top of the concrete channel and covered with an erosion control mat on the south side of the ditch to prevent undermining and rutting as the sheet flow from Area 5 enters the channel. The concrete channel transitions into the existing culvert near the western edge of the landfill property.

An erosion control berm was constructed to impede stormwater run-on and direct any Area 5 stormwater run-off into the north drainage ditch. The erosion control berm consists of a 1.5 foot tall berm with a 4 foot wide top surface. The erosion control berm extends along the entire southern boundary and west side of Area 5 and is sloped to convey stormwater runoff from Area 5 to the north drainage ditch. A portion of the berm includes a V-shaped drainage channel lined with an erosion control mat.

An elevated soil berm and roadway was constructed north of the compost facility to prohibit stormwater generated south of Area 5 from flowing north onto Area 5. The preexisting culvert was removed and replaced with a new culvert that directs stormwater from the roadside ditch on the north side of the compost access road onto the compost pad, and ultimately into the compost facility lagoon. All drainage from roadway structures outside of Area 5, and drainage off the asphalt surface, is now to the south into the compost lagoon.

Inspection, maintenance, and repairs of these stormwater controls will be conducted to identify, prevent, and repair disturbances that result in erosion, settlement, ponded water, and blockage of ditch flow lines.

2.5.1 INSPECTION

Routine and non-routine stormwater system inspection, maintenance and repair procedures will be conducted to preserve the intended function of the stormwater system designs. Routine inspections will be conducted annually. Non-routine inspections will be conducted after significant storm events.

2.5.1.1 North Drainage Ditch

At a minimum, the following north drainage ditch conditions will be observed and documented:

- Appearance and condition of the concrete channel, culvert connections, erosion control mat, and anti-erosion geomembrane;
- Disturbances that result in blockage;
- Erosion at inlets and outlets;
- Sediment buildup;
- Changes in the surface slope or settlement; and
- Damage by vehicles or maintenance machines.

2.5.1.2 Area 5 Erosion Control Berms

At a minimum, the following erosion control berm conditions will be observed and documented:

- Appearance and condition of the erosion control berms, culvert connections, and anti-erosion pramat;
- Disturbances that result in blockage;
- Erosion along the flow line, inlets and outlets;
- Sediment buildup;
- Changes in the surface slope or settlement; and
- Damage by vehicles or maintenance machines.

2.5.1.3 Area 5 Run-On Diversion Systems

At a minimum, the following Area 5 run-on diversion system conditions will be observed and documented:

- Appearance and condition of the stormwater channels, stormwater inlet culvert connections, manhole, and asphalt surfaces;
- Disturbances that result in blockage;
- Erosion along the flow line, inlets and outlets;
- Sediment buildup;
- Changes in the surface slope or settlement that would cause stormwater to flow north onto Area 5;
- Damage by vehicles or maintenance machines; and
- Excessive filling of the compost lagoon.

2.5.2 MAINTENANCE

2.5.2.1 North Drainage Ditch

Maintenance should be performed within 10 working days of discovering sediment buildup, blockage of flow, or damage to the structure. Sediment should be removed and disposed of either by hand or by the use of a skid-steer piece of equipment. In the case of erosion, maintenance should be performed by re-grading the surface by hand or mechanical device using surrounding soil cover material. The area should then be re-seeded in accordance with the prevailing seed mix recommendations.

2.5.2.2 Area 5 Erosion Control Berms

Maintenance should be performed within 10 working days of discovering sediment buildup or blockage of flow. Sediment should be removed by hand and disposed of – taking care not to damage the erosion control mat. In the case of erosion, maintenance should be performed by re-grading the surface by hand or mechanical device using surrounding soil cover material. The area should be re-seeded in accordance with the prevailing seed mix recommendations.

A short length of pipe directs stormwater flows from the erosion control berm into the North Drainage Ditch. Sediment or blockages in the piping system should be flushed out and removed with the use of mechanical jetting and vactor trucks as is common with piped stormwater systems.

2.5.2.3 Area 5 Run-On Diversion Systems

Maintenance should be performed within 10 working days of discovering sediment buildup or blockage of flow. Sediment or blockages in the piping system should be flushed out and removed with the use of mechanical jetting and vactor trucks as is common with piped stormwater systems. In the case of erosion, maintenance should be performed by re-grading the surface by hand or mechanical device using surrounding soil cover material. The area should then be re-seeded in accordance with the prevailing seed mix recommendations.

2.5.3 REPAIRS

For damage to the North Drainage Ditch, spalled or damaged concrete should be repaired where necessary in order to maintain a relatively smooth concrete surface in the channel. Concrete repairs should be in accordance with the Technical Specifications (JUB 2016).

For damage to the high-density polyethylene (HDPE) liner, an HDPE liner installer should be contacted to conduct repairs to any tears found in the liner.

Damaged pipes should be removed and replaced in accordance with the Technical Specifications (JUB 2016).

Where erosion is greater than 4 inches, the surface should be repaired by using soil obtained from the on-site borrow area. The soil should be placed in accordance with the technical specifications

prepared as part of the remedial action construction design documents and re-seeded using the seed mix and tackifier under prevailing recommendations.

2.6 REPORTING

Inspection, maintenance and repairs of the stormwater systems will be conducted as a complement to the work that is performed in accordance with the MSWLF Permit. Annually, an inspection log will be completed on the Stormwater System Inspection Form provided in Appendix B. The inspection form and a summary of any maintenance or repairs will be provided in the annual compliance monitoring summary report.

3.0 REFERENCES

J-U-B Engineers, Inc. (JUB) 2016. *Volume I: Bid and Contract Documents, Volume II: Final Plans and Construction Documents, and Volume III: Construction Quality Assurance (CQA) Manual for Sudbury Road Landfill Remedial Action, Walla Walla, Washington*. Prepared by JUB, Schwyn Environmental Services, LLC, and others for the City of Walla Walla. January.

Schwyn Environmental Services, LLC (Schwyn). 2017. *Construction Quality Assurance Certification Report for Sudbury Road Landfill Remedial Action, Walla Walla, Washington*. Prepared for the City of Walla Walla. April 14.

———. 2016. *Engineering Design Report for Sudbury Road Landfill Remedial Action, Walla Walla, Washington*. Prepared for the City of Walla Walla. January 6.

Washington State Department of Ecology (Ecology). 2007. *Washington Administrative Code*. Chapter 173-340, Model Toxics Control Act Cleanup Regulation. Compiled by Ecology's Toxics Cleanup Program. Publication No. 94-06. November.

———. 1993. *Washington Administrative Code*. Chapter 173-351, Criteria for Municipal Solid Waste Landfills. October.



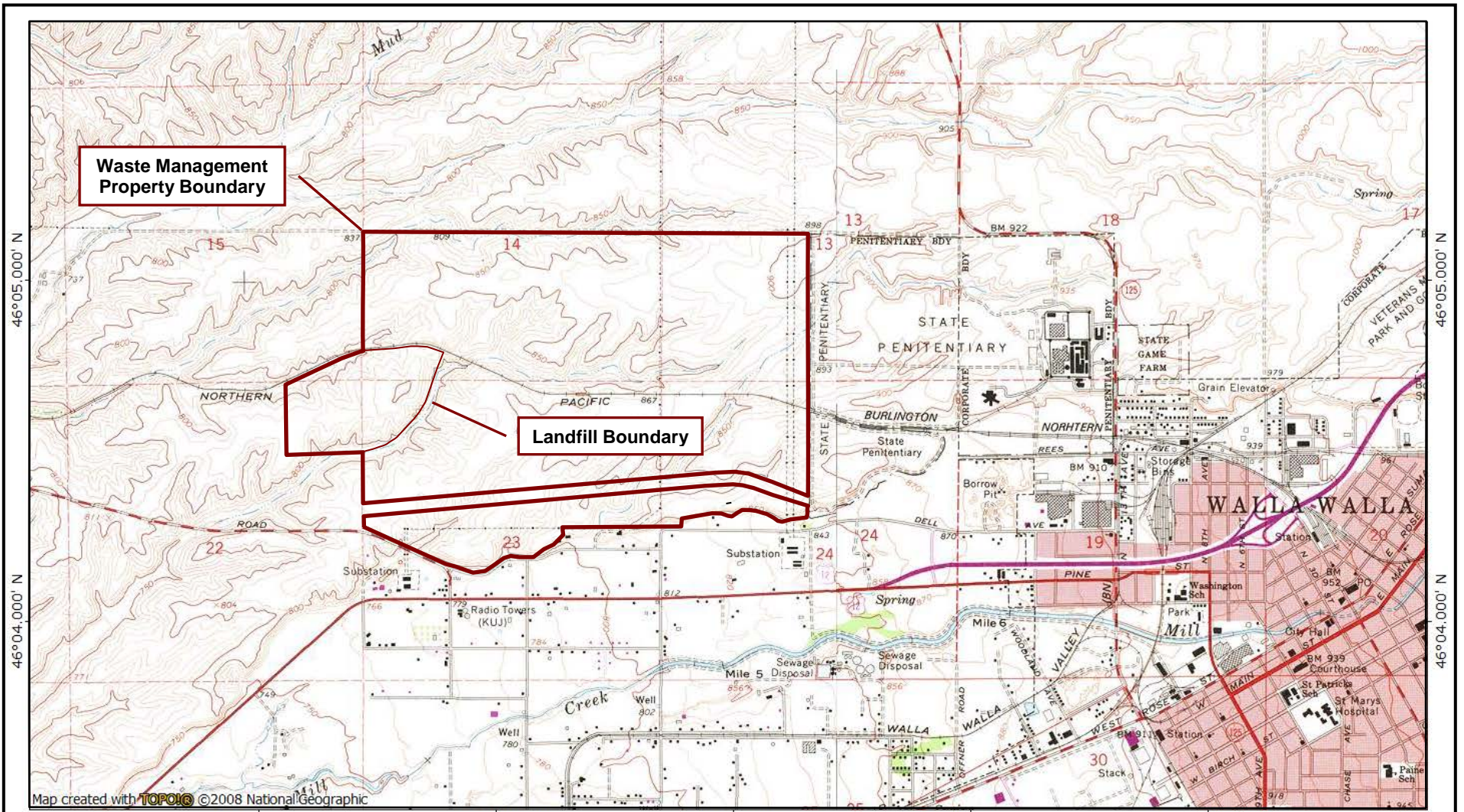
Table 1
SUDBURY ROAD LANDFILL
OPERATION & MAINTENANCE SCHEDULE

GROUNDWATER MONITORING SYSTEM OPERATION, INSPECTION, & MAINTENANCE			
Operation			
Quarterly Groundwater Sample Collection & Reporting			
<p>Corrective Action Monitoring Wells MW-11, MW-12b, MW-14b, MW-15, MW-19, MW-20.</p> <ul style="list-style-type: none"> ✓ VOCs and Low Level Vinyl Chloride. ✓ Report 60 days after receiving laboratory results. <p>WAC 173-351 Compliance Monitoring Wells MW-11, MW-12b, MW-14b, MW-15, Area 7 Leachate.</p> <ul style="list-style-type: none"> ✓ First Quarter (March) Appendix I and II without metals and VOCs. Leachate includes VOCs. ✓ Second Quarter (June) Appendix I, II, and III, without VOCs. Leachate includes VOCs without Appendix III. ✓ Third Quarter (September) Appendix I and II without metals and VOCs. Leachate includes VOCs. ✓ Fourth Quarter (December) Appendix I and II without VOCs. Leachate includes VOCs. ✓ Report 60 days after receiving laboratory results. 			
Annual Task Description			
<ul style="list-style-type: none"> ✓ Annual Compliance and Corrective Action Monitoring Report. Due by April 15 of the following year. 			
Inspection & Maintenance			
Routine Quarterly Observation & Documentation			
<ul style="list-style-type: none"> ✓ Appearance and overall condition of the monitoring well protective casings, including concrete surface cracking or settlement. ✓ condition of each wellhead, including evidence of cracked casing or leakage into the well casing. ✓ Appearance and condition of the protective bollards. ✓ Pump condition at surface including tubing and electrical connection. ✓ Pump and variable pump controller operation. ✓ Document anomalous conditions on the Groundwater Sample Collection Forms. ✓ Implement maintenance and repairs in accordance with the manufacturer's recommendations or on an as-needed basis. 			
Annual Task Description			
<ul style="list-style-type: none"> ✓ Annually (September), conduct and document an inspection on the Well Inspection Form. ✓ Document in the Annual Compliance and Corrective Action Monitoring Report. 			
LANDFILL GAS MONITORING SYSTEM OPERATION, INSPECTION, & MAINTENANCE			
Operation			
Quarterly Groundwater Sample Collection & Reporting			
<p>Compliance and Corrective Action Monitoring Wells GW-7S, GW-7D, GW-8, GW-9, GW-10, GW-12.</p> <p>Interior Monitoring Wells GW-5, GW-6, GW-11.</p> <ul style="list-style-type: none"> ✓ Measure and document methane, carbon dioxide, and oxygen percent by volume measurements. ✓ Notify landfill manager if any perimeter well reading is greater than 2% methane by volume. ✓ Report quarterly with compliance and corrective action monitoring report. 			
Annual Observation & Documentation			
<ul style="list-style-type: none"> ✓ Annual Compliance and Corrective Action Monitoring Report. Due by April 15 of the following year. 			
Inspection & Maintenance			
Routine Quarterly Observation & Documentation			
<ul style="list-style-type: none"> ✓ Appearance and overall condition of the monitoring well protective casings, including concrete surface cracking or settlement. ✓ condition of each wellhead, including evidence of cracked casing or leakage into the well casing. ✓ Appearance and condition of the protective bollards. ✓ Document anomalous conditions on the Landfill Gas Monitoring Forms. ✓ Implement well maintenance and repairs in accordance with the manufacturer's recommendations on an as-needed basis. 			
Annual Task Description			
<ul style="list-style-type: none"> ✓ Annually (September), conduct and document an inspection on the Well Inspection Form. ✓ Document in the Annual Compliance and Corrective Action Monitoring Report. 			
LANDFILL COVER SYSTEM INSPECTION & MAINTENANCE			
Inspection & Documentation			
Non-Routine Observation & Documentation to be conducted after significant storm events			
Routine Annual Observation & Documentation			
<table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> ✓ Appearance and overall vegetation condition. ✓ Deposition of eroded soil at the toe of steep slopes. ✓ Soil erosion. ✓ Rills or cracks in the cover. ✓ Intrusion by humans or animals. ✓ Annually (September), conduct and document an inspection on the Landfill Cover Inspection Form. ✓ Document in the Annual Compliance Monitoring Report. </td> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> ✓ Changes in the surface slope and settlement of waste. ✓ Intrusion by humans or animals. ✓ Holes of any kind that allow surface runoff to enter the MSW directly. ✓ Wildlife trails created on the cover. ✓ Damage by vehicles or maintenance machines. </td> </tr> </table>		<ul style="list-style-type: none"> ✓ Appearance and overall vegetation condition. ✓ Deposition of eroded soil at the toe of steep slopes. ✓ Soil erosion. ✓ Rills or cracks in the cover. ✓ Intrusion by humans or animals. ✓ Annually (September), conduct and document an inspection on the Landfill Cover Inspection Form. ✓ Document in the Annual Compliance Monitoring Report. 	<ul style="list-style-type: none"> ✓ Changes in the surface slope and settlement of waste. ✓ Intrusion by humans or animals. ✓ Holes of any kind that allow surface runoff to enter the MSW directly. ✓ Wildlife trails created on the cover. ✓ Damage by vehicles or maintenance machines.
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Maintenance			
<ul style="list-style-type: none"> ✓ Perform maintenance and repairs within 10 working days of discovering disturbance. ✓ Document maintenance and repairs in the annual report. 			
STORMWATER CONTROL SYSTEMS INSPECTION, & MAINTENANCE			
Inspection & Documentation			
Non-Routine Observation & Documentation to be conducted after significant storm events			
Routine Annual Observation & Documentation			
<ul style="list-style-type: none"> ✓ Appearance and condition of the of the concrete channel, erosion control berms, culverts and connections, asphalt surfaces, erosion control mat, and anti-erosion geomembrane pramat. ✓ Disturbances that result in flow blockage. ✓ Erosion along the flow line, inlets and outlets. ✓ Sediment buildup. ✓ Annually (September), conduct and document an inspection on the Stormwater System Inspection Form. ✓ Document the annual inspection in the Annual Compliance Monitoring Report. <table border="0" style="width: 100%; margin-top: 10px;"> <tr> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> ✓ Damage of any kind that allow surface runoff to enter the MSW. ✓ Changes in the surface slope or settlement. ✓ Damage by vehicles or maintenance machines. </td> </tr> </table>		<ul style="list-style-type: none"> ✓ Damage of any kind that allow surface runoff to enter the MSW. ✓ Changes in the surface slope or settlement. ✓ Damage by vehicles or maintenance machines. 	
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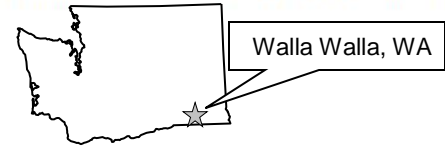
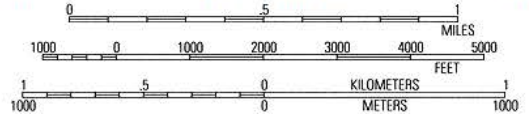


Table 1
SUDBURY ROAD LANDFILL
OPERATION & MAINTENANCE SCHEDULE

GAS COLLECTION AND CONTROL SYSTEM	
Routine Flare Monitoring	
Daily Task Description Green House Gas Readings (telemetry provided)	
<ul style="list-style-type: none"> ✓ Date, Time. ✓ Flow Rate to Flare. ✓ Gas Pressure. 	<ul style="list-style-type: none"> ✓ Gas Temperature. ✓ Methane %. ✓ Total Gas Processed.
Monthly Task Description	
<ul style="list-style-type: none"> ✓ Green House Readings (above). ✓ Download chart recorder information (pumps). ✓ Inlet Vacuum. ✓ Blower, inlet & outlet pressures. ✓ Blower inlet & outlet temperatures. ✓ Knock-Out Vessel dP reading. ✓ Flame Arrestor dP reading. ✓ Air Compressor Oil Level. ✓ Compressed air readings (3 points). ✓ Condensate Sump Pump Counter. ✓ Check Propane Tank Level. ✓ Rotate Active/Inactive Blowers. 	<ul style="list-style-type: none"> ✓ Drain purge water traps & instrumentation. ✓ Clean and Maintain sensors. ✓ Inspect air regulators/controllers. ✓ Inspect air compressor for needed maintenance. ✓ Check & maintain access to flare station and electrical components. ✓ Check Alarm panel history and document it. ✓ Check/clean UV (flame sensor) system. ✓ Check thermocouple condition. ✓ Update critical spare parts list. ✓ Re-fill propane tanks as needed. ✓ General Housekeeping. ✓ General Area Inspection.
Routine Wellfield Monitoring and Maintenance	
Monthly Task Description	
<ul style="list-style-type: none"> ✓ Well Readings - Date, Time, Personnel, Met Data. ✓ System Pressure (Vacuum). ✓ Gas Concentrations. ✓ Visually inspect wellheads. ✓ Visually inspect flex hose connections for integrity. 	<ul style="list-style-type: none"> ✓ Visually inspect landfill gas collection lines for damage. ✓ Wellhead Pressure and Flow readings. ✓ Collection system pressure. ✓ Gas Flow Temperature. ✓ Update Spare Parts Inventory (as parts are utilized).
Landfill Gas Flow Meter Calibration/Maintenance/Testing	
<ul style="list-style-type: none"> ✓ Annually send Thermal Mass Flow Meter to third party for calibration. 	



118°25.000' W 118°24.000' W 118°23.000' W 118°22.000' W WGS84 118°21.000' W



TN /MN
15½°
04/19/11

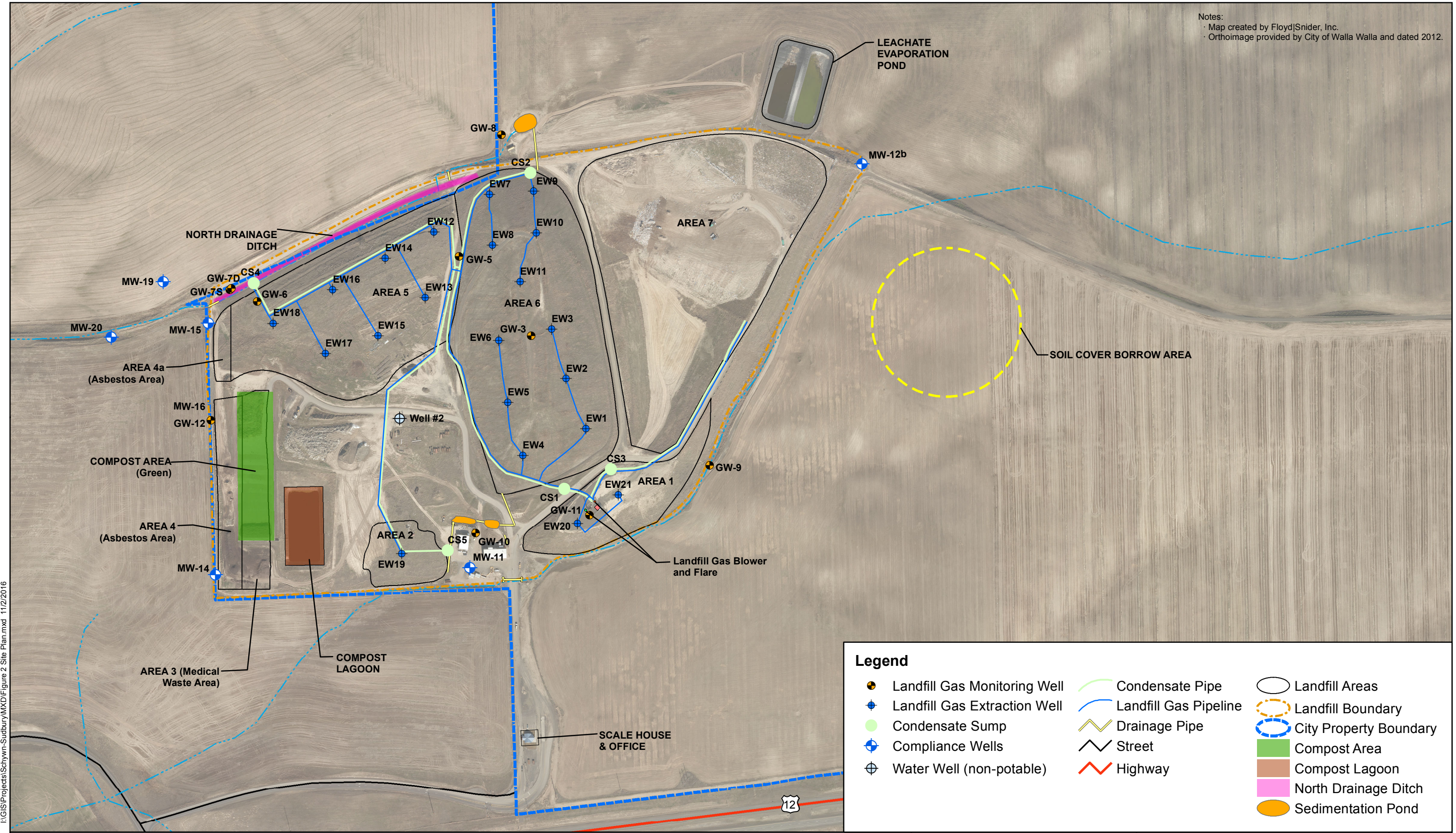


Sudbury Road Landfill
Walla Walla, Washington

Site Location

Figure
1

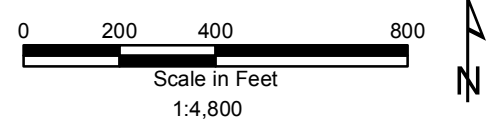
Notes:
 · Map created by Floyd|Snider, Inc.
 · Orthoimage provided by City of Walla Walla and dated 2012.



Legend

● Landfill Gas Monitoring Well	— Condensate Pipe	○ Landfill Areas
● Landfill Gas Extraction Well	— Landfill Gas Pipeline	○ Landfill Boundary
● Condensate Sump	— Drainage Pipe	○ City Property Boundary
● Compliance Wells	— Street	■ Compost Area
⊕ Water Well (non-potable)	— Highway	■ Compost Lagoon
		■ North Drainage Ditch
		● Sedimentation Pond

I:\GIS\Projects\Schuyler-Sudbury\MXD\Figure 2_Site Plan.mxd 11/2/2016



Sudbury Road Landfill
 Walla Walla, Washington

Site Plan

Figure 2

Operation and Maintenance Manual for Gas Collection and Control System



Inspection Forms



**STORMWATER SYSTEM INSPECTION CHECKLIST
SADBURY LANDFILL REMEDIAL ACTION**

Name of Inspector: _____

Signature: _____

Date: _____

Weather: _____

ITEMS	CONDITION		DATE		COMMENTS
	Satisfactory	Unsatisfactory	Maintained	Repaired	
North Drainage Ditch					
Cracks in Concrete Channel					
Flow Line Blockage					
Sediment or Vegetation Buildup					
Settlement or Depressions					
Erosion					
Culvert Obstructions					
Vehicle Damage					
Erosion Control Berms					
Flow Line Blockage					
Settlement or Depressions					
Erosion, Rills, or Cracks					
Sediment or Vegetation Buildup					
Pyramat Damage					
Animal/Human Impacts					
Vehicle Damage					
Area 5 Run-On Controls					
Flow Line Blockage					
Settlement or Depressions					
Erosion, Rills, or Cracks					
Sediment or Vegetation Buildup					
Asphalt Surface and Slope					
Culvert Obstructions					

Other Notes and Observations:

**COVER SYSTEM INSPECTION CHECKLIST
SUDBURY LANDFILL REMEDIAL ACTION**

Name of Inspector: _____

Signature: _____

Date: _____

Weather: _____

ITEMS	CONDITION		DATE		COMMENTS
	Satisfactory	Unsatisfactory	Maintained	Repaired	
Area 2 Cover System Inspection					
Settlement or Depressions					
Erosion					
Rills or Cracks in Cover					
Vegetation Stress or Death					
Animal/Human Impacts					
Holes					
Vehicle Damage					
Area 5 Cover System Inspection					
Settlement or Depressions					
Erosion					
Rills or Cracks in Cover					
Vegetation Stress or Death					
Animal/Human Impacts					
Holes					
Vehicle Damage					
Other Notes and Observations:					