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1.0 COMPLIANCE MONITORING PLAN

This section contains the Compliance Monitoring Plan (CMP) for the Landsburg Mine Site (Site), the location of which is depicted in Figures A-1 and A-2 and defined in Exhibit A to the Consent Decree. The purpose of this CMP is to describe the environmental monitoring for the Site that will be performed during remedial action construction activities (protection monitoring and performance monitoring) and following completion of the cleanup action construction activities (confirmational monitoring). Protection monitoring includes both worker health and safety monitoring and short-term groundwater monitoring for protection of the environment. Performance monitoring includes construction quality assurance (CQA) during the remedial action. Confirmational monitoring consists of groundwater monitoring and maintenance of the cap and begins after the cleanup construction activities. If the Groundwater Contingent Treatment System is implemented and operated, additional maintenance and monitoring will be required.

1.1 General

Under WAC 173-340-410, compliance monitoring consists of protection monitoring, performance monitoring, and confirmational monitoring, as described below. The Sampling and Analysis Plan required in conjunction with the CMP, which applies to both short-term and long-term groundwater monitoring, is provided in Section 4.

The primary purpose of the CMP is to identify the chemical compounds potentially posing a human or environmental health risk and/or which exceed potential regulatory criteria, and which are directly attributable to and the result of the prior waste disposal activities. For the purpose of this CMP, such compounds are referred to as "mine waste contaminants".

1.1.1 Protection Monitoring

Protection monitoring is conducted to confirm "that human health and the environment are adequately protected during future construction and operation of an interim action or cleanup action as described in the safety and health plan" [WAC 173-340-410(a)]. Monitoring for protection of human health will be addressed in the site-specific Construction Health and Safety Plan, which will be submitted to Ecology following development of the Engineering Design Report with Construction Specifications). Monitoring for protection of the environment will be provided by short-term groundwater monitoring, which is presented in Section 1.5.3 of this document.

1.1.2 Performance Monitoring

Performance monitoring confirms that the cleanup standard or other performance standards have been attained [see WAC 173-340-410(b)]. Because removal is not part of the selected remedy, and no media are exposed above cleanup levels, performance monitoring will consist of construction quality assurance (CQA) for the cap and associated drainage features. The CQA measures are outlined in Section 1.6. A more detailed CQA Plan based on these measures will be provided in conjunction with the Engineering

Design Report and the Construction Specifications, which will be submitted to Ecology as part of the detailed design process.

1.1.3 *Confirmational Monitoring*

Confirmational monitoring is performed to confirm the long-term effectiveness of the remedy, following completion of the constructed cleanup action [see WAC 173-340-410(c)]. Long-term maintenance and monitoring inspections of the cap are described in the O&M Plan (Part B). Confirmational monitoring in this CMP specifically describes long-term monitoring of groundwater.

Groundwater currently meets cleanup levels at the designated points of compliance monitoring wells. Groundwater monitoring of mine waste contaminants will be performed to allow detection in the event that mine waste contaminants exceed remediation levels in the future. In the event that remediation levels are exceeded in the future at compliance locations, the cause of the exceedance will be determined and appropriate action taken. A contingent groundwater extraction and treatment system has been designed (Part C) which could be installed quickly if needed.

1.2 Remediation and Cleanup Levels

Remediation levels are concentrations of mine waste contaminants within specific media above which particular cleanup action components will be required as part of the cleanup action. A cleanup level is the maximum acceptable concentration of a mine waste contaminant to which the human or ecological receptors would be exposed via a specified exposure route (e.g., direct contact) under a specified exposure scenario (e.g., residential land use).

MTCA Method B is the standard method for determining cleanup levels, and shall be considered applicable to the Landsburg site. Method B and A cleanup levels assume a residential use scenario and are determined using risk-based equations or with consideration of Washington State background levels, as specified in MTCA regulations. For individual carcinogens, the cleanup levels are based on the upper bound of the excess lifetime cancer risk of one in one million (1×10^{-6}). Total excess cancer risk under Method B for multiple substances and pathways cannot exceed one in one hundred thousand (1×10^{-5}), and the total hazard index for substances with similar types of toxic response must be less than one. In addition, Method B levels must comply with applicable state and federal regulations or criteria (MCLs, for instance). For mine waste contaminants that have an established Federal and State MCL promulgated, but represents a calculated excess cancer risk of 1×10^{-5} or hazard index of one, the Method B cleanup level shall be adjusted to not exceed an excess cancer risk of 1×10^{-5} or hazard index of one. However, no cleanup level shall be more stringent than an established Washington State background or site-specific area background concentrations for the site. Groundwater and surface water cleanup levels for the site will be Method B cleanup levels.

1.3 Sentinel Wells

Sentinel wells will be included in the confirmational groundwater monitoring program, beginning after the completion of the remedial action construction activities. Sentinel wells will be used as an early warning signal for impacted groundwater migration. Four new Sentinel wells will be installed prior to the completion of the remedial action construction activities. Two sentinel wells will be installed in the northern portion of the site and two in the south. The north sentinel well system will include a shallow well and a deeper well that will be monitoring at approximately the 150 foot depth within the mine. The south sentinel well system will include two wells installed at the 150-170 foot depth within the mine. Monitoring wells LMW-9 and LMW-11 are also considered sentinel wells. The additional new sentinel wells will serve two purposes:

1. Immediate detection of any waste constituent migrating toward the south beyond the waste disposal area; and
2. Effectiveness monitoring of groundwater level changes resulting from remedial actions.

The new sentinel wells are depicted on Figure A-7 and the approximate depths and screen lengths are provided in Table A-1 of this report.

1.4 Points of Compliance

A point of compliance is defined as a location where monitoring is conducted to determine that cleanup levels have been met. Under WAC 173-340-720(8)(c), "conditional points of compliance" for groundwater are set as close as practicable to the source of hazardous substances, not to exceed the property boundary. Conditional points of compliance will be established for groundwater and surface water at the locations of groundwater and surface water discharge from the site, as defined by the property boundary (property owned by Palmer Coking Coal Company, LLC (PCC). Figure A-6 depicts the compliance monitoring boundary and the points of compliance.

For the Landsburg Mine, the points of compliance for groundwater have been established in the Landsburg Mine Site Cleanup Action Plan (Exhibit B). Because groundwater from the trench is channeled by the trench sidewalls with vertically sloping rock strata, hydraulic conductivity is much greater longitudinally in the mine than laterally. As such, if a release were to occur, the nine monitoring wells located at the north and south ends of the mine and the two monitoring wells in the adjacent Frasier and Landsburg coal seams would provide detection along these critical pathways for migrating mine waste contaminants. As such, monitoring wells located near the north, south, east, and west sides of the property boundary are considered points of compliance. Specifically, monitoring wells LMW-2, LMW-3, LMW-4, LMW-5, LMW-8, and LMW-10, will be considered the north and south points of compliance. To monitor for the unlikely event that impacted groundwater is migrating laterally to the trench axis, LMW-6, and LMW-7, located within adjacent Frasier and Landsburg coal seams, will be used as the east and west points of compliance.

There are several wells at the north and south compliance boundaries because each well monitors a different groundwater zone. For example, shallow groundwater from the south portal (Portal 3) will be monitored by well LMW-8. Monitoring wells LMW-2 and LMW-4 were completed to monitor shallow and deeper zones within the Rogers coal mine (Rogers Seam), north of the subsidence trench. Monitoring wells LMW-6 and LMW-7 will monitor groundwater within the Frasier and Landsburg coal seams that will intercept groundwater migrating west and east from the site. Monitoring wells LMW-3 and LMW-5 were completed to monitor shallow and deeper zones within the Rogers seam south of the subsidence trench. LMW-10 was installed for monitoring deeper zones of the aquifer at the north end of the site. The monitoring well locations are shown on Figure A-3 and A-6. In the event that a release is detected in compliance wells, the affected compliance well would be immediately re-sampled and additional wells may be sampled to evaluate the potential migration of affected groundwater. If the release to compliance wells is confirmed and the measured concentration of mine waste contaminants is one-half or more of MTCA Method B cleanup levels, then the Contingency Groundwater Extraction and Treatment Plan (Exhibit E – Part C to the Consent Decree) will be implemented. Monitoring wells LMW-9 and LMW-11 and the four new proposed sentinel wells are not points of compliance. Rather, they are included in the compliance monitoring as "early detectors" of the migration of affected groundwater. If mine waste contaminants are detected above remediation levels (one-half of MTCA Method B cleanup level) in LMW-9, LMW-11, or one of the proposed sentinel wells, the contingency groundwater plan is not necessarily implemented because they are not considered points of compliance wells (see Sections 1.5 and 1.7 for details).

1.5 Protection Monitoring

Protection monitoring ensures that human health and the environment are adequately protected during remedial construction activities or cleanup actions.

1.5.1 Construction Health & Safety Plan

A site-specific Construction Health and Safety plan will be developed following completion of the engineering plans and specifications and prior to on-site remedial activities. The Health and Safety plan will specify protective clothing, equipment, and monitoring that will be required for protection of human health during the construction activities.

1.5.2 Spill Prevention, Control, And Countermeasure Plan

A site-specific spill prevention, control and countermeasure (SPCC) plan will be established by the contractor (and ultimately approved by Ecology) for the hazardous substances and petroleum products used and stored on the site during construction. SPCC plans are required for certain facilities/projects for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The site-specific SPCC will require routine inspections and monitoring procedures for the hazardous substances and petroleum products, which will be implemented by the contractor. The

inspections and monitoring will continue until hazardous substances and petroleum products are no longer used or stored on the site.

1.5.3 Protection Groundwater Monitoring

Short-term protection monitoring will be conducted during the remediation to ensure that there are no adverse effects to the environment from remediation activities. Backfilling the trench may increase the load on the buried drums and thus create the potential for collapse of intact drums that may still be in the trench. Drum failure induced by such loading, were it to occur, would be expected to occur quickly. Based upon the reported handling of drums during placement in the trench, and given the length of time since placement, it is expected that few if any intact drums remain in the trench. Leakage from ruptured drums would likely result in slow leakage of liquids (if present). In addition, surrounding soil and carbonaceous materials would provide containment and some adsorption of released liquids. Therefore, drum failure would not necessarily lead to groundwater impacts.

Short-term protection monitoring will commence when the trench backfilling begins, and will continue throughout the trench backfilling and cap construction (estimated duration 16-20 weeks). Short-term groundwater monitoring parameters and frequency are given in Table A-2. Monitoring wells included in the short-term protection groundwater monitoring program consist of the 10 existing wells LMW-2 through LMW-11. This short-term protection monitoring will be performed under the Health and Safety Plan provided in Appendix HASP to this document. As a rapid screening tool, samples will be collected from the above listed wells bi-weekly (twice every month) and analyzed in the field for pH and specific conductance (as an indicator for metals and other inorganic compounds), dissolved oxygen, and turbidity. The confirmation sampling test parameters will be expanded on a monthly basis to include total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs). Other potential mine waste contaminants including metals, semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs) and pesticides, will only be analyzed in specific monitoring wells during protection groundwater monitoring, if TPH or VOCs are detected and confirmed to be present. The Quality Assurance Project Plan (QAPP) provided in Appendix QAPP to this document defines the analytical method analytes, the sampling procedures, and quality controls that will be used during protection groundwater monitoring.

Short term monitoring will continue for an additional four weeks following completion of trench backfill and cap construction. The extended four-week monitoring will consist of bi-weekly (twice per month) sampling of the above listed wells and analysis for pH, conductivity, turbidity, dissolved oxygen, TPH, and VOCs.

If groundwater remediation levels (one-half of MTCA Method B cleanup level) are exceeded during short-term monitoring, the following steps will be taken:

1. If remedial action is still underway, construction activities will immediately be halted.

2. Ecology will be notified of the potential exceedance within two days.
3. The well(s) in which the exceedance occurred will be immediately re-sampled for verification and analyzed for VOCs and TPH with expedited turnaround.
4. If the analyses are below groundwater remediation levels (50 percent of the MTCA cleanup levels), then no further action is required. Groundwater monitoring will resume as normal.
5. If verification sampling confirms an exceedance of 50 percent of the MTCA cleanup level, the well(s) will be immediately sampled for the full suite of analytes (metals, SVOCs, PCBs and pesticides) with expedited laboratory turnaround, but construction does not have to be halted. If any analytes do not exceed the MTCA cleanup levels, but do exceed 50 percent of the MTCA level, groundwater from that well will be sampled for the analytes exceeding one-half the MTCA cleanup levels every two weeks during the remaining construction period. In addition, an "alternative source evaluation" will be conducted to evaluate if the detection is caused by another source other than the waste disposed in the Roger's mine trenches.
6. If exceedance of groundwater MTCA cleanup levels is verified at a compliance well, then appropriate corrective action will be determined and proposed for Ecology approval. If the alternative source of the detected analyte is not identified, the Group will take corrective action by installing and starting operation of the groundwater extraction and treatment system discussed in Part C, the Contingent Groundwater Extraction and Treatment System Plan.

If, at the completion of all short-term monitoring, there are no exceedances of groundwater remediation levels, then confirmational (long-term) monitoring will begin as described in Section 1.7.

1.6 Performance Monitoring

Performance monitoring confirms that the cleanup standard or other performance standards have been attained. Because removal is not part of the selected remedy and no media are exposed above cleanup levels, performance monitoring will primarily consist of construction quality assurance (CQA) for the cap and associated drainage features. A more detailed CQA Plan based on these measures will be provided in conjunction with the Engineering Design Report and the Construction Plans and Specifications, which will be submitted to Ecology as part of the detailed design process.

CQA monitoring will ensure that design drawings and specifications are adhered to during implementation of the remedial activities, including the following:

- Visual inspection of all soil or other material approved for trench backfill.
- Visual inspection of all loads of soil used for cap construction.
- Testing of materials (trench backfill material, topsoil, soil for cap liner, other materials required for ditch construction).
- Compaction and permeability testing for the low-permeability soil layer (cap liner).
- Cap layer thicknesses verification.
- Attainment of design grades.

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Soil material tests and frequency will be specified in the CQA Plan based on final design and will be provided in the Engineering Design Report. Such tests typically include gradation per ASTM D422 and a moisture-density curve per ASTM D698.

Permeability of the cap soil will be determined using laboratory permeability testing on compacted soil samples, and compared to the moisture-density curve for the liner soil. Field CQA for compaction and attainment of cap liner permeability testing specifications will be included in the CQA Plan.

Attainment of design grades will be verified by geodetic surveying during construction. A final "as built" survey will be performed for comparison to the results of geodetic surveys for long-term monitoring/inspections conducted per the O&M Plan (see Part B).

1.7 Confirmational Monitoring

Long-term, or confirmational, monitoring is conducted to ensure that the site remedy performs as expected over time. For the Landsburg Mine Site this entails monitoring groundwater quality emanating from the mine for changes in concentrations of chemicals, which may indicate a release. Monitoring will be performed using monitoring wells LMW-2, LMW-3, LMW-4, LMW-5, LMW-6, LMW-7, LMW-8, LMW-9, LMW-10, and LMW-11 and four additional sentinel wells (yet to be installed). These monitoring points are strategically located to intercept groundwater flow emanating along preferential flow paths from the north and south ends of the mine and laterally from the Frasier and Landsburg mines. Long-term confirmational monitoring will begin at the completion of the short-term protection monitoring. Long-term confirmational groundwater monitoring will continue until residual hazardous substance concentrations no longer exceed cleanup or remediation levels as described in the CAP resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment.

1.7.1 Monitoring Parameters and Frequency

Groundwater monitoring parameters and frequency are given in Table A-2. The priority pollutant metals consist of the following thirteen (13) metals: antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.

During the first year following completion of the site remediation, groundwater monitoring will be conducted quarterly. The first quarterly sampling round would consist of VOCs (by EPA Method 8260), SVOCs (by EPA Method 8270), chlorinated pesticides (by EPA Method 8081), PCBs (by EPA Method 8082) and priority pollutant metals (Table A-2). The Quality Assurance Project Plan (QAPP) provided in Appendix QAPP to this document defines the analytical method analytes, the sampling procedures, and quality controls that will be used during confirmational groundwater monitoring. During the remaining three quarters of the first year of sampling, monitoring will be conducted with a reduced analyte list, and

will include pH, specific conductance, turbidity, dissolved oxygen, priority pollutant metals, and VOCs (EPA Method 8260).

If no mine waste contaminants are detected at concentrations of 50 percent of the MTCA cleanup levels during the first year of sampling, the groundwater monitoring frequency will be reduced to semi-annually (2 times per year) for years two through five of the long-term confirmational monitoring program. The first round for each year of semi-annual sampling will include VOCs (EPA Method 8260), and SVOCs (EPA Method 8270), chlorinated pesticides (EPA Method 8081), PCBs (EPA Method 8082), priority pollutant metals, and general wet chemistry parameters Table A-2). This round will be conducted during the expected low groundwater time of the year (approximately October/November), as this would be when any potential leakage would be less diluted and present at the highest potential concentrations. The second round each year would be limited to the reduced list of constituents and will be conducted during the expected high groundwater time of year (approximately April/May).

The frequency of long-term confirmational monitoring during years six through ten, if no mine waste contaminants are detected at concentrations of 50 percent of the MTCA cleanup levels, will be reduced to annual sampling and analysis for the VOCs, TPH, SVOCs, PCBs and chlorinated pesticides, priority pollutant metals, and general wet chemistry parameters. The annual monitoring will be conducted during the expected low groundwater time of the year. If no mine waste contaminants are detected at concentrations above 50 percent of the MTCA cleanup levels at points of compliance during the first 10 years of monitoring, the frequency of confirmational monitoring will be reduced, but the sampling frequency will be analyte- and well location- dependent, as follows:

- Monitoring wells LMW-2, LMW-4, LMW-10, Deep North Sentinel Well (yet to be installed), Shallow North Sentinel Well (yet to be installed), LMW-6, and LMW-7 will have a monitoring frequency of 2.5 years for VOCs and TPH; and every 5 years for metals, SVOCs, PCBs, chlorinated pesticides and wet chemistry parameters.
- LMW-3, LMW-5, LMW-8, LMW-9, MWL-11, South Shallow Sentinel Well (yet to be installed), Dual South Sentinel/Cap Effectiveness Well (yet to be installed) will have a monitoring frequency of 5 years for VOCs and TPH; and every 10 years for metals, SVOCs, PCBs, chlorinated pesticides and wet chemistry parameters.

These frequencies were based on the evaluation of BIOSCREEN modeling (Golder 2009a and 2009b) and Ecology's decision on long-term groundwater monitoring frequency (Ecology 2009). Table A-2 provides a summary of the monitoring frequency and test parameters for the entire long-term confirmational monitoring project. Long-term confirmational groundwater monitoring will continue until residual hazardous substance concentrations no longer exceed cleanup or remediation levels as described in the CAP resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment.

1.7.2 Response If Remediation Levels Are Exceeded

The contingent groundwater treatment system will be installed after confirmed remediation levels (>0.5 MTCA cleanup levels at a compliance monitoring well) are exceeded, but before groundwater concentrations reach cleanup levels at the compliance boundary wells. Because the specific mine waste contaminants that could exceed the cleanup levels are not known and because groundwater treatment technology depends on specific contaminants, the contingent groundwater treatment system cannot be designed or installed until the specific mine waste contaminants requiring treatment are identified. Therefore, a specific or detailed groundwater treatment system cannot be defined at this time. A response action will depend on information gained during groundwater monitoring and cap inspections. In the event that routine groundwater monitoring detects a mine waste contaminant in a sentinel well or a point of compliance well, the response actions illustrated in Figure A-8 and Figure A-9, respectively, will be followed. A summary of the response actions following detections are as follows:

Sentinel Well Detections (see Figure A-8):

- If following validation of a laboratory detection greater than 0.5 times the MTCA Cleanup Level at a sentinel well, the Group will inform Ecology and confirm the detection by re-sampling the compliance well and will analyze for the analyte that was detected over 0.5 times the MTCA Cleanup Level.
- If the detection in a sentinel well is confirmed by re-sampling, the Group will notify Ecology and will conduct an "alternative source evaluation" to understand if the detection is caused by another source other than the waste disposed in the Roger's mine trenches. The detection at a sentinel well does not trigger a remedial response action other than to evaluate whether the detection could be from a source other than the waste disposed in the Roger's subsidence trenches. The sequence of steps for detections at sentinel wells is shown on Figure A-8.

Compliance Well Detections Over 0.25 MTCA Cleanup Levels (see Figure A-9):

- If following validation of the laboratory data (QA/QC) the detection at a compliance well is over 0.25 of the MTCA Cleanup Level, the Group will inform Ecology within seven (7) days and then confirm the detection by re-sampling the compliance well. The sample will be analyzed for the analyte that was detected over 0.25 MTCA Cleanup Level.
- If the analytical validation and confirmation re-sampling results confirms that the analyte is present within groundwater from the compliance well at a concentration that exceeds 0.25 of the MTCA Cleanup Level, the Group will notify Ecology within seven (7) days and then conduct an "alternative source evaluation" to evaluate if the detection is caused by another source other than the waste disposed in the Roger's mine trenches.
- If an alternative source of the detected analyte is not identified, the Group will then commit to increasing the monitoring frequency as per Table A-3. The increased monitoring will only be for groundwater at the particular compliance well and for the particular analyte having a validated and confirmed detection above 0.25 of the MTCA Cleanup Level. This sequence of steps for detections at compliance wells is shown on Figure A-9.

Compliance Well Detections above 0.5 of the MTCA Cleanup Level:

- If following validation of the laboratory data (QA/QC), the detection is determined valid and the detected concentration is over 0.5 of the MTCA Cleanup Level at a compliance well, the Group will inform Ecology of the detection within seven (7) days and then confirm the detection by re-sampling the compliance well and analyzing for the analyte that was detected over 0.5 MTCA Cleanup Level.
- If confirmation re-sampling does not confirm the contaminant at a concentration above 0.5 of the MTCA Cleanup Level, then the confirmational monitoring cycle will continue without the implementation of corrective remedial action to install the Contingent Groundwater Treatment System (see Figure A-9).
- If the confirmation re-sampling confirms the concentration of the contaminant above 0.5 of the MTCA Cleanup Level in a compliance well, the Contingent Groundwater Treatment System presented in Exhibit E – Part C will be implemented and installed as the corrective remedial action for containment and treatment of impacted groundwater.
- Groundwater containment (pumping and treatment) will not be initiated unless groundwater concentrations of contaminants reach MTCA Cleanup Levels at a

compliance boundary well(s). Treated groundwater will be discharged to the local POTW sewer (see Exhibit E - Part C for more details).

Because a detection at a compliance well may never increase to the MTCA Cleanup Level, the increased frequency of groundwater monitoring at specific compliance well(s) (as specified in Table A-3 in Exhibit E – Part A) can end and return to the regular long-term monitoring in accordance with Table A-2 in Exhibit E – Part A under any of the following conditions:

- If the validated and confirmed detection becomes non-detect at the same laboratory Method Detection Level (MDL) for three consecutive monitoring periods.
- If the trend analysis (using a minimum eight monitoring events for statistical representativeness) shows a steady or decreasing trend; or
- If the trend analysis indicates a rate of increase would not result in concentrations reaching the MTCA Cleanup Level in a time period that is less than the routine long-term monitoring specified in the CMP (Table A-2).

Groundwater Monitoring During Operation of the Contingent Groundwater Treatment System:

- During the contingent groundwater treatment system operation, compliance wells at the compliance boundary where the exceedance of MTCA Cleanup Levels occurred will be monitored quarterly only for the analytes that were in exceedance. All other wells will be monitored as per the long-term monitoring program.
- Contingency groundwater extraction and treatment will continue until groundwater at the points of compliance and the pumped effluent are below MTCA Cleanup Levels for four consecutive monitoring periods or a minimum of one (year). When the contingency groundwater extraction and treatment system is implemented, the compliance monitoring frequency of treatment system inflow and outflow will be determined by the Metro discharge permit.

1.7.3 Reporting

The Landsburg Mine Potentially Liable Parties (PLPs) will submit a letter report to Ecology within 60 days of groundwater monitoring events. The PLPs for the Landsburg Site are: Palmer Coking Coal Company, LLP; PACCAR Inc; Plum Creek Timberlands Company, L.P.; Browning-Ferris Industries of Illinois, Inc.; TOC Holdings Co.; and the BNSF Railway Company. The report will summarize the sampling activity and provide a table of groundwater elevations and analytical results. The report will include the laboratory analytical reports and will be in accordance with Policy 840. The report will include a summary on page 1, with a checklist box that says:

- No parameters exceeded the Method B cleanup level.
- The following parameters exceeded the Method B cleanup level (followed by a description of the parameters).

See Appendix QAPP for more details on requirements.

2.0 SAMPLING AND ANALYSIS PLAN

2.1 Monitoring Wells

Both short-term and long-term monitoring requires collection of representative groundwater samples from some or all of the following monitoring wells: LMW-2, LMW-3, LMW-4, LMW-5, LMW-6, LMW-7, LMW-8, LMW-9, LMW-10, and LMW-11. Additionally, four sentinel wells will be installed, before the completion of the remedy, and will be sampled as part of the long-term monitoring program. Each sampling event will include the following:

- Measurement of static water levels.
- Well purging to insure representative sampling with the currently installed dedicated pumping systems.
- Measurement of field parameters pH, specific conductance, dissolved oxygen, temperature, and turbidity.
- Collection of all purged water in appropriate containers for temporary on-site storage prior to disposal.
- Collection of representative groundwater samples in appropriate containers.

Each of these activities will be subject to controls and strict QA protocols and procedures specified in the relevant technical procedures referenced in the attached QAPP (Appendix QAPP). Water levels will be taken according to the specifications of procedure TP-1.4-6 "Water Level Measurements." Sample collection and handling will be performed as described in procedure TP-1.2-20 "Collection of Groundwater Quality Samples." All instruments used for field analysis will be calibrated in accordance with manufacturer's recommendations. Chain of custody will be maintained in accordance with the procedure TP-1.2-23, "Sample Handling and Chain of Custody."

The static water level will be measured at each well prior to the initiation of any other activities. An electric well sounder will be used for all manual water level measurements. The sounder will be cleaned before and after each use by a process involving a detergent rinse, followed by an organic free distilled/deionized water rinse. The water level will be measured from the elevation survey mark and will be recorded to the nearest 0.01 feet. All measurements, dates, times and well identifiers will be recorded on Water Level Readings forms for maintenance in the project file.

Each of the ten groundwater monitoring wells are or will be equipped with a dedicated submersible pump, with Teflon-lined polyethylene discharge hose. The pumps purge groundwater under positive pressure. The pumps installed in wells LMW-3, LMW-4, and LMW-5 are equipped with a viton packer assembly approximately 10 feet above the pump unit. The packer is used in order to minimize the amount of water purged from each well. The packer assembly is inflated with nitrogen sealing off the water column above the packer thus significantly reducing the column of purge water required during sampling. The packer will be deflated after sample collection is complete.

Purging will involve the removal of a minimum of three discharge line volumes utilizing the "Low Flow Sampling Technique" with pumping rates not exceeding 200 ml/minute for sample collection. During purging, field parameters pH, conductivity, turbidity and temperature will be periodically measured. Purging will continue beyond the three discharge line volumes until the measured rate of change of the parameters is in accordance with TP-1.2-20 on consecutive readings. During purging of wells LMW-3, LMW-4, and LMW-5, the packer will be inflated prior to groundwater removal; hence a volume of well water represents entrained water below the packer. The instruments used in the field parameter measurements will be field calibrated per the manufacturers' specifications and as described in the QAPP. All field parameter measurements and purge volumes will be recorded on Sample Integrity Data Sheets.

All purge water produced during sampling will be collected in suitable containers for temporary on-site storage. The results of the groundwater sampling and analysis will be used to determine appropriate means of purge water disposal. The purge water will be disposed of in accordance with all applicable regulatory requirements. If the purge water is not considered to be contaminated (following receipt of laboratory analysis), this water will be discharged to the land surface in the area of each well.

Samples will be collected in bottles provided by the contract laboratory and of appropriate volume and type, including preservatives as appropriate, as detailed in the QAPP. After filling, the bottles will be immediately sealed, labeled and placed in a cooler maintained at 4° C. Samples will be transported to the laboratory for analysis with chain of custody documentation in sufficient time to perform the requested analyses within the applicable holding times.

Documentation for sampling will include bottle labels, completion of Sample Integrity Data Sheets and Chain of Custody Records. Sample coolers will be secured with chain of custody seals. The Sample Integrity Data Sheet will be used to document sample collection information, as further described in the QAPP.

2.2 Data Quality Review

For groundwater monitoring, laboratory analytical data will be subjected to a data quality review using the following criteria:

- **Completeness:** the data will be reviewed to ensure that all requested analyses are reported and that all required information has been provided;
- **Consistency:** the data will be checked to ensure that redundant information is reported consistently throughout the laboratory reports;
- **Correctness:** the data will be checked to ensure that samples reported using correctly applied algorithms for the calculation of sample concentrations (i.e., dilution factors applied properly), and
- **Compliance:** the data will be checked to ensure that all required QC specifications have been met.

Deficiencies identified during data quality review will require correction prior to conducting data analysis activities. A brief quality review report will be prepared after each sampling round and will be included in the data reports. Groundwater data will be entered into the Ecology Environmental Information Management System (EIMS) in accordance with the Data Management Plan (DMP) in Appendix DMS to this document, after the data has been quality reviewed with appropriate qualifiers.

3.0 REFERENCES

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- Golder 1996. *Remedial Investigation and Feasibility Study for the Landsburg Mine Site*. Prepared for the Landsburg PLP Steering Committee. Golder Associates Inc., Redmond, Washington.
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- Ecology, Washington Department of. 2009. Letter from Jerome Cruz of Ecology to Douglas Morell of Golder Associates Inc.. Dated January 21, 2009 (actually 2010). Northwest Regional Office. Bellevue, Washington.

TABLES

Table A-1
Sentinel Wells Proposed Construction Details

Sentinel Well	Approx. Well Depth (feet bgs)	Screen Length (feet)
Shallow North	<30	10
Deep North	200	10
South/Cap Effectiveness	170	10
South Shallow	150	10

TABLE A-2
COMPLIANCE MONITORING FOR WELLS LMW-2, LMW-3, LMW-4, LMW-5, LMW-6, LMW-7, LMW-8, LMW-9, LMW-10, AND LMW-11

Analysis	Short-Term Monitoring ^a		Long-Term Monitoring											
	Biweekly ^b	Monthly	Year 1					Years 2 - 5		Years 6 - 10			Years 11+	
			1	2	3	4	1	2	Annual	1 every 2.5 years	1 every 5 years	1 every 10 years		
pH ^c	X	X	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^d	X ^{de}	X ^{de}	X ^e
Sp. Conductance ^c	X	X	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^d	X ^{de}	X ^{de}	X ^e
Dissolved Oxygen ^c	X	X	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^d	X ^{de}	X ^{de}	X ^e
Turbidity ^c	X	X	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^d	X ^{de}	X ^{de}	X ^e
Method 418.1 Mod. Priority Metals		X	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^d	X ^{de}	X ^{de}	X ^e
VOC (Method 8260)		X	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^d	X ^{de}	X ^{de}	X ^e
SemiVol. (Method 8270)			X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^d	X ^{de}	X ^{de}	X ^e
OCP, PCB's (Method 8081)			X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^{de}	X ^d	X ^{de}	X ^{de}	X ^e

Notes:

During long-term monitoring, field parameters will only be monitored on those wells that are being sampled.

^a Short-term monitoring will be performed during the trench backfill and cap construction.

^b Biweekly monitoring (twice per month) will be extended for four weeks following completion of trench backfill and capping at the same schedule as noted above.

^c The pH and Specific Conductance analysis will be performed in the field.

X - means the analysis will be conducted on all compliance monitoring wells: LMW-2 through LMW-11.

X^e - means the analysis will be conducted only on Northward wells: LMW-2, LMW-4, LMW-5, LMW-8, LMW-9, LMW-10, Deep North Sentinel Well (yet to be installed), LMW-6, and LMW-7.

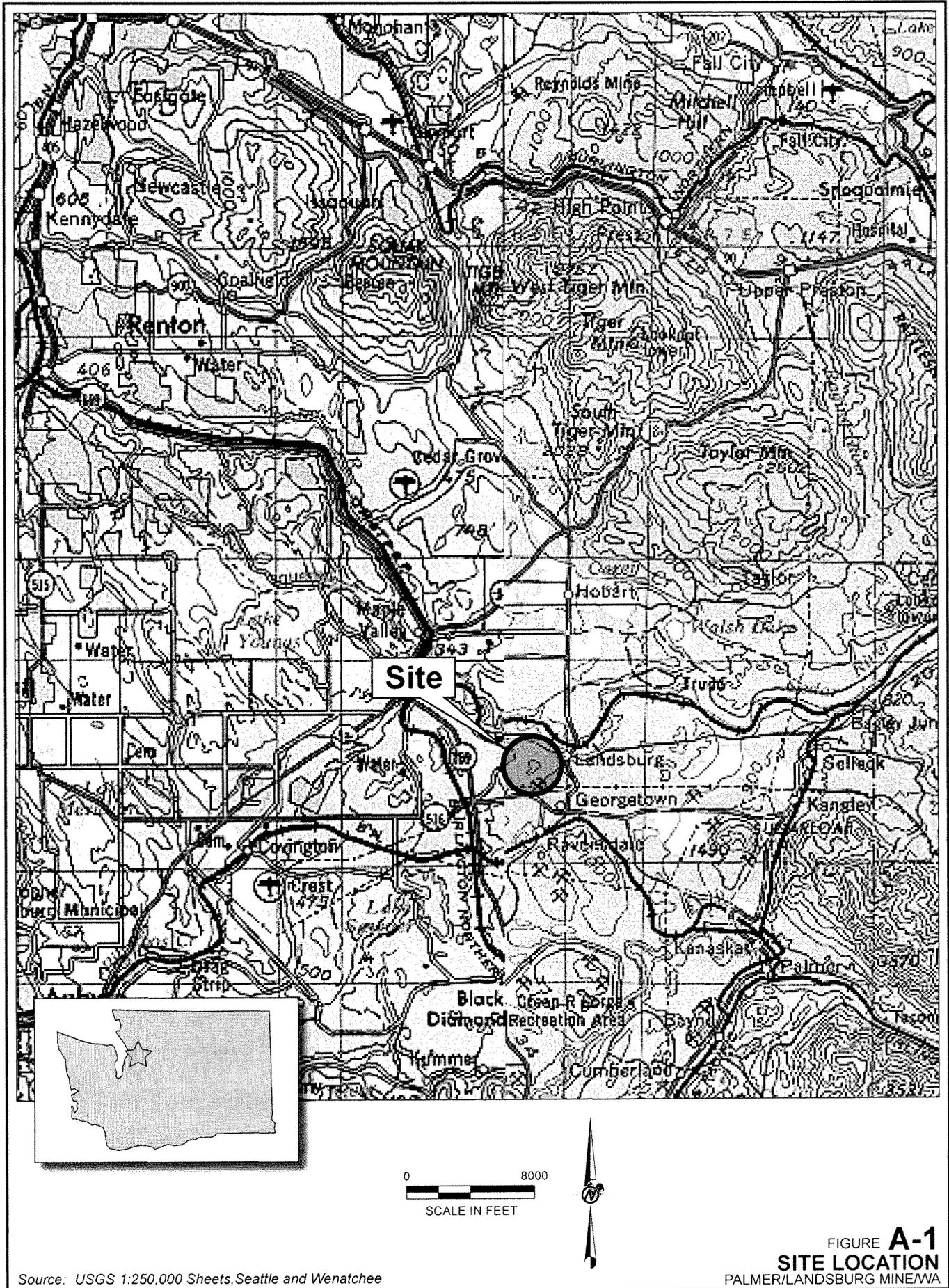
X^d - means the analysis will be conducted only on Southward wells: LMW-3, LMW-7, LMW-11, South Shallow Sentinel Well (yet to be installed), and Dual South Sentinel/Cap Effectiveness Well (yet to be installed).



TABLE A-3
 INCREASED MONITORING FREQUENCY AT COMPLIANCE WELLS IF DETECTION OCCURS
 ABOVE 0.25 MTCA CLEANUP LEVEL

	Southern Pathway Compliance Boundary	Northern Pathway Compliance Boundary
VOCs, TPH	6 months	4 months
Metals, SVOCs, Pesticides	2 years	2 years

FIGURES



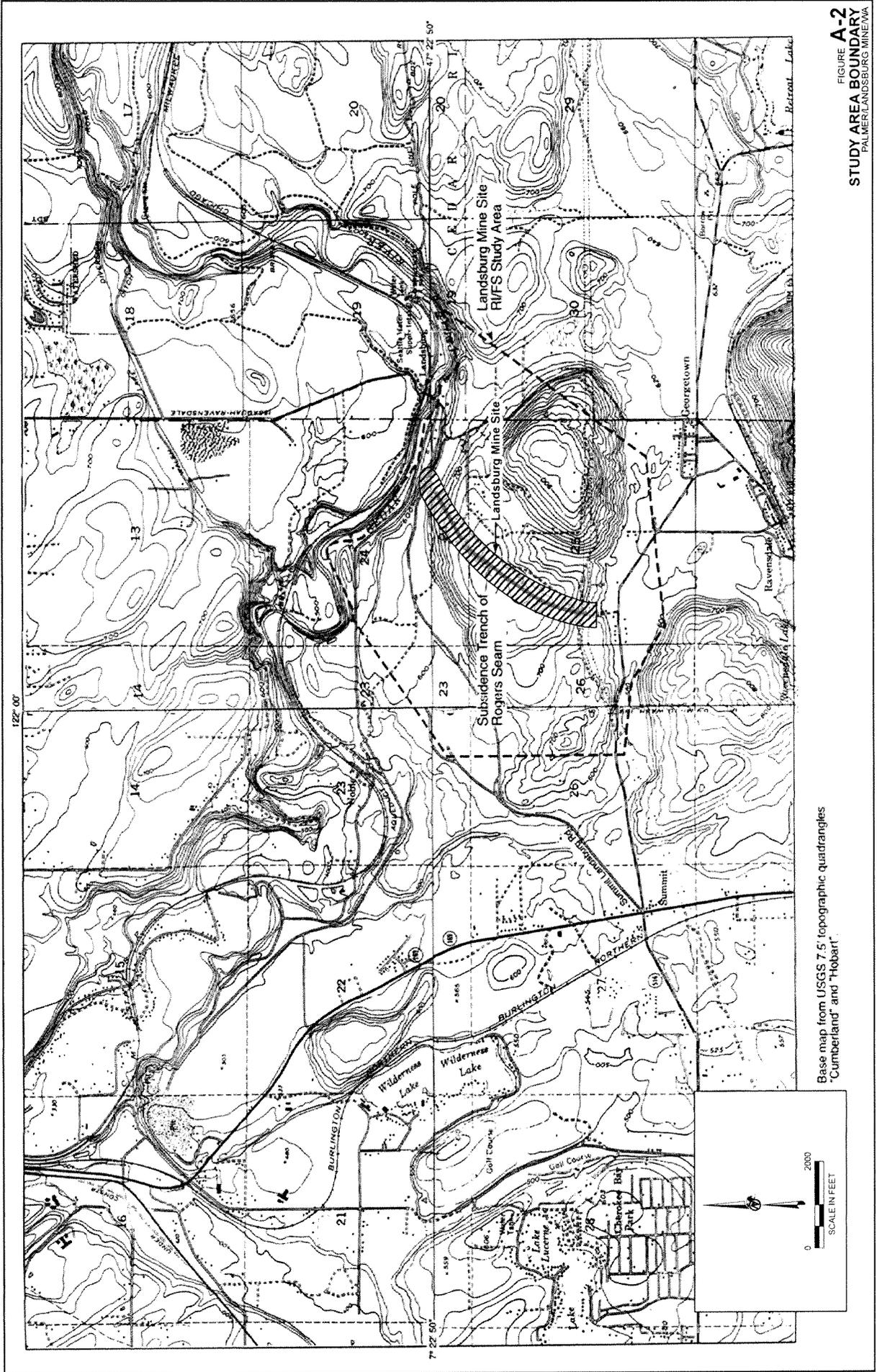
Source: USGS 1:250,000 Sheets, Seattle and Wenatchee

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FIGURE **A-1**
SITE LOCATION
 PALMER/LANDBURG MINE/WA

DRAFT

Golder Associates



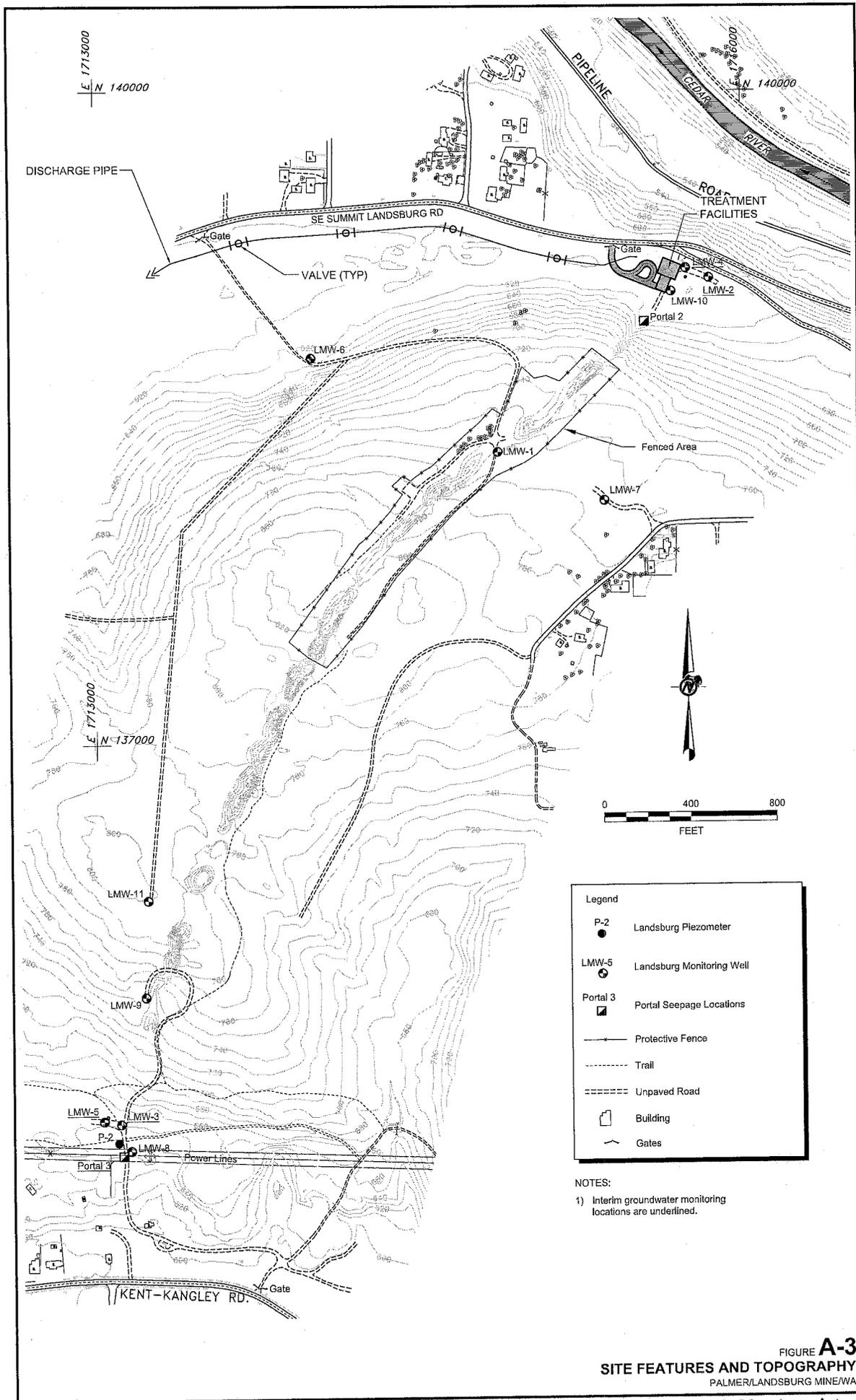
Base map from USGS 7.5' topographic quadrangles "Cumberland" and "Hobart"

FIGURE A-2
STUDY AREA BOUNDARY
PALMERLANDSBURG MINE/MA

Golder Associates

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K:\CAD\Projects\1992\9231000\02\R154\CMP\923_1000_02_R154_FA-3r2.dwg 03/01/2011, 13:42 Layout: Fig A-3

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Golder Associates

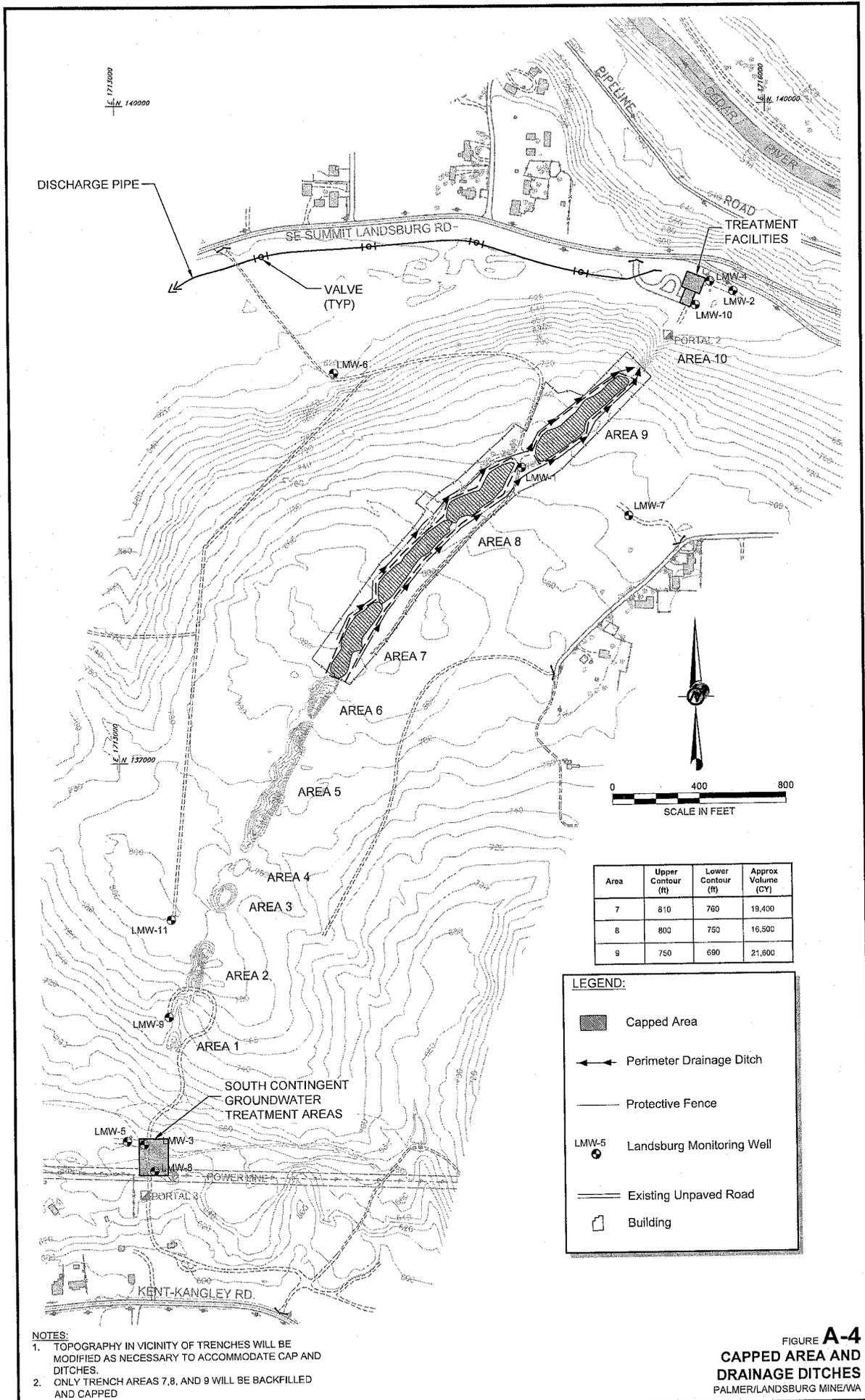


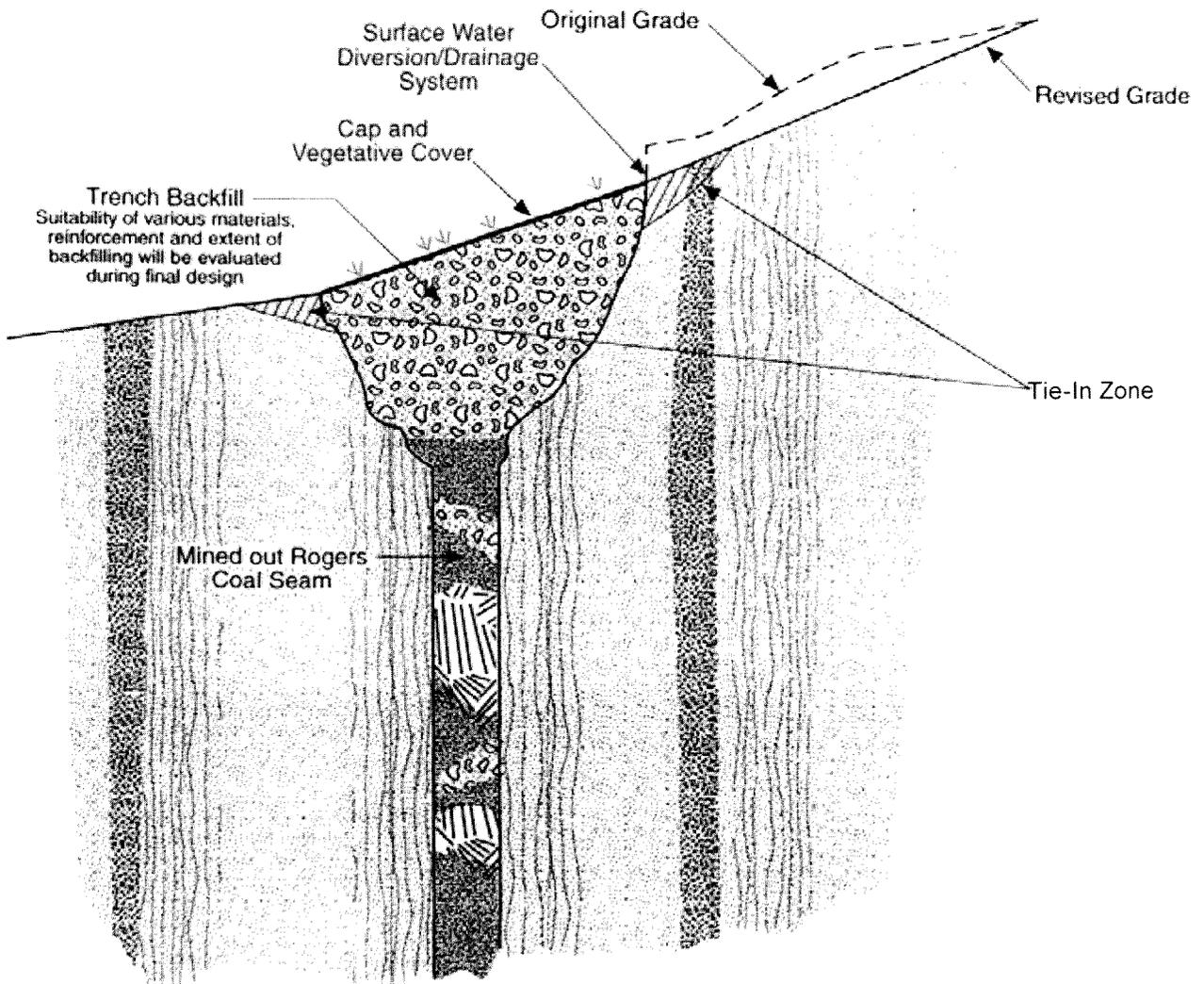
FIGURE A-4
CAPPED AREA AND DRAINAGE DITCHES
PALMER/LANDSBURG MINE/WA

K:\CAD\Projects\1962923100\0602R154\CMR\922_1000_02_R154_FA-4.dwg | Fig A-4 Capped Area and Drainage Ditches | Mod: 07/31/2013 13:38 | Plotted: 07/22/2013 14:21 | alford

FINAL DRAFT

Golder Associates

**Conceptual Cross-Section
(not to scale)**



Cap Design

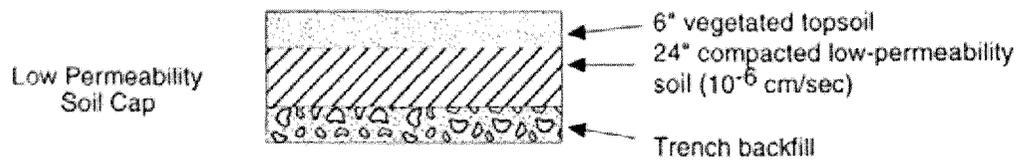
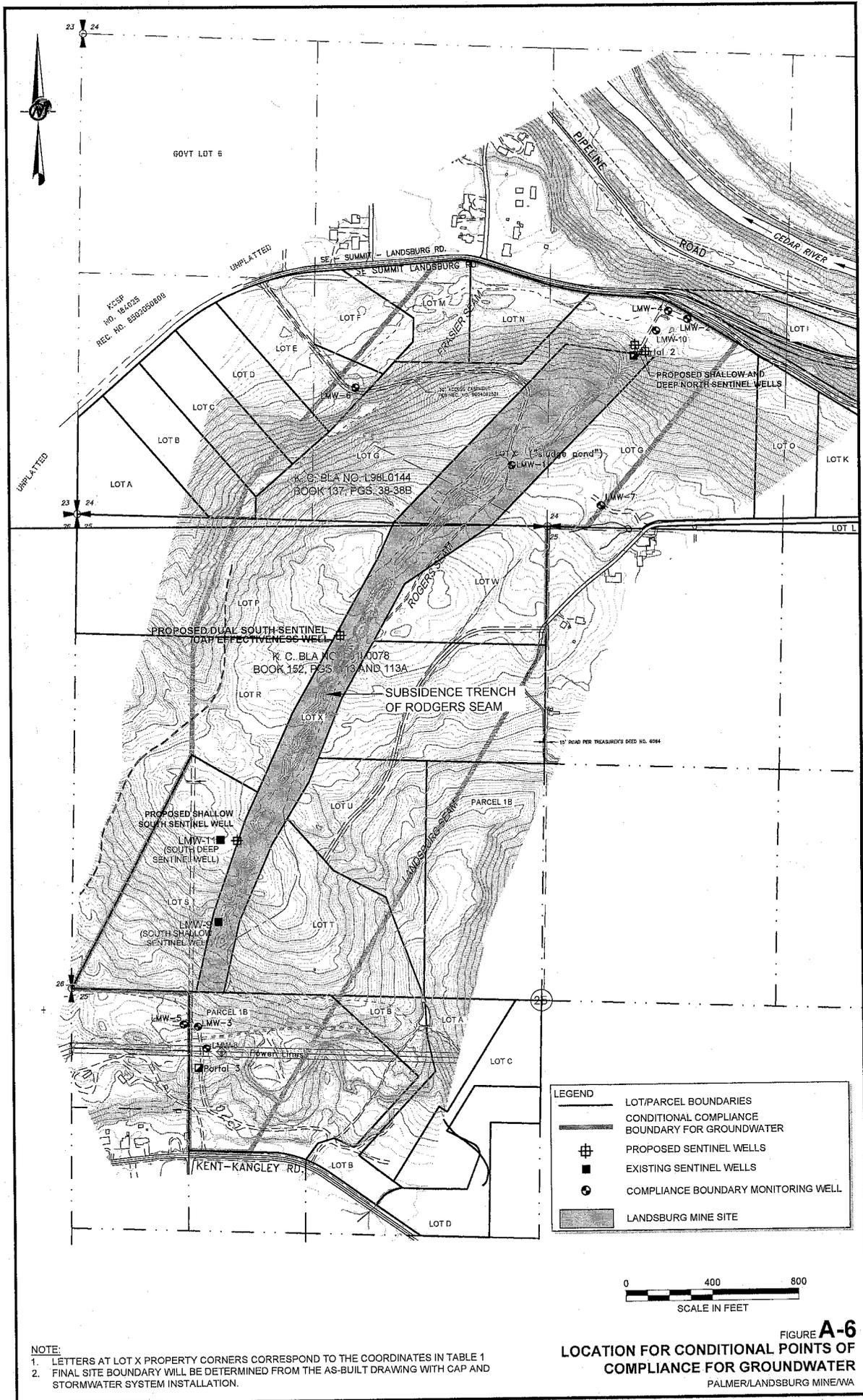


FIGURE A-5
CAP DESIGN
PALMER/LANDBURG MINE/WA



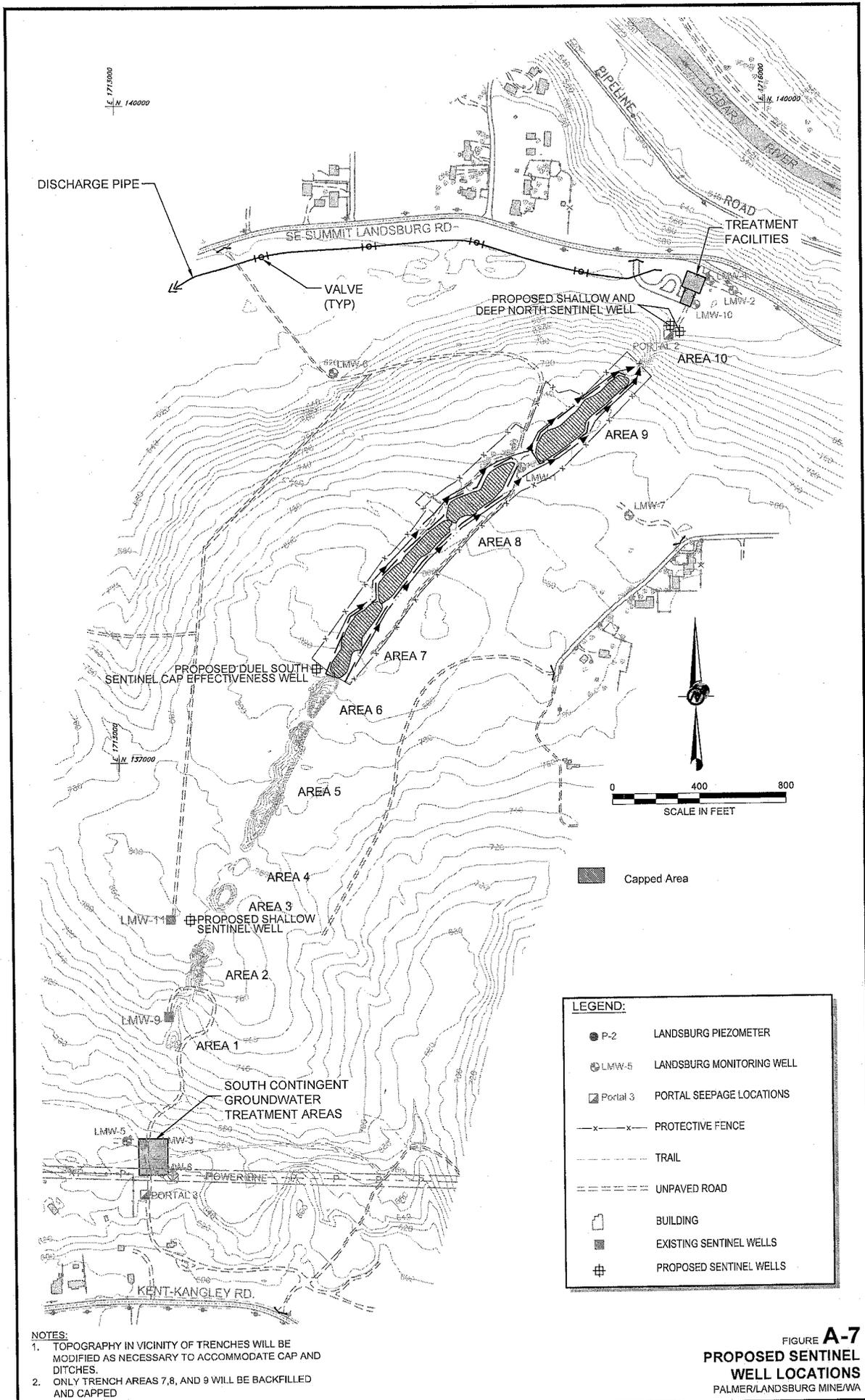
NOTE:
 1. LETTERS AT LOT X PROPERTY CORNERS CORRESPOND TO THE COORDINATES IN TABLE 1
 2. FINAL SITE BOUNDARY WILL BE DETERMINED FROM THE AS-BUILT DRAWING WITH CAP AND STORMWATER SYSTEM INSTALLATION.

LEGEND

- LOT/PARCEL BOUNDARIES
- CONDITIONAL COMPLIANCE BOUNDARY FOR GROUNDWATER
- ⊕ PROPOSED SENTINEL WELLS
- EXISTING SENTINEL WELLS
- ⊙ COMPLIANCE BOUNDARY MONITORING WELL
- ▨ LANDSBURG MINE SITE



FIGURE A-6
LOCATION FOR CONDITIONAL POINTS OF COMPLIANCE FOR GROUNDWATER
 PALMER/LANDSBURG MINE/WA



NOTES:
 1. TOPOGRAPHY IN VICINITY OF TRENCHES WILL BE MODIFIED AS NECESSARY TO ACCOMMODATE CAP AND DITCHES.
 2. ONLY TRENCH AREAS 7, 8, AND 9 WILL BE BACKFILLED AND CAPPED

LEGEND:

	P-2 LANDSBURG PIEZOMETER
	LMW-5 LANDSBURG MONITORING WELL
	Portal 3 PORTAL SEEPAGE LOCATIONS
	PROTECTIVE FENCE
	TRAIL
	UNPAVED ROAD
	BUILDING
	EXISTING SENTINEL WELLS
	PROPOSED SENTINEL WELLS

FIGURE A-7
PROPOSED SENTINEL WELL LOCATIONS
 PALMER/LANDSBURG MINE/WA

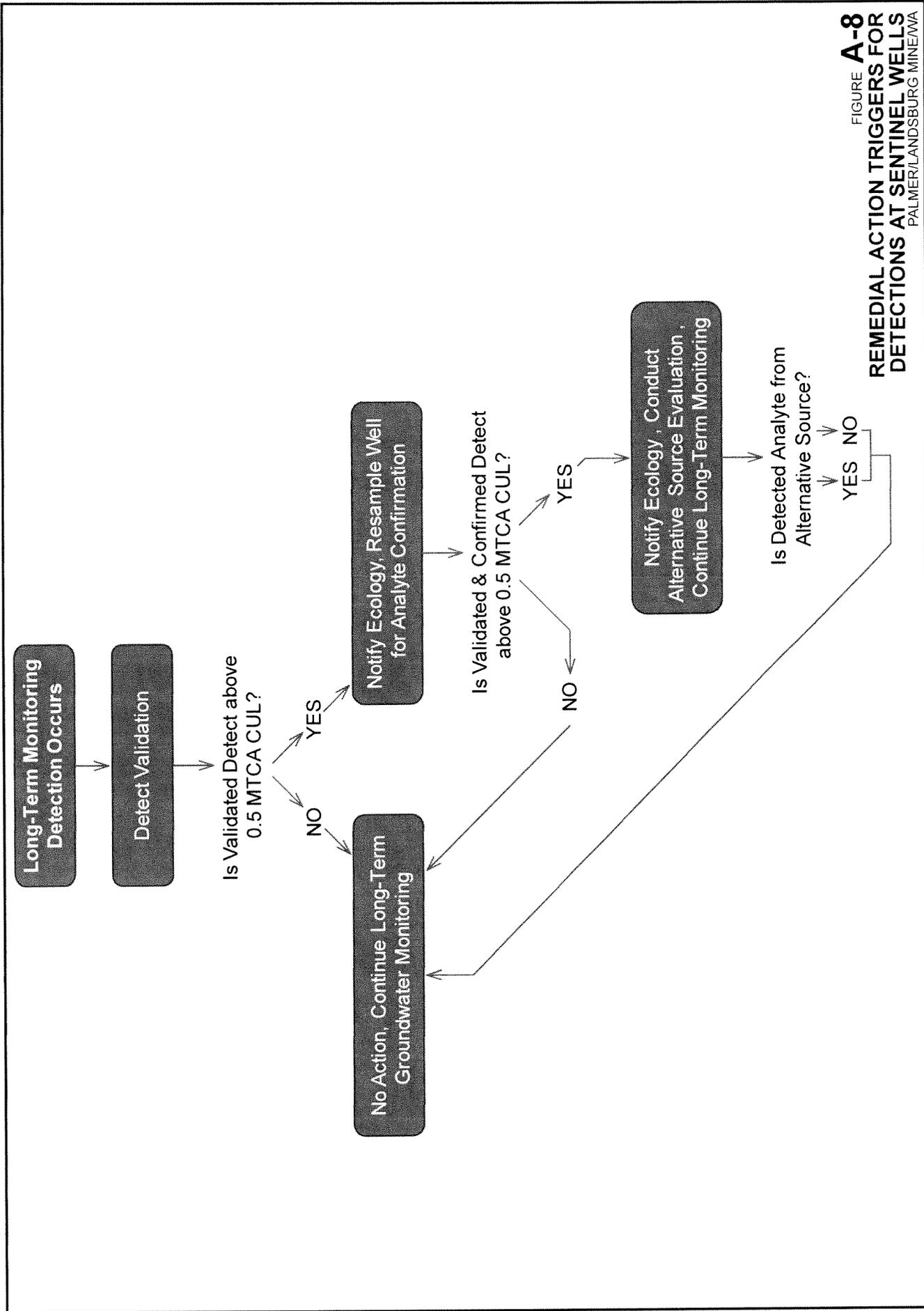


FIGURE **A-8**
REMEDIAL ACTION TRIGGERS FOR
DETECTIONS AT SENTINEL WELLS
 PALMER/LANDBURG MINE/WA

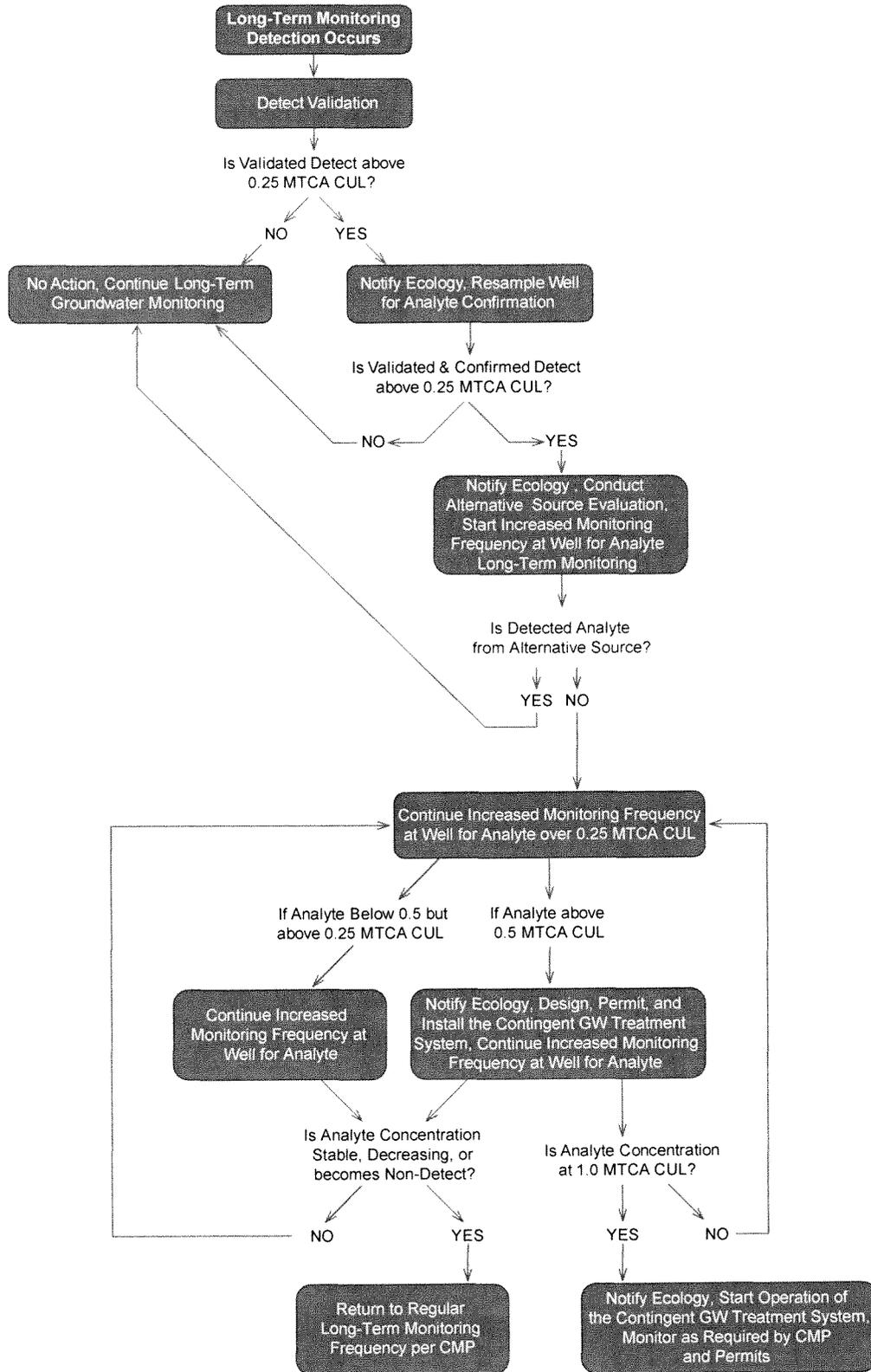


FIGURE A-9
 REMEDIAL ACTION TRIGGERS FOR
 DETECTIONS AT COMPLIANCE WELLS
 PALMER/LANDBURG MINE/IWA

EXHIBIT E

PART A

(COMPLIANCE MONITORING PLAN)

[APPENDICES NOT INCLUDED HERE]

Part B
OPERATION AND MAINTENANCE PLAN



REPORT

FINAL DRAFT

PART B

OPERATION AND MAINTENANCE PLAN

**Landsburg Mine Site
MTCA Remediation Project
Ravensdale, Washington**

Submitted To: Washington Department of Ecology
3190 – 160th Avenue SE
Bellevue, WA 98008

Submitted By: Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052 USA

Submitted On Behalf Of: The Landsburg Mine Site PLP Group

July 31, 2013

Project No. 923-1000-002.R154

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1.2	Cap Geodetic Surveys	3
1.3	Schedule	3
1.4	Maintenance.....	3
1.5	Inspection of the Cap after an Earthquake	4
1.6	Reporting.....	5

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- Figure B-1 Capped Area and Drainage Ditches
- Figure B-2 Cap Cross Section

1.0 OPERATION AND MAINTENANCE PLAN

This section contains the Operation and Maintenance (O&M) Plan for the Landsburg Mine Site. The purpose of the Operation and Maintenance (O&M) Plan is to provide technical guidance and procedures to ensure effective confirmational monitoring of the operation and maintenance of the constructed cleanup actions under both normal and emergency conditions.

O&M will consist primarily of routine inspection of the cap and associated drainage features, along with any necessary repairs. The selected remedy for the Landsburg Mine Site is construction of a low-permeability soil cap followed by long-term maintenance and monitoring (see Section 1.4). Because no treatment system is involved, many of the items often included in an O&M Plan (i.e., relating to treatment systems) are not relevant for this plan. Operation of the cap consists of periodic routine inspections and maintenance. Maintenance consists of repairs to the cap and/or associated drainage system (see Figures B-1 and B-2) to address erosion and settling that adversely affect the integrity of the remedy, as detected during monitoring.

Construction Quality Assurance (CQA) of cap construction is briefly described in the Compliance Monitoring Plan (Part A) under performance monitoring (Section 1.6 of Part A) with the specific CQA Plan developed and provided with the Engineering Design and Specifications. Groundwater monitoring is described in the Compliance Monitoring Plan under confirmation (long-term) monitoring (Section 1.6).

Additional as-built engineering drawings, designs, and specifications will be added to this O&M plan following completion of the remedial construction activities.

This O&M Plan does not include O&M for the Contingent Groundwater Extraction and Treatment System. If a contingent treatment system is required in the future, then a treatment technology specific O&M Plan will be developed and submitted to Ecology for review after identification of a groundwater threat. The groundwater treatment system-specific O&M Plan would be incorporated into this O&M as an attachment.

1.1 Routine Inspections

Routine inspections will be conducted of the site cap and drainage features following the schedule given in Section 1.3. The site maintenance inspections will focus on the condition of the cap and drainage ditches, including:

- Erosion
- Cap settlement
- Vegetative cover
- Animal burrowing
- Drainage ditches

Photographs will be taken during the inspection to document the results of the inspection and assist in observation of changes over time. Site maintenance inspection logs will be completed for each inspection noting the condition of the cap and drainage ditches and corrective actions taken as described in Section 1.4.

Erosion

Erosion of the cap and cover may occur due to stormwater run-off and wind. Inspectors will note rills, gullies, or other evidence of significant erosion. Inspectors will look for visual evidence of soil loss from the cap. Soil loss over large areas of the cap will be detected by measuring and recording the soil depth against cap monuments. The cap monuments will be installed in the cap during its construction. When the monuments are installed, a survey will precisely measure the location and depth of soil at the monument. The cap monuments will not penetrate the cap (low-permeability layer). Erosion will be indicated by a decrease in the depth of soil at the monuments. Severe erosion and/or settling of the cap will be evidenced if the inspector can see down to the low permeability materials through the vegetated cover soils.

At the north end of the cap, long-term erosion will be controlled by the final engineered grade that is sufficient for the cap materials and also by establishing a stable vegetative cover suitable for the local climate. For the south end of the cap, the cap will terminate at a mine pillar (between Trench 7 and 6). The cap will be sloped for drainage toward the east and/or west into stormwater diversion ditches. The cap side slopes will be engineered and stabilized by the final grade that is acceptable for the cap materials and will also be stabilized by a vegetative cover.

Inspectors will check for soil accumulation in drainage ditches, which is evidence of erosion and also could prevent proper operation of the ditches. Inspectors will also note the presence and extent of debris accumulation in the ditches, which could also prevent their proper operation.

Cap Settlement

During routine inspections, the cap will be visually observed by the inspector traveling the length of the cap on foot. The inspector will look for signs of differential cap settlement, such as low spots or ponding. The inspector will also look for cracks or other signs of cap penetration. Overall settling of the cap will be determined by site surveys (see Section 1.2). Some cap settlement is expected.

Vegetative Cover

Visual inspection of the vegetative cover will be performed during each inspection round. Inspectors will check the condition and density of the vegetative cover, and note the presence of any deep-rooted plants. Dead or absent vegetation will produce areas susceptible to erosion and will be noted for maintenance.

Animal Activity

Visual inspection of the cover for evidence of burrowing animals will be performed during each monitoring round.

Drainage Ditches

Visual inspection of the cap's drainage ditches will be performed during each inspection round. The drainage ditches will be inspected for signs of blockage, unusually damp soil, localized settlement, or displacement. Excessive debris observed within the drainage system will be noted for subsequent removal. Damage to the drainage channel that significantly reduces the channel's capacity to drain water away from the cap will be noted for repair. Discharge points for the drainage ditches will also be inspected during each inspection round.

1.2 Cap Geodetic Surveys

Cap geodetic surveys will be conducted by a qualified surveyor registered in the State of Washington. Surveys will be conducted using geodetic benchmark(s) established in exposed bedrock adjacent to the capped areas. The benchmark(s) will be established by a state-certified surveyor prior to the completion of the cap. The geodetic benchmark(s) will allow for the comparison and calibration of the surveyed cap data. The survey will cover the cap area and adjacent drainage ditches. The survey will measure the location and elevation of high and low points of the cap and drainage ditches for comparison to original grades and in comparison to the geodetic benchmark(s). The survey will also measure cap elevations on a 50-ft grid, with additional survey points around areas of differential settlement as determined by visual observation.

1.3 Schedule

Routine inspections as described in Section 1.1 will be performed quarterly in the first year, semi-annually for the next four (4) years, and annually thereafter until completion of the post-closure period. Additional inspections will be conducted if warranted.

Geodetic surveying of the cap as described in Section 1.2 will be performed quarterly in the first year, when most settlement will occur, semi-annually for the next four (4) years, and annually for the next five (5) years thereafter.

Additionally, special surveys will be conducted if warranted based on results of routine inspections.

1.4 Maintenance

Maintenance will be conducted as necessary based on inspection and geodetic survey results, and will consist of repairs to address:

- Cap settlement
- Erosion damage to the cap and drainage ditches
- Removal of debris from the drainage ditches
- Burrowing animals
- Vegetative cover

Maintenance to address minor settling and/or erosion of the cap will consist of adding topsoil to restore the original grades and/or correct undesirable drainage patterns. If the erosion and/or settling are severe, the cap will be rebuilt in the damaged area so that the integrity of the low-permeability soil layer (liner) is maintained, in terms of both liner depth and continuity. Severe erosion and/or settling of the cap will be evident if the inspector can see the low permeability materials through the vegetated cover soils. For repair of major cap settlement, a special survey will be conducted of the repaired area to document successful completion of the maintenance. For minor cap settlement, no special survey will be conducted. Cap maintenance work will typically be performed during the dryer summer months.

The drainage ditches will be cleaned, repaired, or modified as required to maintain their proper operation. Excessive debris observed within the drainage system will be removed during the inspection.

If they are presenting a significant problem, burrowing animals will be trapped and removed from the site. The burrows will be excavated and the cap repaired.

If the vegetative cover is insufficient, the affected area will be reseeded. If reseeding is not successful, then a more suitable plant species may be substituted, or another suitable repair conducted (depending on the cause of the problem). Tree saplings or other deep-rooted plants growing on the cap will be mowed or removed. The cap will be mowed as needed to inhibit tree growth and to promote vegetative cover growth. Trees and other deep-rooting plants will be removed since they could penetrate the low-permeability cap and create a potential infiltration conduit.

1.5 Inspection of the Cap after an Earthquake

In the event of an earthquake of Intensity IV or greater (Modified Mercalli Intensity Scale) in the area, the cap will be inspected for damage and repaired accordingly. The north and south portal areas will be inspected for ground ruptures, fractures, earth displacements, or similar damage to original (pre-earthquake) landscape. If portal water surfaces due to the earthquake event, it will be inspected for signs of anomalous water quality (color, turbidity, odor, etc.). Ecology will be notified of site conditions within seven (7) days and a decision will be made between the property owner and Ecology on taking groundwater samples from site wells in accordance with the sampling network, protocols, and analytical methods of the Compliance Monitoring Plan in the Consent Decree (Exhibit E). Contingency actions will be implemented in accordance with this plan.

1.6 Reporting

The Landsburg Mine Potentially Liable Parties (PLPs) will submit a letter report to Ecology within 30 days of an inspection, survey, or major maintenance activity conducted under this O&M Plan. The PLPs for the Landsburg Site consist of Palmer Coking Coal Company, LLP; PACCAR Inc; Plum Creek Timberlands Company, L.P.; Browning-Ferris Industries of Illinois, Inc.; TOC Holdings Co.; and the BNSF Railway Company. The report will include the date(s) of the activity, and the results of the inspection, survey, or maintenance activities. For geodetic surveys, the report will include a table containing the survey data (Northing, Easting, and elevation) and a figure showing cap elevations. For routine inspections, the report may include site photographs showing key features and document inspection observations. For maintenance activities, the report will describe the maintenance activity and document successful completion of the activity (including any special survey data).

FIGURES

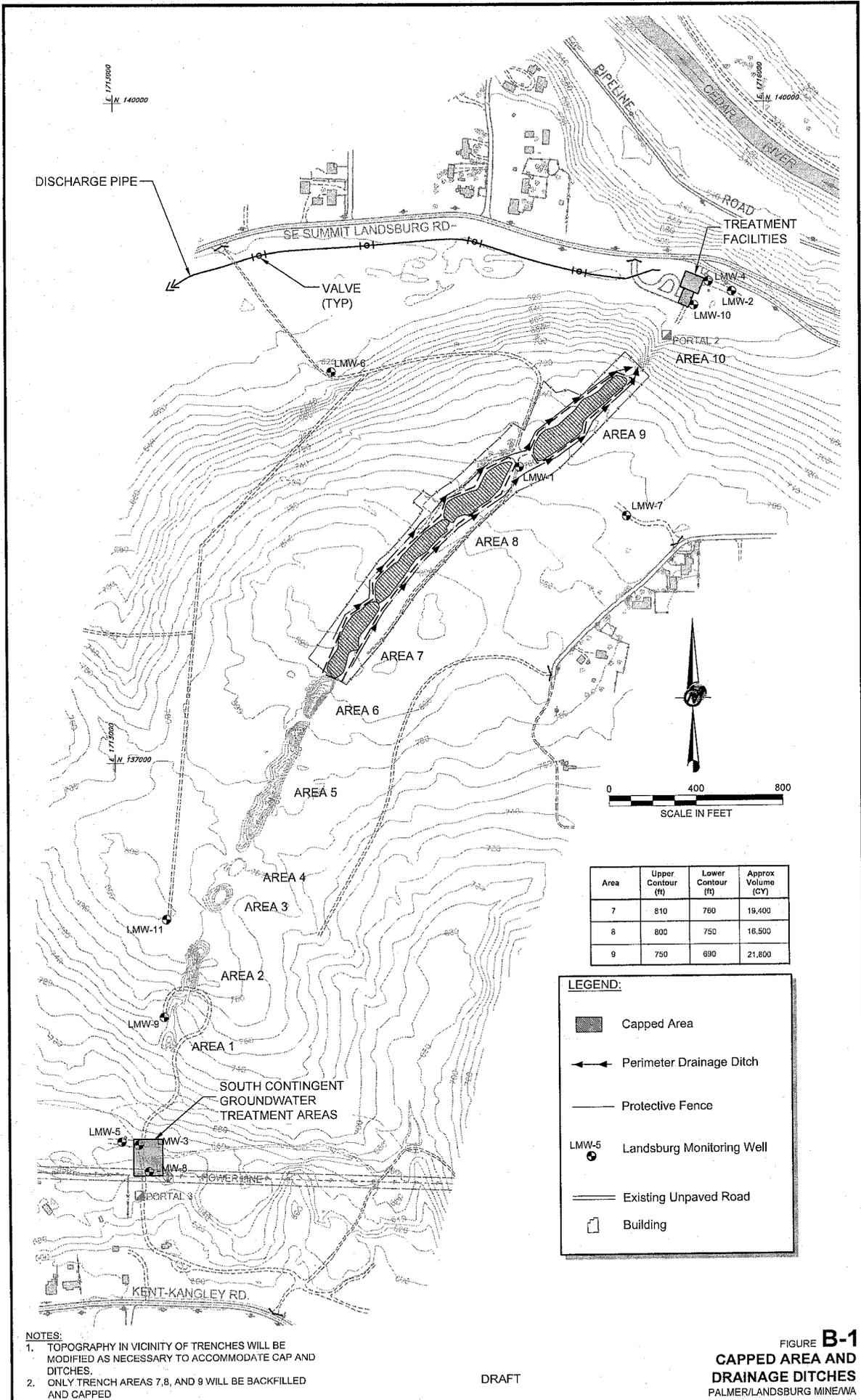
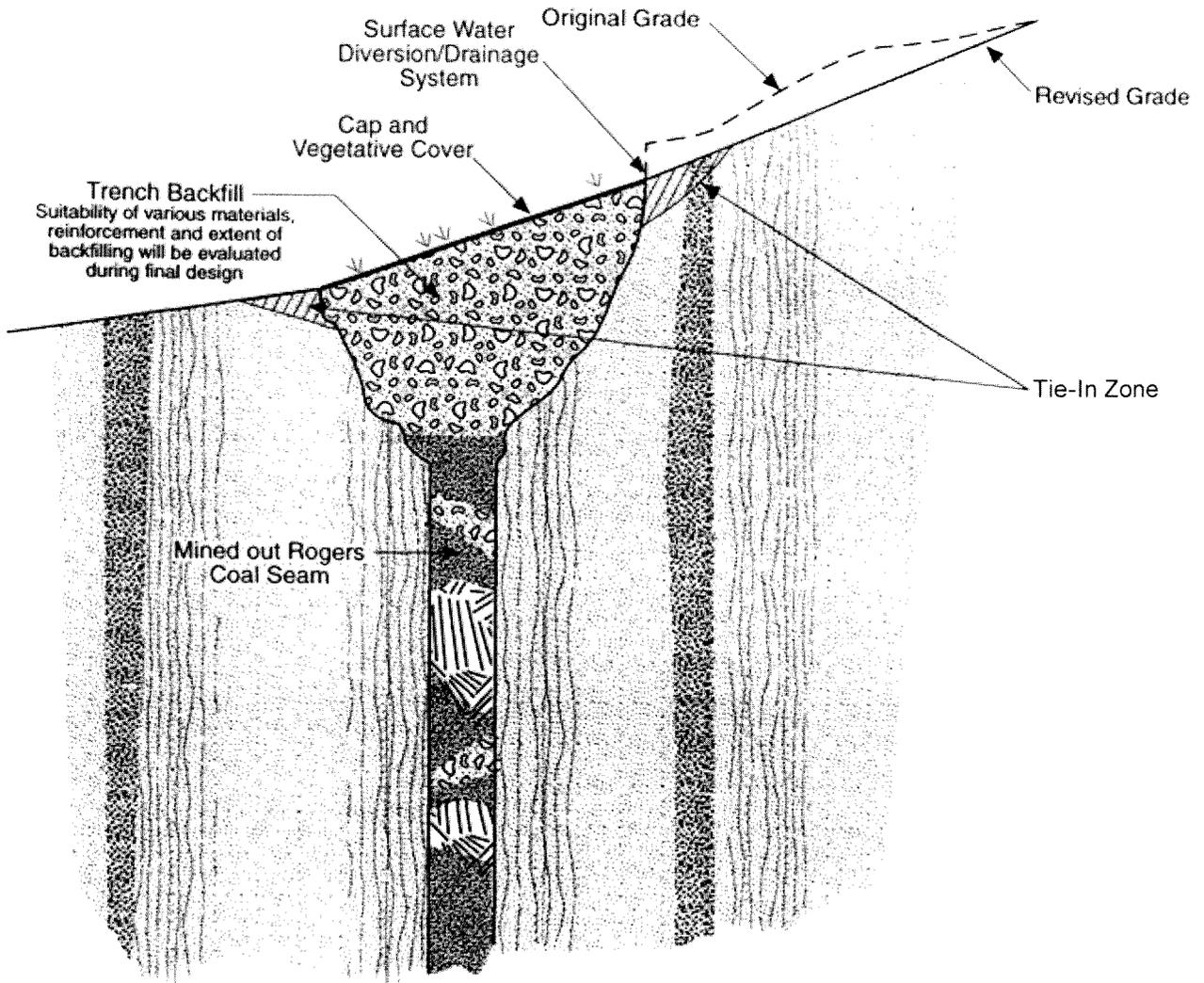


FIGURE B-1
CAPPED AREA AND
DRAINAGE DITCHES
 PALMER/LANDSBURG MINE/WA

Golder Associates

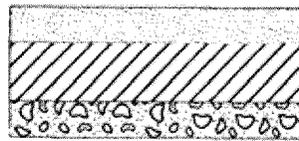
K:\CAD\Projects\1962\9231000\002R154\0 & M922_1001_002_R154_B-1\2.dwg | Fig B-1 Capped Area and Drainage Ditches | Mod: 07/31/2013, 13:38 | Plotted 07/31/2013, 14:26 | atdrcr

**Conceptual Cross-Section
(not to scale)**



Cap Design

Low Permeability
Soil Cap



- 6" vegetated topsoil
- 24" compacted low-permeability soil (10^{-6} cm/sec)
- Trench backfill

FINAL DRAFT

FIGURE **B-2**
CAP DESIGN
PALMER/LANDBURG MINE/WA

Part C

CONTINGENT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PLAN

REPORT

FINAL DRAFT

PART C

CONTINGENT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PLAN

Landsburg Mine Site
MTCA Remediation Project
Ravensdale, Washington

Submitted To: Washington Department of Ecology
3190 – 160th Avenue SE
Bellevue, WA 98008

Submitted By: Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052 USA

Submitted On Behalf Of: The Landsburg Mine Site PLP Group

July 31, 2013

Project No. 923-1000-002.R154

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- Figure C-4 North Portal Infrastructure for the Contingent Groundwater Treatment System
- Figure C-5 South Portal Infrastructure for the Contingent Groundwater Treatment System
- Figure C-6 Generalized Construction of Groundwater Extraction Wells (North & South Portals)
- Figure C-7 North Portal #2 Groundwater Treatment Process Diagram

Appendices

- Appendix A King County Letter to Washington State Department of Ecology

1.0 PURPOSE AND SCOPE

This Contingent Groundwater Extraction and Treatment System Plan (Plan) is Part C of the Compliance Monitoring Plan (CMP) and provides the basic elements of a contingency plan for the implementation and operation of the groundwater extraction and treatment system for the Landsburg Mine (Site). This document is a supplement to the Draft Cleanup Action Plan (DCAP). The primary purpose of the DCAP was to identify the chemical compounds potentially posing a human or environmental health risk and/or which exceed potential regulatory criteria, and which are directly attributable to, and the result of, the prior waste disposal activities within the Roger coal mine (Rogers Seam) at the Site. For the purpose of this Contingency Plan, such compounds are referred to as "mine waste contaminants".

Groundwater at the Landsburg Mine compliance boundaries currently meets all designated concentrations of contaminants listed under the Washington Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Method B cleanup levels. MTCA Method B cleanup levels are the most restrictive regulatory limits under MTCA.

The Landsburg Mine groundwater extraction and treatment system described herein would be operated only if mine waste contaminant concentrations reach MTCA cleanup levels at the compliance boundaries in the future. Should MTCA cleanup levels be exceeded in the future, it will be desirable to implement a groundwater extraction and treatment system as soon as possible. By monitoring sentinel wells and preparing the fundamentals of an extraction and treatment system in advance, the installation of the systems can be accomplished faster and within time to keep any contaminants from being released beyond the compliance boundaries. Because it is unknown if any mine waste contaminants will exceed action levels in the future and if so, which mine waste contaminants will be in exceedance, it is not possible to design a specific groundwater treatment system at this time. Furthermore, groundwater treatment technology is continuing to evolve and improve, so a treatment system designed now may not be the best available technology 10 years from now.

The fundamentals of a groundwater treatment system described herein are suitable for a wide variety of constituents and are expected to cover the vast majority of potential mine waste contaminants at the Landsburg Mine. The systems described in this Plan can be implemented quickly but will require optimization under operating conditions to maximize performance. Prior to implementation of these contingent systems, an operation and maintenance plan and a performance monitoring plan tailored to the specific contaminants will be developed to verify effectiveness of the facilities.

2.0 GROUNDWATER MONITORING & EXISTING INFRASTRUCTURE

2.1 Compliance Monitoring

Long-term, or confirmational, monitoring is conducted to ensure that the site remedy performs as expected over time. For the Landsburg Mine, this entails monitoring groundwater quality at the Site compliance boundaries for changes in groundwater quality, which may indicate a contaminant release. Monitoring will be performed using existing monitoring wells LMW-2, LMW-3, LMW-4, LMW-5, LMW-6, LMW-7, LMW-8, LMW-9, LMW-10, and LMW-11, and four additional sentinel wells (yet to be installed). These monitoring points are strategically located to intercept groundwater flowing along preferential flow paths from the north and south ends of the mine and laterally from the Frasier and Landsburg mines. Long-term confirmational groundwater monitoring would begin at the completion of the short-term protection and performance monitoring. Long-term confirmational groundwater monitoring will continue until residual hazardous substance concentrations no longer exceed cleanup or remediation levels as described in the CAP resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment.

2.1.1 Compliance Boundary

The approved standards for groundwater at the Landsburg Mine will be the MTCA Method B cleanup levels. Conditional points of compliance will be established for groundwater and surface water at the locations of groundwater and surface water discharge from the site as defined by the property boundary (owned by Palmer Coking Coal Company, LLP [PCC]). Figure C-1 depicts the compliance boundary and conditional points of compliance for the Site. Specifically for the north end of the mine site, the point of compliance will be the northern PCC property boundary. For the south side of the mine site, the point of compliance will be the southern PCC property boundary. Monitoring wells LMW-2, LMW-4, and LMW-10 will serve as the northern point of compliance monitoring points; monitoring wells LMW-3, LMW-5, and LMW-8 will serve as the southern point of compliance monitoring points. For the east and west conditional compliance boundary for groundwater, monitoring wells LMW-7 and LMW-6, respectively, will be used for compliance monitoring.

2.2 Sentinel Wells

Four additional sentinel wells will be installed prior to the completion of the remedial action. The sentinel wells will aid in early detection of migrating mine waste contaminants in the groundwater. Two sentinel wells will be in the north and two wells in the south. Figure C-1 illustrates the locations of the proposed additional sentinel wells. Figure C-2 depicts the depth profile of the compliance and sentinel well systems along the Rogers Seam.

2.2.1 South Sentinel Well System

Two additional sentinel wells will be added to the existing monitoring wells in the south (LMW-9 and LMW-11) for a total of four sentinel wells that will be used for the early detection of waste constituents. Both of these new sentinel wells will be installed to monitor the surface of the water table within the mine because the two flow paths with the highest potential for contaminants to migrate toward the south are along the surface of the water table and near the bottom of the mine. One new sentinel well will be located near LMW-11 (estimated to be about 150 feet deep). This sentinel well will be installed before remedial actions are completed. The other new sentinel well will be placed just south of the capped waste disposal trenches (estimated depth of about 170 feet). This additional new sentinel well location will serve two purposes:

1. Immediate detection of any waste constituent migrating toward the south beyond the waste disposal area; and
2. Effectiveness monitoring of groundwater level changes resulting from remedial actions.

This dual purpose sentinel and effectiveness monitoring well will be a sufficient distance from the south monitoring wells so as to determine whether future groundwater is able to flow toward the south from the waste disposal area. This sentinel well will be installed prior to filling the waste disposal trenches in order to monitor water level changes in the Rogers coal mine due to remedial actions.

2.2.2 North Sentinel Well System

The northern compliance boundary of the Site currently lacks early detection sentinel monitoring wells with the possible exception of LMW-10, which is about 150 feet south of the north compliance monitoring wells (LMW-2 and LMW-4). Figures C-1 and C-4 also show the location and approximate depth of the north sentinel wells, which will be located adjacent to the north portal (Portal #2). These sentinel wells will be installed after the CAP is finalized and remedial action is complete. One sentinel well will monitor the shallow groundwater table (at less than 30 feet bgs) and the other sentinel well will monitor the groundwater at approximately the 200 foot depth within the mine. These two additional sentinel wells, together with monitoring of LMW-10 as a sentinel well, provide full vertical coverage of groundwater flowing within and emanating from the mine before reaching the north compliance boundary.

2.3 Contingent Groundwater Treatment System Infrastructure

To speed up the installation (if necessary) of a contingent treatment system, the components of the treatment system infrastructure that have long lead times (i.e. those requiring permits) were installed ahead of time. Infrastructure was installed in 2008 near the north portal (Portal #2) (Golder 2009), while infrastructure for the south portal (Portal #3) is planned to be installed during the remedial action. The following is a discussion of the infrastructure that has already been, or will be installed by the completion

of the remediation action. Figure C-3 depicts the Site and the location of the contingent groundwater treatment system infrastructure components for the north and south portal areas.

2.3.1 North Portal Infrastructure

The infrastructure that was selected for early installation were the items that have a long lead time or permitting issues that might slow the installation process. For example, a fenced gravel pad area to support the extraction/treatment equipment was installed north of Portal 2. A discharge pipeline was installed from the treatment pad extending to the west to be eventually tied into the local Metro POTW sewer. Additionally, an electrical transformer and control box for equipment hook-up have been installed. The area has lighting and is fenced for security. The groundwater extraction well, necessary pumps, piping and storage (surge tanks) will not be installed until the contingency triggers have been met because lead times are relatively short for these items. Figure C-4 depicts the infrastructure at the north portal.

2.3.2 South Portal Infrastructure

Similar to the north portal, infrastructure to support a contingent groundwater extraction and treatment system will be installed during the remedial action. The infrastructure that would be installed at the south portal will include a gravel pad to support future groundwater extraction well, pumps and groundwater storage (surge) tanks, an electrical transformer, lighting, and an equipment control panel, within a fenced area. The existing gravel access road near the south portal will be connected and improved for heavy truck access. The groundwater extraction well, pumps and groundwater storage tanks will be installed after site groundwater reaches a confirmed concentration of 0.5 MTCA cleanup Levels at the south compliance boundary wells. A temporary pipeline leading from the south portal to the treatment system at the north portal will be used to transport contaminated groundwater to the north portal for treatment and discharge to the Metro Publicly Owned Treatment Works (POTW) sewer. If a temporary pipeline is initially used, it could eventually be replaced with a buried permanent pipeline. Figure C-5 depicts the infrastructure that will be installed at the south portal.

3.0 DESIGN BASIS AND PROCESS SELECTION

The design flow rate for the treatment system ranges from 10 to 40 gpm. This rate was selected based on historical rates of 30 to 40 gpm that were required to dewater the underground mine during operation. Groundwater extraction at 30 to 40 gpm is expected to meet or exceed the groundwater extraction rate necessary to prevent off-site migration of groundwater affected by mine waste contaminants. The sentinel wells and compliance wells are within the vertical aquifer at various depth intervals. The groundwater levels monitored in sentinel wells and compliance wells together with the drawdown in the pumping well will provide the data for analyzing the effective aquifer capture zone. Monitoring the groundwater quality at the compliance wells will provide data on compliance for the system.

Impacted groundwater would be extracted from the pumping wells located near the mine portals, which are hydraulically up-gradient from the north or south site boundaries. However, affected groundwater will only be treated at the northern boundary. These pumping wells will mainly extract groundwater emanating from the mine workings. Figure C-3 shows contingent treatment facility locations and the proposed extraction well locations for the north and south site boundaries. In the event that groundwater extraction and treatment will be needed, it is relatively more likely that affected groundwater will be found only at one of these locations. In the event that affected groundwater is found at both locations, only the north site boundary will have a treatment system.

Treated groundwater will be discharged to a POTW sewer. A discharge permit will be required to discharge pre-treated groundwater to the sewer. The treatment system effluent discharge pipeline has been installed, but does not currently connect to the Metro POTW sanitary sewer adjacent to the Tahoma Junior High School. If groundwater capture and treatment becomes necessary, the effluent from the treatment system will be temporarily trucked to the Metro POTW intake at Four Corners, Maple Valley, Washington until the discharge pipeline is connected. The discharge pipeline will be installed in accordance with King County requirements as stated in the letter from Karen Wolf to Jerome Cruz dated February 15, 2006 and provided in Appendix A. Ecology will assist in obtaining permission to place the remainder of the effluent discharge pipeline along the S.E. Summit-Landsburg Road right-of-way or the adjacent King County open space land that is located along the road right-of-way.

Figures C-4 and C-5 show the general layout of the contingent extraction and treatment systems at the north and south property boundaries, respectively. Electrical transformers and control boxes for equipment hook-up have been installed at the north portal. The power equipment is in place and ready to be used in case the contingent groundwater treatment system needs to be implemented. Similar infrastructure will be installed at the south portal.

The mine waste contaminants can be broadly classified into either organic or inorganic chemicals, with corresponding relevant treatment processes. Because the specific mine waste contaminants that would

be encountered are uncertain, the treatment processes in the contingent systems cannot be identified at this time. Once remediation levels are exceeded and confirmed at a compliance well that triggers this contingent remedial action, the design of the contingent system will be submitted to Ecology along with a contingent system-specific Operation and Maintenance (O&M) Plan for approval. It is anticipated that the designs presented in this document can be detailed or revised and an O&M Plan prepared and submitted to Ecology in one month after confirmation of the remediation level exceedance.

Contingency groundwater extraction and treatment would continue until groundwater at the points of compliance meets MTCA Method B cleanup levels. The compliance monitoring frequency of treatment system inflow and outflow, if and when the contingency groundwater extraction and treatment system is implemented, will be determined by the Metro POTW discharge permit. Both inflow and outflow are measured in order to evaluate the concentrations of mine waste contaminants entering the treatment system and the percentage that are being removed by the treatment system. The results of the inflow analysis will help determine whether the extracted groundwater requires treatment to meet Metro POTW discharge limitations as outlined in the permit. If inflow results meet discharge limitations (i.e. are below limitations) then the extracted groundwater can be directly discharged to the POTW without prior treatment.

4.0 CONTINGENCY PLAN TRIGGERS

A response action will depend on information gained during groundwater monitoring. In the event that routine groundwater monitoring detects a mine waste contaminant at a compliance boundary or sentinel well above the laboratory minimum detection limit (MDL), the steps that will be taken are identified and presented in Part A of this Compliance Monitoring Plan.

5.0 SYSTEM INSTALLATION PROCESS

The following is the general guide to the installation process for the contingent groundwater treatment system, once it has been determined that the treatment system must be installed. Steps 1 through 4 presented below will be immediately initialized and conducted concurrently, while steps 5, 6 and 7 will be conducted at the soonest appropriate time, once the design is sufficiently complete to order, install, connect and operate the equipment for groundwater extraction and treatment.

1. Initiate Completion of North Discharge Pipeline
2. Install South Discharge Pipeline (if groundwater is impacted at the south portal)
3. Design Treatment System
4. Install Extraction Well And Pump
5. Order and install necessary Equipment
6. Hook-up Equipment to power source
7. Start Operation of the Contingent Groundwater Pump and Treat System

5.1 Initiate Completion of North Discharge Pipeline

The discharge pipeline in the north needs to be completed to discharge pre-treated groundwater. This entails connecting the existing pipeline to the local Metro POTW sewer. This also requires obtaining the necessary permits and discharge authorization from King County Metro POTW to discharge pre-treated water into the sewer system. The time frame necessary to apply and get authorization should be a maximum of one month since the discharge limitations for Metro POTW are greater than the MTCA cleanup levels (CULs). The discharge pipeline will be installed in accordance with King County requirements as stated in the letter from Karen Wolf (king County) to Jerome Cruz (Ecology) dated February 15, 2006 and provided in Appendix A. If authorization for extending the discharge pipeline is taking too long, as a temporary measure, the treated groundwater effluent will be temporarily trucked to the nearest Metro POTW sewer intake (likely Four Corners in Maple Valley), until the existing buried pipeline can be connected directly to the Metro POTW sewer (assuming the groundwater meets all discharge limits). Upon receiving discharge authorization, the POTW will likely require routine testing and reporting of the condition of the treated water prior to disposal to ensure that discharge limitations are met. The required testing for effluent discharge will be stated in the Treatment System O&M Plan.

5.2 Install South Extraction Pipeline (if needed)

If groundwater is above 0.5 MTCA cleanup level concentrations at the south compliance boundary wells, a temporary or a permanent pipeline that will convey extracted groundwater from the south portal up to the north portal pad area for treatment. A temporary above ground pipeline could be installed, if needed before the permanent (underground) pipeline is constructed. The estimated time frame to order and install a temporary pipeline connecting the south portal to the north portal is one month.

5.3 Design Treatment System

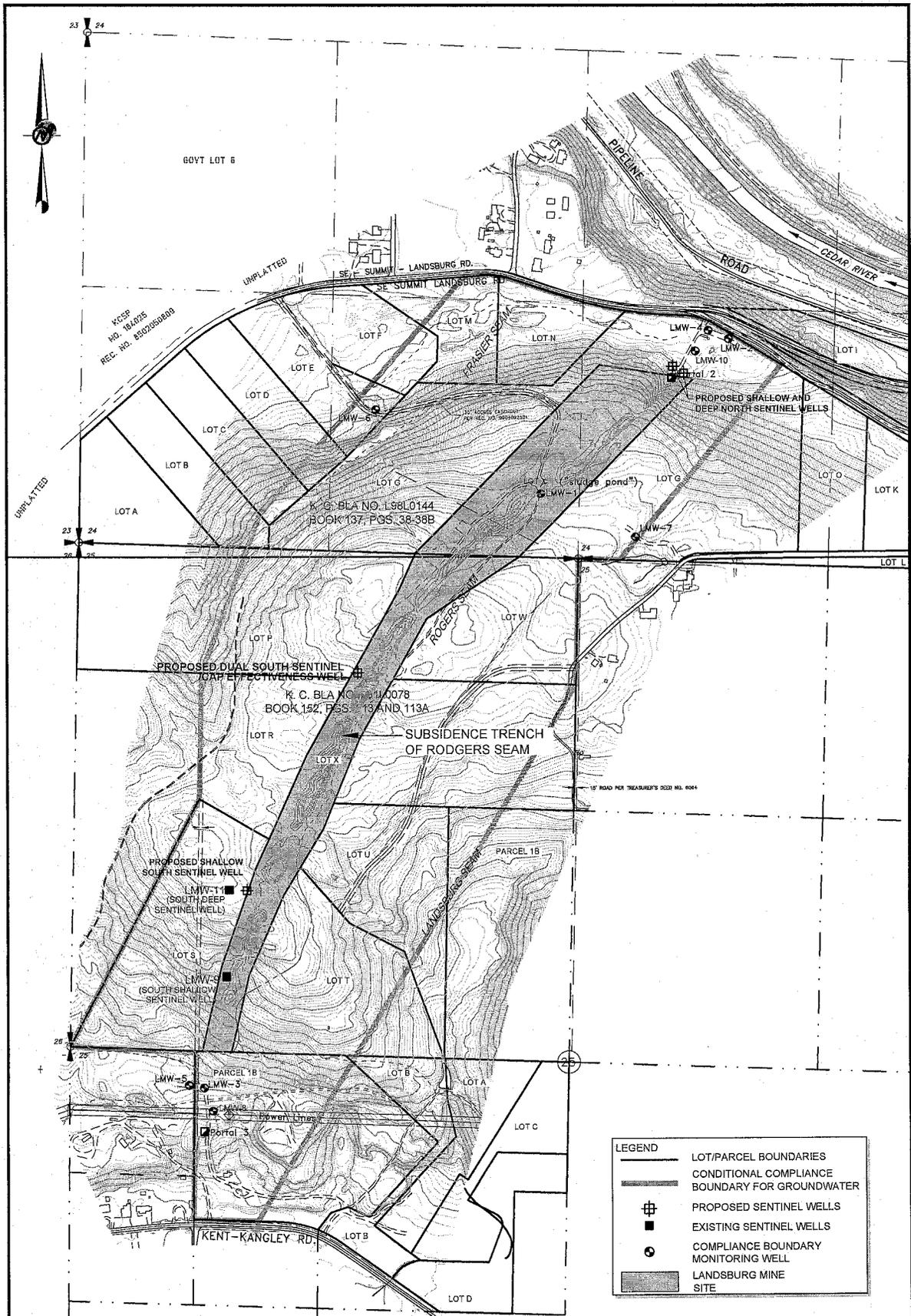
The contingent groundwater treatment system will be designed and a system specific O&M Plan will be prepared that will be able to adequately remediate the specific mine waste contaminants that has been detected in compliance wells. A treatment system will only be designed for and installed at the north portal area, but will service either or both contaminated groundwater from the north and south compliance boundaries. The design phase cannot occur until it has been identified that a contingent treatment system is necessary because treatment technology is continually evolving and is very contaminant specific. The treatment system design along with a system-specific O&M Plan will be proposed to Ecology in a Draft Corrective Action Plan for approval. The Draft Corrective Action Plan will be used for meeting the substantive requirements of a King County building permit, if required. After Ecology approves the treatment system design and required substantive requirements are met, the necessary equipment will be ordered and shipped to the site. Likely, equipment will be an off the shelf modular unit that can be increased or decreased in series, depending upon the system requirements. The idea is to have flexibility in the treatment system to adjust to changing site conditions. The time for design of the treatment system and Draft Corrective Action Plan is estimated to be one month. The time for Ecology and King County review and approval is estimated to be one month. One month is anticipated to be needed to order and install the treatment system. If the reviews and approvals are taking longer than anticipated, options that can become operational in a few weeks exist; for example: ordering and installing a temporary treatment system (consisting of rental Baker tanks and pumps), which can be used if pre-treatment of the groundwater effluent is not necessary prior to discharge to the Metro POTW; or start extracting groundwater with temporary discharge back to the mine workings until all reviews and approvals are obtained and the permanent system is installed and operational.

5.4 Install Extraction Well And Pump

The extraction well(s) and dedicated extraction pump(s) will be installed. The pump that will be installed will have a flow rate of approximately 10 to 40 gallons per minute capacity. Installation of the well head will also occur at this time. The extraction system consists of up to two wells: one new 6-inch well to be located (if needed) at the north and south ends of the site. The extraction well(s) will only be installed at optimum location and depth (for the screened interval within the site where contaminated groundwater is encountered and emanating from the Rogers Seam. The new 6-inch well would be installed while the treatment system is being designed, purchased and delivered. The extraction wells are anticipated to take about one month to design, contract and construct. If needed, the existing monitoring or sentinel wells can be used temporarily to extract groundwater and contain the plume until the permanent extraction well is installed and operational. Submersible pumps and associated controls would be placed in each of the extraction wells. The groundwater extraction system would be the same regardless of which treatment system (organics or inorganics) is needed. A general schematic of an extraction well is

illustrated in Figure C-6. Well pumps would primarily operate on water level control within the wells. High water level in treatment system tanks (Figure C-5) would also automatically shut off the well pumps.

FIGURES



NOTE:
 1. LETTERS AT LOT X PROPERTY CORNERS CORRESPOND TO THE COORDINATES IN TABLE 1
 2. FINAL SITE BOUNDARY WILL BE DETERMINED FROM THE AS-BUILT DRAWING WITH CAP AND STORMWATER SYSTEM INSTALLATION.

FINAL DRAFT FIGURE **C-1**
COMPLIANCE BOUNDARY AND WELLS
 PALMER/LANDBURG MINE/WA

K:\CAD\Project\1962923100\002R154\cshbr E Part C Contingency Plan\623_100_002_R154_FC-1.dwg | Fig C-1 Compliance Boundary and Wells | Mod: 07/31/2013, 08:34 | Plotted: 07/31/2013, 15:54 | aforster

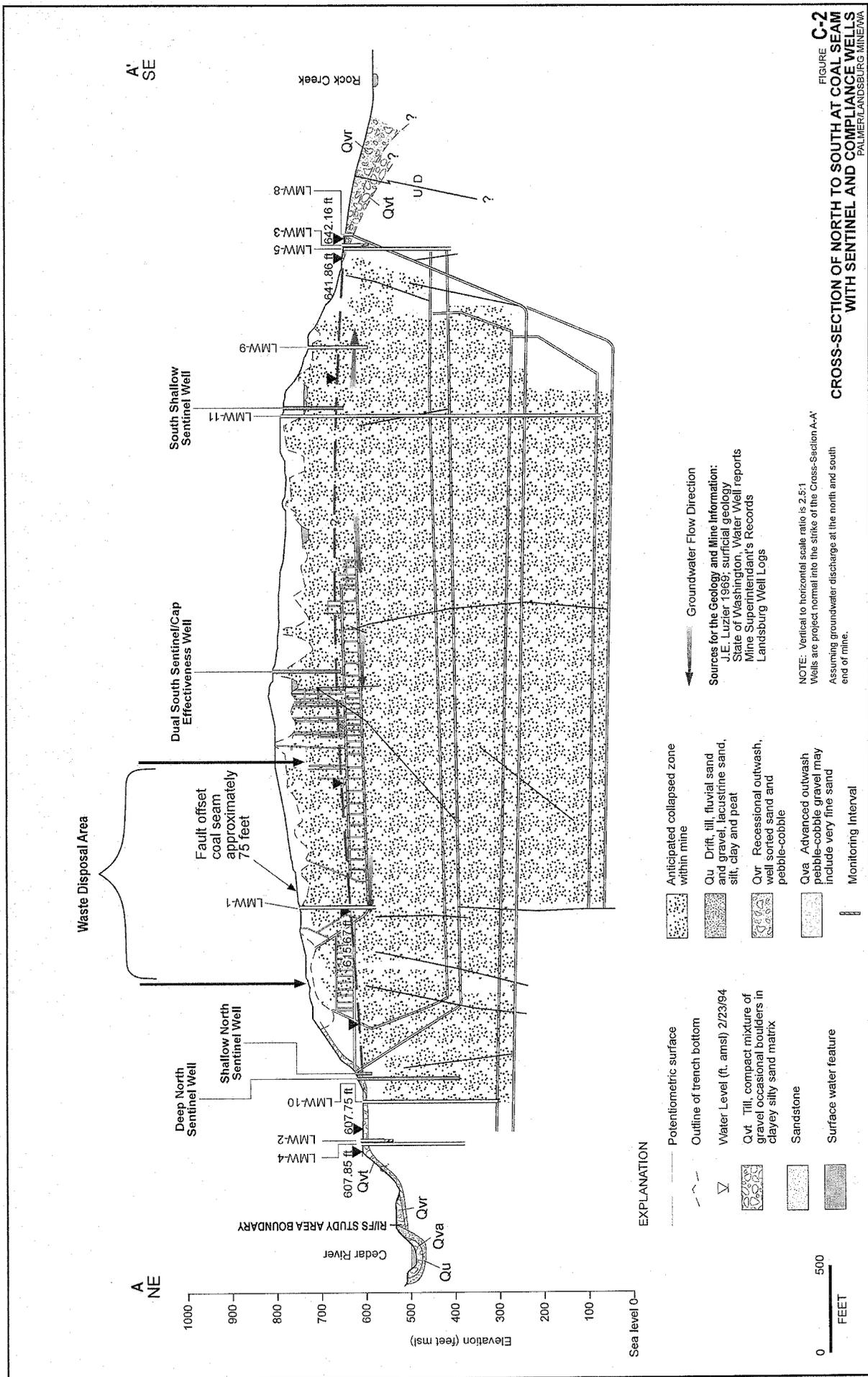


FIGURE C-2
CROSS-SECTION OF NORTH TO SOUTH AT COAL SEAM
WITH SENTINEL AND COMPLIANCE WELLS
 PALMER/LANDBURG MINE/MA

Goldier Associates

EXPLANATION

- Potentiometric surface
- - - Outline of trench bottom
- ▽ Water Level (ft. amsl) 2/23/94
- Qvr Till, compact mixture of gravel occasional boulders in clayey silty sand matrix
- Quaternary (Qu, Qvr, Qva)
- Sandstone
- Surface water feature
- Anticipated collapsed zone within mine
- Qu Drift, till, fluvial sand and gravel, lacustrine sand, silt, clay and peat
- Qvr Recessional outwash, well sorted sand and pebble-cobble
- Qva Advanced outwash pebble-cobble gravel may include very fine sand
- Monitoring Interval

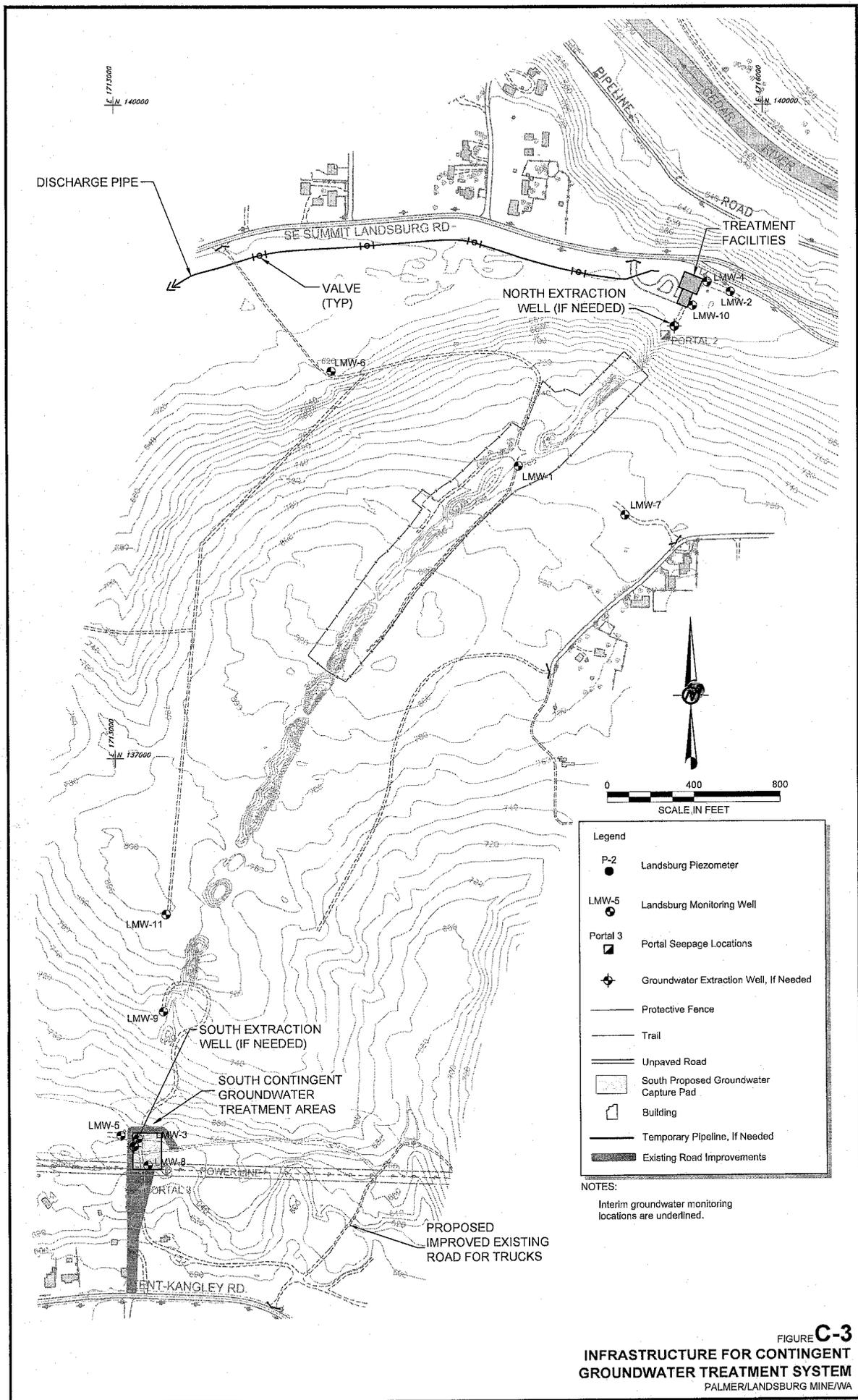
Groundwater Flow Direction

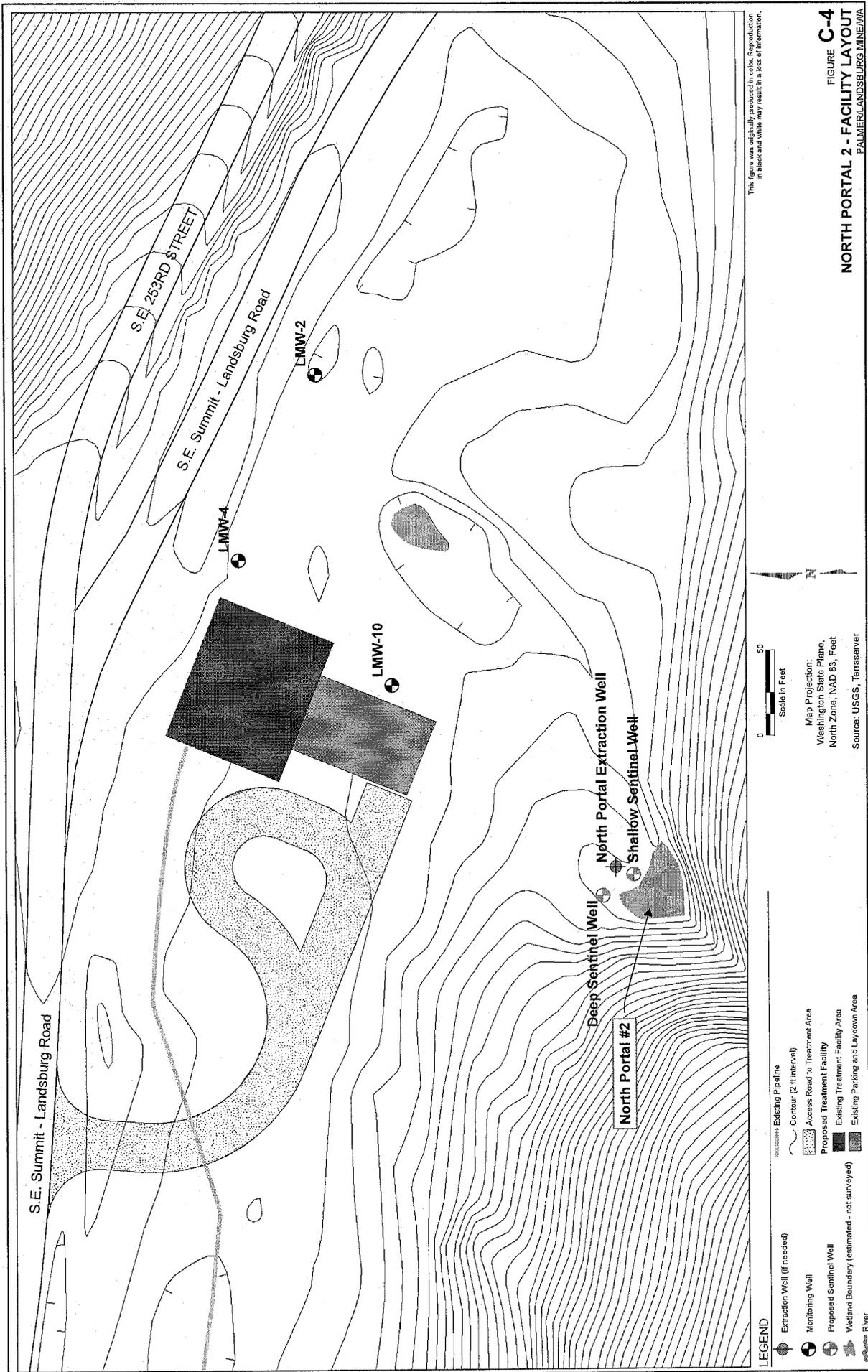
Sources for the Geology and Mine Information:
 J.E. Luzier, 1968; surficial geology
 State of Washington, Water Well reports
 Mine Superintendent's Records
 Landsburg Well Logs

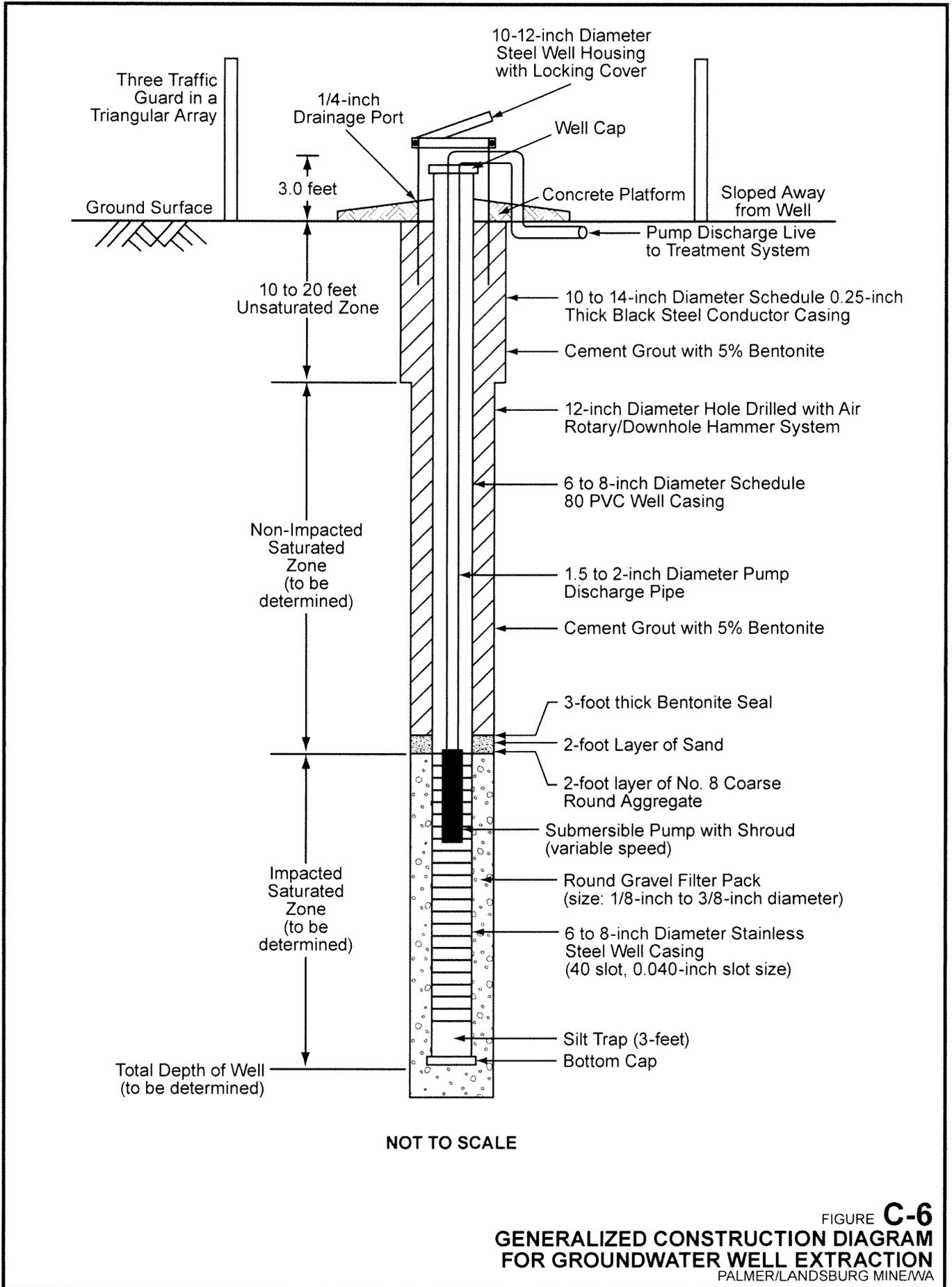
NOTE: Vertical to horizontal scale ratio is 2.5:1
 Wells are project normal into the strike of the Cross-Section A-A'
 Assuming groundwater discharge at the north and south end of mine.

DRAFT

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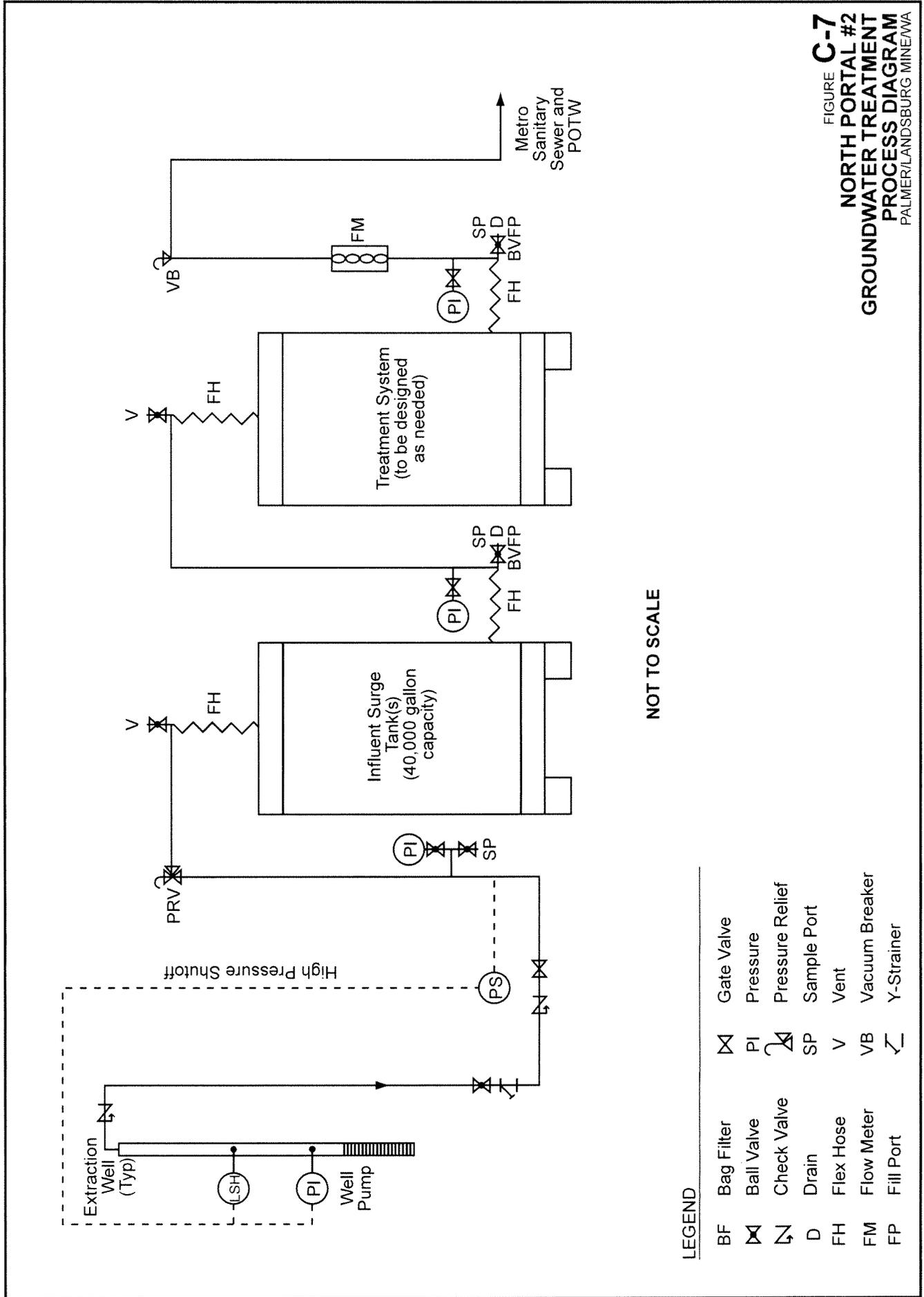




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DRAFT

Golder Associates



NOT TO SCALE

LEGEND

BF	Bag Filter	Gate Valve
PI	Pressure	Pressure Relief
PS	Pressure Switch	Sample Port
D	Drain	Vent
FH	Flex Hose	Vacuum Breaker
FM	Flow Meter	Y-Strainer
FP	Fill Port	

FIGURE C-7
NORTH PORTAL #2
GROUNDWATER TREATMENT
 PROCESS DIAGRAM
 PALMER/LANDBURG MINE/WA

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APPENDIX A

KING COUNTY LETTER TO WASHINGTON STATE DEPARTMENT OF ECOLOGY



King County

Ron Sims

King County Executive

701 Fifth Avenue, Suite 3210

Seattle, WA 98104

206-296-4040 Fax 206-296-0194

TTY Relay: 711

www.metrokc.gov

February 15, 2006

Jerome Cruz, Site Manager
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008

Dear Mr. Cruz:

Thank you for the opportunity to comment on the Agreed Order Amendment for the Landsburg Mine Site.

King County appreciates the opportunities we have had to meet with you and your staff on the proposed changes to the Agreed Order and the State Environmental Policy Act documents. Several King County staff also attended the public meeting conducted by the Department of Ecology on February 7, 2006 to listen to questions and comments from the community. I have reviewed the proposal with knowledgeable King County staff in our departments of Development and Environmental Services (DES), Natural Resources and Parks (DNRP), and Public Health (DPH). Our comments are as follows:

1. King County agrees in concept to allow the dry sewer pipe from the mine site to be placed in the ground, and left unconnected and unused, until monitoring determines that contaminants threaten public health and safety.
2. The sewer pipe from the mine to the Tahoma School District's Jr. High School will be a tightline dedicated solely for the disposal of waters from the mine and only upon determination of a threat to public health and safety, as required by the King County Code.
3. An amendment to the Soos Creek Sewer District Comprehensive Plan approved by the King County Council will be required prior to the connection from the mine site to the Tahoma School District tightline sewer line. This amendment will address the new tightline sewer to serve the mine site and also the proposed connection to the existing tightline sewer serving the school. Additionally, the Department of Ecology will presumably need to coordinate and obtain approval from Soos Creek and the School District to connect to their facilities.
4. Based on comments raised at the February 7, 2006, public meeting, King County will further analyze placing the sewer pipe under the Summit-Landsburg Road rather than placing the pipe through the King County park land as currently proposed by the



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King County is an Equal Opportunity/Affirmative Action Employer

with the Americans with Disabilities Act



Jerome Cruz
February 15, 2006
Page 2

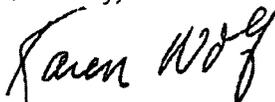
Department of Ecology We will work with you to develop a schedule to allow for this analysis

- 5 Monitoring reports of test wells at the mine site must be routinely sent by either the Department of Ecology or the site trustee to the Environmental Health Division of Public Health-Seattle and King County, with appropriate staff as identified by the Division
- 6 The waste from the mine must be pre-treated to standards established by King County Wastewater Division's Industrial Pre-Treatment Program before it may be discharged into the wastewater system. The PLPs or the trustee are responsible for all fees associated with the permitting for such disposal and the ongoing service costs of sewer disposal

We assume that the other institutional controls associated with the cleanup plan will conform to the requirements of the Model Toxics Control Act, including periodic review by the Department of Ecology and consultation with King County as the local and use authority. King County's technical review group, comprised of myself and the staff copied below, is ready to work with you and your staff in the coming months to address these issues as the project moves forward. If you have any further questions, please do not hesitate to call me at 206-296-3423.

Again, thank you for your attention to our comments and concerns.

Sincerely,



Karen Wolf
Sr Executive Policy Advisor

cc: Paul Reitenbach, Senior Policy Analyst, DDES
Laura Wharton, Supervisor, Wastewater Treatment Division, DNRP
Bob Hirsch, Government Relations Administrator, Wastewater Treatment Division,
DNRP
Dave Monthie, Regional Water Policy Analyst, DNRP
Larry Fay, Section Manager, Community Environmental Health, Public Health-Seattle
and King County
Bill Lasby, Health and Environmental Investigator, Community Environmental Health,
Public Health-Seattle and King County
Joe Rochelle, Senior Deputy, Office of the Prosecuting Attorney (PAO)
Kevin Wright, Assistant Chief Civil Deputy, PAO
William Blakeney, Supervising Attorney, PAO

Received Time Feb '06 4:46PM

EXHIBIT F
RESTRICTIVE COVENANT

Environmental Covenant

After Recording Return to:
William Kombol
PALMER COKING COAL COMPANY, LLP
P.O. Box 10
Black Diamond, WA 98010
(425) 432-3542 – Fax (425) 432-3883

Department of Ecology
Northwest Regional Office
3190 160th Ave. SE
Bellevue, WA 98008-5452

Environmental Covenant

Grantor: Palmer Coking Coal Company, LLP
Grantee: State of Washington, Department of Ecology
Legal: See Exhibit 1
Tax Parcel Nos.: See Exhibit 2
Map Pages: See Figure 1 and Figure 2

Grantor, **Palmer Coking Coal Company, LLP**, hereby binds Grantor, its successors and assigns to the land use restrictions identified herein and grants such other rights under this environmental covenant (hereafter “Covenant”) made this ____ day of _____, 2013 in favor of the State of Washington Department of Ecology (“Ecology”). Ecology shall have full right of enforcement of the rights conveyed under this Covenant pursuant to the Model Toxics Control Act, RCW 70.105D.030(1)(g), and the Uniform Environmental Covenants Act, RCW 64.70.110.

This Covenant is made pursuant to RCW 70.105D.030(1)(f) and (g) and WAC 173-340-440 by Palmer Coking Coal Company, LLP, its successors and assigns, and Ecology, its successors and assigns.

The property that is the subject of this Covenant is the subject of a remedial action (the "Remedial Action") taking place at the area Ecology has designated as the Landsburg Mine Site. The Remedial Action is described in the following document[s]:

Consent Decree, and all exhibits thereto, including the final Cleanup Action Plan for the Landsburg Mine Site, entered in *State of Washington Department of Ecology v. Palmer Coking Coal Company, LLP, et al.*, King County Superior Court Cause No. _____ (the "Consent Decree"). These documents are on file at Ecology's Northwest Regional Office.

This Covenant is required because the Remedial Action to be implemented under the Consent Decree requires containment of hazardous substances and a conditional point of compliance has been established for groundwater.

The undersigned, Palmer Coking Coal Company, LLP ("Palmer"), is the fee owner of real property in the County of King, State of Washington, that is subject to this Covenant. The legal description of the property that is subject to this Covenant, which consists of both the Cap Protection Area and the Groundwater and Portal Protection Area, is attached as Exhibit 1, and made a part hereof by reference. The Cap Protection Area and Groundwater and Portal Protection Area shall be collectively referred to in this Covenant as "the Property" and are shown on Figures 1 and 2 respectively.

Palmer Coking Coal Company, LLP makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

Section 1.

a. Uses of the Property shall be limited to uses that are not incompatible with the Remedial Action.

b. Any activity on the Property that interferes with the integrity of the Remedial Action and continued protection of human health and the environment is prohibited.

c. Any activity on the Property that may result in the release or exposure to the environment of a hazardous substance that remains on the Property as part of the Remedial Action, or create a new exposure pathway, is prohibited without prior written approval from Ecology.

d. No groundwater may be withdrawn from the Property for any non-remedial purpose. Water emanating directly from the former mine portal areas (Portals 2 and 3 on Figure 2) shall not be used for any non-remedial purpose. No water emanating from Portal 2 or Portal 3 shall be allowed to travel from the Property as surface water.

e. Warning signs shall be posted and maintained in appropriate locations approved by Ecology on the Property sufficient to provide: (i) notice of restrictions on use of groundwater and water discharging from the former mine portals (Portals 2 and 3) the Property as set forth in this Covenant, and (ii) notice of and identification of the boundary of the Cap Protection Area.

f. (Cap Protection Area only)

i. All structures or buildings are prohibited within the Cap Protection Area unless they are part of the Remedial Action. Consistent with Section 1.b above, structures or buildings placed within the Cap Protection Area shall not interfere with or compromise the integrity or effectiveness of the cap, nor cause subsidence or vertical loads that may collapse buried drums or mobilize buried waste beneath the cap and trench infilling. With approval from Ecology, variances from this restriction may be allowed if necessary for the purpose of emergency remediation of buried contamination or to mitigate threats from contamination within the mine workings, so long as the buildings or structures do not compromise the Remedial Action as outlined in the Cleanup Action Plan, attached as an exhibit to the Consent Decree.

ii. Consistent with Section 1.c above, any activity on the Property that may result in the release or exposure to the environment of the contaminated soil and waste contained as part of the Remedial Action, or create a new exposure pathway, is prohibited. Some examples of activities that are prohibited in the Cap Protection Area include: drilling; digging; placement of any objects or use of any equipment which deforms or stresses the surface beyond its load bearing capability; piercing the surface with a rod, spike or similar item; bulldozing; or earthwork.

iii. Routine maintenance of the cap required by the Consent Decree that involves disturbance of the ground surface (e.g., excavation, filling, grading) does not require Ecology approval.

iv. Structures or buildings placed within the Cap Protection Area that are not prohibited by Section 1.f.i (above) must be designed to prevent the accumulation of gases at hazardous concentrations within.

g. (Groundwater and Portal Protection Area only) Redevelopment of land within designated buffer zones around the former mine portals for residential, industrial, or commercial purposes is prohibited, except that road construction, road maintenance, and utilities and other infrastructure improvements shall be allowed to the extent such activities will not interfere with the installation, integrity, and function of any Contingency Groundwater Treatment System infrastructure that may be required.

i. For Portal 2 at the north end, the buffer zone will encompass the area depicted in Figure 3.

ii. For Portal 3 at the south end the buffer zone will consist of the area depicted in Figure 4.

h. Infrastructure for the Contingent Groundwater Treatment Systems. The infrastructure for Contingent Groundwater Treatment Systems located near Portals 2 and 3 to the north and south, respectively (Figure 1) must be maintained for the duration of the Consent Decree. Consistent with Section 1.b above, any activities that may affect the integrity or function of these structures and access to these structures is prohibited.

Section 2. The Owner of the Property must give thirty (30) day advance written notice to Ecology of the Owner's intent to convey any of its interests in the Property. No voluntary conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action.

Section 3. The Owner must restrict land leases to uses and activities consistent with this Covenant and notify all lessees of the restrictions on the use of the Property.

Section 4. The Owner, after conferring with the other parties to the Consent Decree (or their successors or assigns), must notify and obtain approval from Ecology before initiating any use

of the Property that is inconsistent with the terms of this Covenant. Ecology may approve any inconsistent use only after public notice and comment.

Section 5. The Owner shall allow authorized representatives of Ecology and designees of the other parties to the Consent Decree (or their successors or assigns) the right to enter the Property at reasonable times for the purpose of performing and evaluating the Remedial Action as outlined in the CAP; to take samples; to inspect remedial actions conducted at the property; to determine compliance with this Covenant; and to inspect records that are related to the Remedial Action.

Section 6. The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Covenant shall no longer limit use of the Property or be of any further force or effect. However, such an instrument may be recorded only after the Owner of the Property confers with the parties (or their successors and assigns) to the Consent Decree and only if Ecology, after public notice and opportunity for comment, concurs.

PALMER COKING COAL COMPANY, LLP

William Kombol
Manager

Dated: _____

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

**[Name of Person Acknowledging Receipt]
[Title]**

Dated: _____

STATE OF WASHINGTON
COUNTY OF KING

On this _____ day of _____, 2013, I certify that William Kombol personally appeared before me, acknowledged that he is the Manager of the corporation that executed the within and foregoing instrument, and signed said instrument by free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute said instrument for said corporation.

Notary Public in and for the State of
Washington, residing at
_____.
My appointment
expires _____.

Exhibit 1
Legal Description

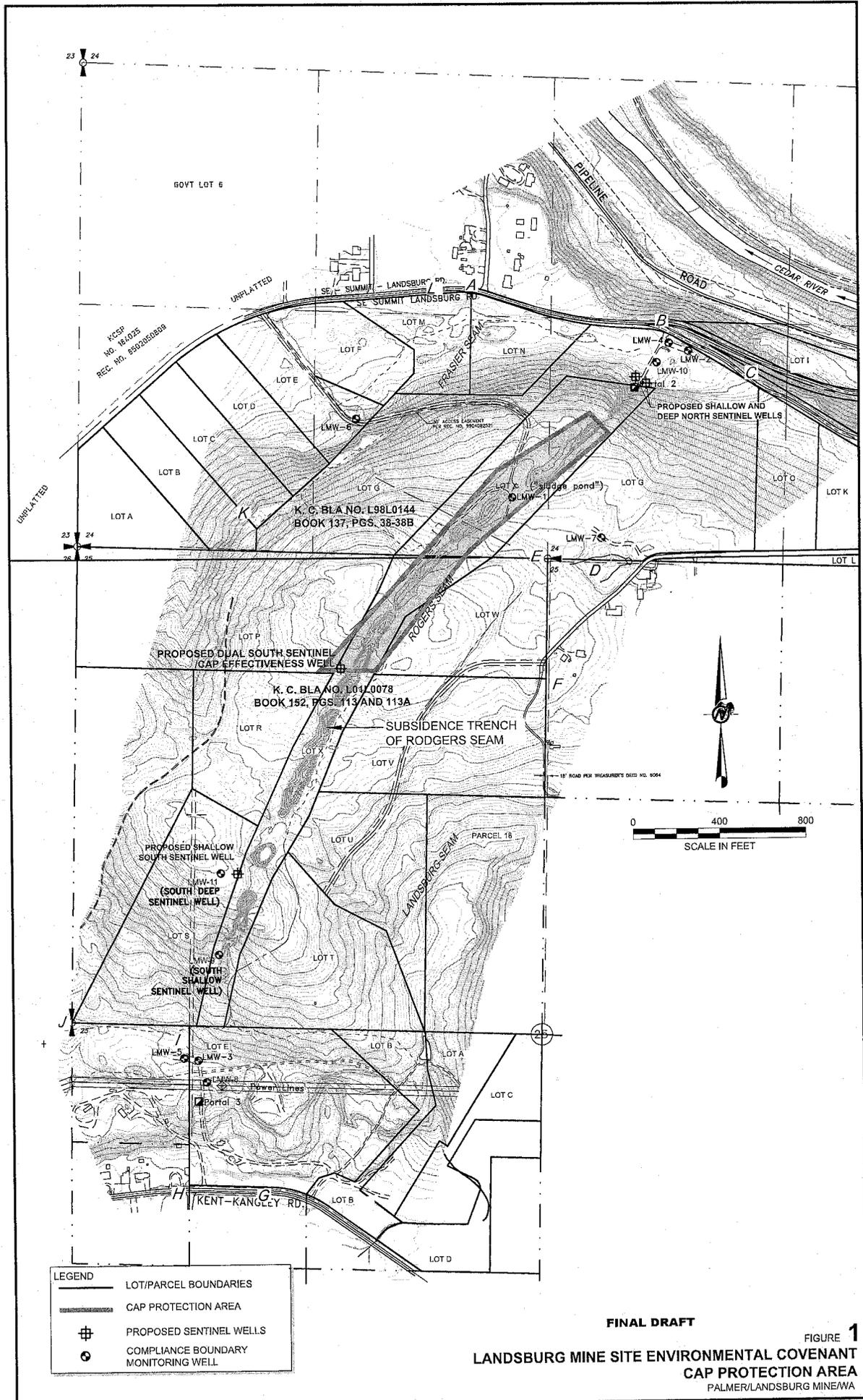
FILL IN FULL LEGAL DESCRIPTION WHEN AVAILABLE AFTER REMEDIAL
ACTION CONSTRUCTION

CAP PROTECTION AREA:

GROUNDWATER AND PORTAL PROTECTION AREA:

Exhibit 2
Tax Parcel Numbers
(TO BE COMPLETED)

Figures 1 & 2
Cap Protection Area Map & Groundwater and Portal Protection Area Map



LEGEND	
	LOT/PARCEL BOUNDARIES
	CAP PROTECTION AREA
	PROPOSED SENTINEL WELLS
	COMPLIANCE BOUNDARY MONITORING WELL

FINAL DRAFT
 FIGURE 1
LANDSBURG MINE SITE ENVIRONMENTAL COVENANT
CAP PROTECTION AREA
 PALMER/LANDSBURG MINE/WA

K:\CAD\Project\19228231\000\02\2R154\Exhibit F Restorative Covenant\923_1000_002_R154_F2.dwg | 1 CAP PROTECTION AREA | Mod: 04/05/2013, 11:21 | PlotNo: 04/05/2013, 11:47 | D:\cutter

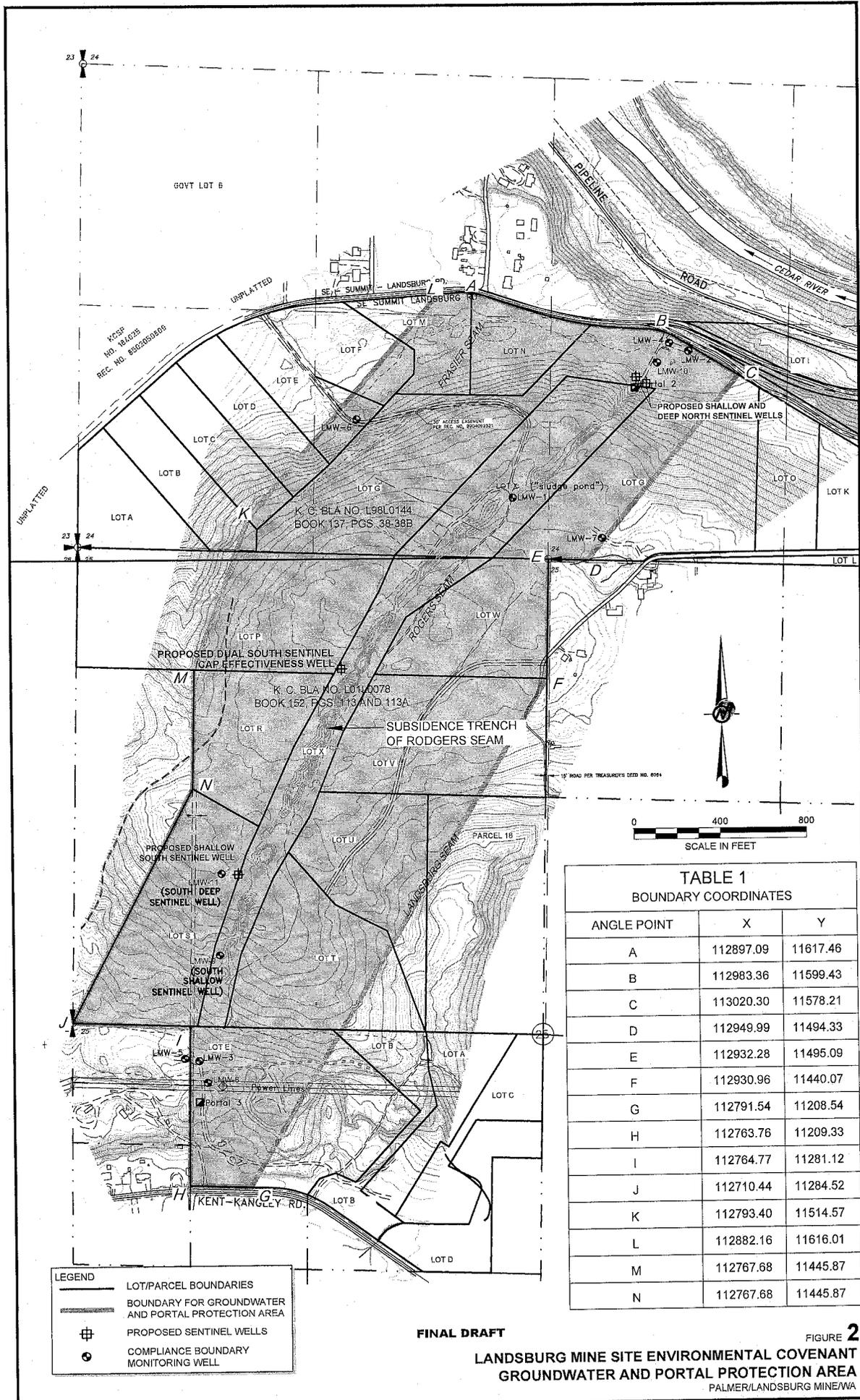


TABLE 1
BOUNDARY COORDINATES

ANGLE POINT	X	Y
A	112897.09	11617.46
B	112983.36	11599.43
C	113020.30	11578.21
D	112949.99	11494.33
E	112932.28	11495.09
F	112930.96	11440.07
G	112791.54	11208.54
H	112763.76	11209.33
I	112764.77	11281.12
J	112710.44	11284.52
K	112793.40	11514.57
L	112882.16	11616.01
M	112767.68	11445.87
N	112767.68	11445.87

FINAL DRAFT

FIGURE 2

**LANDSBURG MINE SITE ENVIRONMENTAL COVENANT
GROUNDWATER AND PORTAL PROTECTION AREA**
PALMER/LANDSBURG MINE/WA

- LEGEND**
- LOT/PARCEL BOUNDARIES
 - BOUNDARY FOR GROUNDWATER AND PORTAL PROTECTION AREA
 - ⊕ PROPOSED SENTINEL WELLS
 - COMPLIANCE BOUNDARY MONITORING WELL

Figures 3 & 4
North Portal 2 Buffer Zone & South Portal 3 Buffer Zone

LEGEND

- Wells
- ▨ South Portal Buffer Zone
- Truck Access Roadway
- - - Property Boundary

REFERENCES

- 1) Bing Maps (Imagery)
- 2) Golder Associates Inc.
- 3) COORDINATE SYSTEM: NAD 1983 StatePlane Washington North FIPS 4601 Feet

FINAL DRAFT



PROJECT NO.	937000002	DATE	20 JUL 2013	SCALE	AS SHOWN	REV	0
DESIGN	TH	TH	20 JUL 2013	DESIGNER	AS SHOWN	REV	0
DATE	20 JUL 2013	DATE	20 JUL 2013	DESIGNER	AS SHOWN	REV	0
DATE	20 JUL 2013	DATE	20 JUL 2013	DESIGNER	AS SHOWN	REV	0

PROJECT: PALMER COKING COAL COMPANY
PALMER/LANDSBURG MINE
KING COUNTY, WASHINGTON

TITLE: SOUTH PORTAL 3 - BUFFER ZONE



FIGURE: 4



Map Document: M:\GIS\Projects\19212131000\02\191M\X\9213100002\F7_901\Final\Buffer.mxd / Modified 6/28/2013 1:07:55 PM by Hammond / Exported 7/30/2013 2:26:45 PM by Hammond

EXHIBIT F
RESTRICTIVE COVENANT

Environmental Covenant

After Recording Return to:
[CURRENT OWNER]
[insert address]

Department of Ecology
Northwest Regional Office
3190 160th Ave. SE
Bellevue, WA 98008-5452

Environmental Covenant

Grantor: [Current Owner]
Grantee: State of Washington, Department of Ecology
Legal: See Exhibit 1
Tax Parcel Nos.: See Exhibit 2
Map Pages: See Figure 1

Grantor, _____, hereby binds Grantor, its successors and assigns to the land use restrictions identified herein and grants such other rights under this environmental covenant (hereafter "Covenant") made this ____ day of _____, 2013 in favor of the State of Washington Department of Ecology ("Ecology"). Ecology shall have full right of enforcement of the rights conveyed under this Covenant pursuant to the Model Toxics Control Act, RCW 70.105D.030(1)(g), and the Uniform Environmental Covenants Act, RCW 64.70.110.

This Covenant is made pursuant to RCW 70.105D.030(1)(f) and (g) and WAC 173-340-440 by [Current Owner], his successors and assigns, and Ecology, its successors and assigns.

The property that is the subject of this Covenant is contiguous to property that is the subject of a remedial action (the "Remedial Action") taking place at the area Ecology has designated as the Landsburg Mine Site. The Remedial Action is described in the following document[s]:

Consent Decree, and all exhibits thereto, including the final Cleanup Action Plan for the Landsburg Mine Site, entered in *State of Washington Department of Ecology v. Palmer*

Coking Coal Company, LLP, et al., King County Superior Court Cause No. _____ (the "Consent Decree"). These documents are on file at Ecology's Northwest Regional Office.

This Covenant is required because the Remedial Action to be implemented under the Consent Decree requires certain institutional controls to be established at and near the Landsburg Mine Site. These institutional controls are to protect human health and the environment, maintain the long-term effectiveness of the Remedial Action, and preserve the future opportunity to install a contingent groundwater extraction and treatment system, if the installation of such a system proves necessary.

The undersigned, [**Current Owner**], is the fee owner of real property in the County of King, State of Washington, that is subject to this Covenant. The legal description of the property that is subject to this Covenant is attached as Exhibit 1.

[**Current Owner**] makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

Section 1.

a. Uses of the Property shall be limited to uses that are not incompatible with the Remedial Action.

b. Any activity on the Property that interferes with the integrity of the Remedial Action and continued protection of human health and the environment is prohibited.

c. Any activity on the Property that may result in the release or exposure to the environment of a hazardous substance that remains on the Property as part of the Remedial Action, or create a new exposure pathway, is prohibited without prior written approval from Ecology.

d. No groundwater may be withdrawn from the Property for any non-remedial purpose.

Section 2. The Owner of the Property must give thirty (30) day advance written notice to Ecology of the Owner's intent to convey any of its interests in the Property. No voluntary

conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action.

Section 3. The Owner must restrict land leases to uses and activities consistent with this Covenant and notify all lessees of the restrictions on the use of the Property.

Section 4. The Owner, after conferring with the parties to the Consent Decree (or their successors or assigns), must notify and obtain approval from Ecology before initiating any use of the Property that is inconsistent with the terms of this Covenant. Ecology may approve any inconsistent use only after public notice and comment.

Section 5. The Owner shall allow authorized representatives of Ecology and designees of the other parties to the Consent Decree (or their successors or assigns) the right to enter the Property at reasonable times for the purpose of performing and evaluating the Remedial Action as outlined in the CAP; to take samples; to inspect remedial actions conducted at the property; to determine compliance with this Covenant; and to inspect records that are related to the Remedial Action. Under this section, the Owner of the Property specifically consents to entry on to the Property by the above persons for purposes of installing and operating portions of the contingent groundwater extraction and treatment system that is part of the Remedial Action to be implemented under the Consent Decree, if the installation of such a system proves necessary.

Section 6. The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Covenant shall no longer limit use of the Property or be of any further force or effect. However, such an instrument may be recorded only after the Owner of the Property confers with the parties (or their successors and assigns) to the Consent Decree and only if Ecology, after public notice and opportunity for comment, concurs. To the extent the provisions of this Environmental Covenant conflict with the provisions of the Deed recorded under King County recording number 199808180540, the provisions of this Covenant shall control.

[CURRENT OWNER]

Dated: _____

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

**[Name of Person Acknowledging Receipt]
[Title]**

Dated: _____

STATE OF WASHINGTON
COUNTY OF KING

On this _____ day of _____, 2013, I certify that [CURRENT OWNER] personally appeared before me, acknowledged that he is the Manager of the corporation that executed the within and foregoing instrument, and signed said instrument by free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute said instrument for said corporation.

Notary Public in and for the State of
Washington, residing at

My appointment
expires_____.

Exhibit 1
Legal Description

FULL LEGAL DESCRIPTION :

Quarter Section-Section-Township-Range: SW-25-22-6

N 1/2 OF NW 1/4 OF NW 1/4 OF SW 1/4 E 20 FT FOR RD LESS C/M RGTS SUBJ TO TRANS LN
R/W

Exhibit 2
Tax Parcel Numbers

King County Tax Parcel Number: 252206-9066

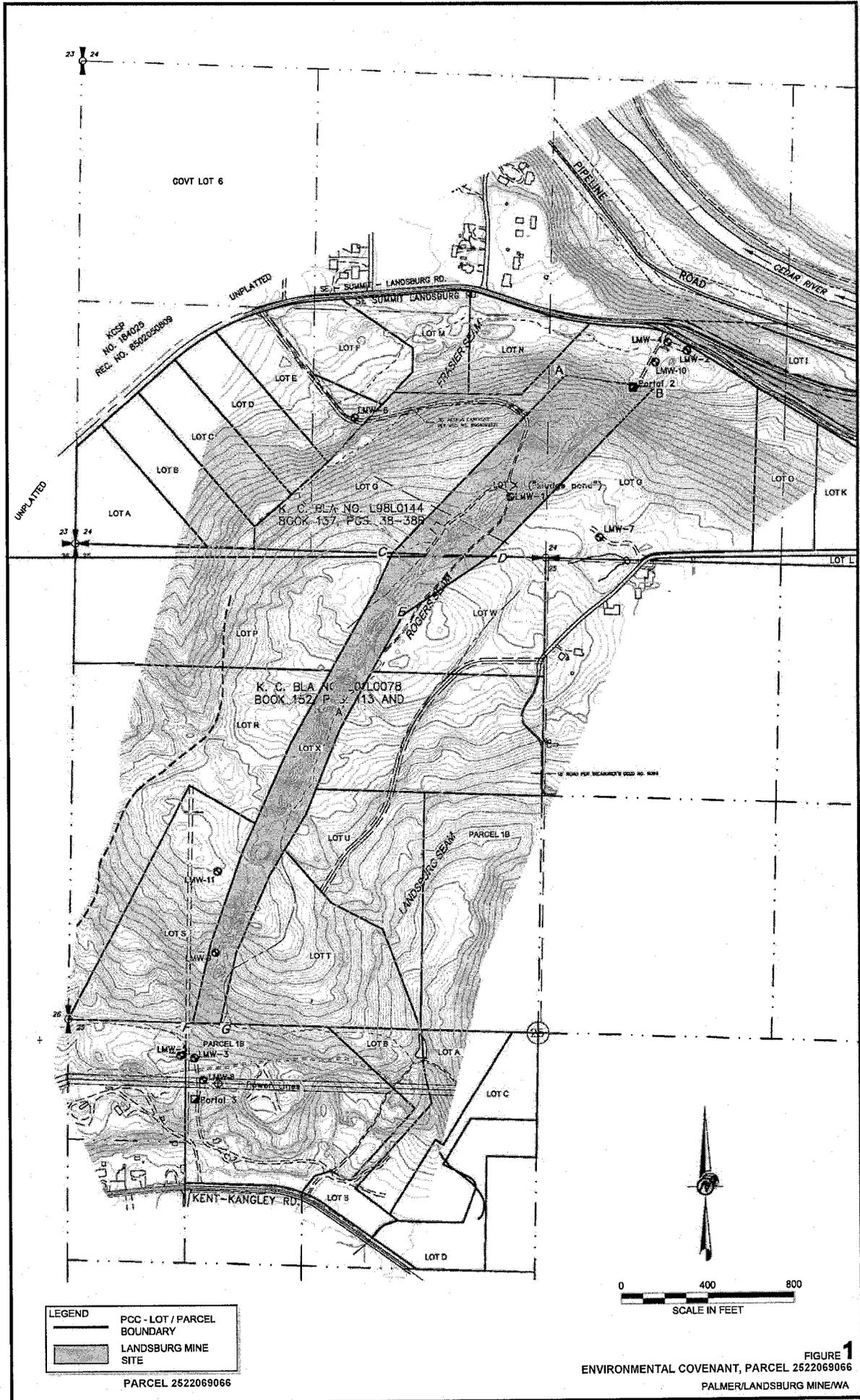


FIGURE 1
 ENVIRONMENTAL COVENANT, PARCEL 2522069066
 PALMER/LANDBURG MINE/WA

Golder Associates

EXHIBIT G
REMEDIAL ACTION PERMITS

State or local permit is not exempted under MTCA, they will be specifically identified below, otherwise only the substantive requirements of the State or local permits listed below are necessary. Federal permits listed below are not exempted by MTCA. Most State and local permits are exempted under MTCA and are identified below.

2.0 LOW PERMEABILITY CLOSURE CAP AND SURFACE WATER DIVERSION

2.1 Federal

2.1.1 Clean Water Act

Potentially a Section 404 (Clean Water Act) Permit will be required from the Army Corps of Engineers (Corps) for the filling of or other impacts to wetlands at the site. It is anticipated that the work would be conducted/authorized under a Corps Nation Wide Permit 38 (NWP 38; Cleanup of Hazardous and Toxic Waste). NWP 38 requires pre-construction notification to the Corps (a Joint Aquatic Resources Permit Application [JARPA]). Consultation with the Corps will be needed to determine whether or not wetlands within the mine subsidence trenches and in surrounding areas of the mine are jurisdictional and regulated under Section 404. The Corps will make the jurisdictional decision on the wetland applicability and consult with appropriate agencies for Section 7 (Endangered Species Act) and Section 106 (National Historic Preservation Act).

If a Section 404 permit is required, a Biological Assessment (Section 7) may be required. If applicable, the Corps would conduct Section 7 consultation with the U.S. Fish and Wildlife Service and potentially the National Oceanic and Atmospheric Administration (NOAA Fisheries).

The project may be subject to the Spill Prevention, Control, and Countermeasure (SPCC) Regulation 40 CFR part 112 if the construction project will include the storage of more than 1,320 gallons of oil on the Site. The Storage of over 1,320 gallons of fuel or oil is unlikely during remedial actions.

2.2 State of Washington

2.2.1 State Environmental Policy Act

State Environmental Policy Act (SEPA) review will be required to obtain and local or state permits for the project including permits from Ecology. The Landsburg PLP Group will prepare and submit a permit application and SEPA Checklist to Ecology (SEPA lead) to initiate SEPA review. Any project that requires state or local agency permitting, licensing, funding, or adoption of a policy, plan, or program can trigger environmental review under SEPA. A Determination of Non Significance (DNS) needs to be obtained to implement remedial actions. Ecology has the option of preparing an EIS for the project if they feel it is likely to have significant adverse impacts, but is unlikely for remedial actions at Landsburg Mine Site.

2.2.2 Section 401 of the Clean Water Act (Water Quality Certification)

If the proposed project requires a Section 404 permit from the Corps as discussed above, a water quality certification would also be required from Ecology for any activity that may result in a discharge into surface waters, including wetlands. Ecology provides certification that the discharge complies with the discharge requirements and the aquatic protection requirements of state law. Conditions of the 401 Certification become conditions of the federal permit. If work is authorized under a NWP 38, approval is granted for the Section 401 permit.

If the Corps does not take jurisdiction of the Site wetlands, a wetland permit would be required from the State of Washington. Again a consultation with the State Department of Ecology will identify whether any wetland permits are required. The State has no minimum size exemption for wetlands.

2.2.3 National Pollutant Discharge Elimination System under the Clean Water Act

A National Pollutant Discharge Elimination System Permit (NPDES) will be required from Ecology for ground disturbance during construction affecting more than 1 acre of ground for potential stormwater discharge to surface water. This permit is to protect and maintain water quality and prevent or minimize sediment, chemicals, and other pollutants from entering surface water and groundwater. This permit is required at least 60 days prior to any construction activity that could result in a discharge of stormwater. A Construction Stormwater General Permit will be required because activities will include clearing, grading, and excavating and more than one acre will be disturbed. This permit will require the submission of a Notice of Intent application and the development of a Stormwater Pollution Prevention Plan. A new draft permit was released by Ecology on July 21, 2010.

2.2.4 Section 106 of the National Historic Preservation Act

A Cultural Resources review (Section 106) could also potentially be required. The Corps would conduct Section 106 consultation with the Department of Archaeology and Historic Preservation (DAHP) and affected tribes.

2.2.5 Washington State Forest Practices Act

Forestry Practices Permit from the Washington Department of Natural Resources will be required because more than 5,000 board feet will be cleared. This permit is not exempt by MTCA.

2.2.6 Coastal Zone Management Certification

A Coastal Zone Management (CZM) certification is required for work conducted within a coastal county. This certifies the project is consistent with the CZM program. If a NWP 38 is required, the CZM is already certified. If a NWP 38 is not required, a CZM certification is needed from the State.

2.3 King County

2.3.1 Clearing and Grading Permit

Clearing Permit is required for the removal of trees or vegetation from a critical area; clearing over 7,000 square feet in a rural (RA) zoned property; or the removal of 5,000 board feet of timber.

Grading Permit will be required for any amount of grading in a critical area or grading 100 cubic yards or more of soils will be excavated and filled. King County identifies the need for a SEPA checklist for the disturbance of more than 500 cubic yards.

2.3.2 Critical Areas Ordinances

Compliance with King County's Critical Areas Ordinance (Chapter 21A.24) is required for project activities within or near critical areas (i.e. critical area and/or in protective buffer area). King County has identified the following critical areas: Critical aquifer recharge area, Coal mine hazard area; Erosion hazard area; Flood hazard area except in the severe channel migration hazard area; Landslide hazard area under forty percent slope; Seismic hazard area; Volcanic hazard areas; Severe channel migration hazard area; Landslide hazard area over forty percent slope; Steep slope hazard area; Wetland; Aquatic area; Wildlife habitat conservation area; and Wildlife habitat network.

Prior to any clearing, grading, or site preparation, King County would conduct a critical area review to identify any critical area, active breeding site of a protected species or of a critical area or active breeding site that has been mapped or identified within 300 feet of the site. A critical areas report (e.g. wetland delineation report) would need to be prepared. A mitigation and monitoring plan would also be required. Wetlands within the Mine trenches will be buried or receive less surface water after construction of the cap and diversion ditches. A Wetland Mitigation Plan needs to be approved by King County.

2.3.3 Shoreline Management Act

A Shoreline Management Act Permit will not be required from King County, because the project does not involve work within 200 feet of any watercourse that falls under jurisdiction of the county shoreline management program. Such waters include lakes 20 acres in size or greater, and rivers averaging 20 cfs or more.

3.0 CONTINGENT GROUNDWATER TREATMENT SYSTEM, IF IMPLEMENTED

3.1 Federal

Permits from the Federal government are the same as those described above for the first phase remedial actions. Below are additional requirements for the installation and operation of the Contingent Groundwater Treatment System.

3.2 State of Washington

Permits or substantive requirements of permits for the State of Washington are the same as those described above for the first phase remedial actions. Below are additional requirements for the installation and operation of the Contingent Groundwater Treatment System.

3.2.1 Hazardous Waste Management Act

A Dangerous Waste Generator Identification under WAC 173-303 is potentially needed if the treatment system generates dangerous wastes.

3.2.2 Clean Air Act

A Quality Notice of Construction (NOC) Permit may be needed if there are emissions of air contaminants to the atmosphere that are generated during treatment. The NOC permits are issued by the Puget Sound Clean Air Agency. An Air Operating Permit will be required by Ecology if the treatment system emissions exceed certain thresholds of hazardous air pollutants specified by this permit.

3.2.3 National Pollutant Discharge Elimination System Under Clean Water Act

The current plan is to discharge any treated or untreated groundwater effluents to the King County Metro Publically Owned Treatment Works (POTW). If this is changed to a discharge to surface water, then an NPDES Industrial General Stormwater Permit will be required once the treatment system is operational. This permit is not exempt under MTCA.

3.2.4 Water Rights Act

A Groundwater Extraction/Water Right is not required for remedial actions under MTCA, but potential impacts or influences from groundwater extraction will need to be identified.

3.3 King County

Permits or substantive requirements of permits from King County are the same as those described above for the first phase remedial actions. Below are additional requirements for the installation and operation of the Contingent Groundwater Treatment System..

Department of Development and Environmental Services Ordinances

Clearing Permit is required for the removal of trees or vegetation from a critical area; clearing over 7,000 square feet in a rural (RA) zoned property; or the removal of 5,000 board feet of timber.

Grading Permit will be required because 100 cubic yards of soils will be excavated and filled for connecting the pipeline to the King County sanitary sewer.

Building Permit will be necessary from King County for the treatment system installation. This permit will also include the extension of the discharge pipeline under the County road and to the sanitary sewer.

A Plumbing Permit and a Backflow Prevention Assemblies Permit may be required for the installation of the discharge pipeline. These permits can be obtained through Public Health of Seattle & King County.

Industrial Waste Program Wastewater Discharge Permit will be required from King County to discharge captured and or treated groundwater to King County's Metro POTW.

Electrical Permit is required for the electrical design and its installation for the treatment system. In unincorporated King County, Electrical Permits are issued by the Washington Department of Labor and Industries.

ATTACHMENT B

Ecology's October 2013 Materials Regarding The Proposed Plan

1. Ecology Fact Sheet (October 2013)
2. Ecology Public Meeting Presentation Materials (October 24, 2013)
3. Ecology Website Materials (Current)

Toxics Cleanup Program**October 2013**

Consent Decree and Draft Cleanup Action Plan Now Available for Review

The Washington State Department of Ecology (Ecology) prepared this fact sheet to announce the planned cleanup of the Landsburg Mine site (Site). Landsburg Mine is a former underground coal mine located approximately 1.5 miles northwest of Ravensdale in southeast King County. During the late 1960s to late 1970s, industrial wastes were disposed in the trench that formed above the former mine.

Ecology and the Potentially Liable Persons (PLPs) will enter into a legal agreement called a Consent Decree to be filed in court. Under the Consent Decree, the PLPs agree to clean up the Site in accordance with the Cleanup Action Plan (CAP). The Draft CAP is one of the exhibits to the Consent Decree. The public is invited to review the Draft CAP and other exhibits and provide comments to Ecology.

Public Meeting

A public meeting will be held to provide information about the proposed cleanup actions and other documents for Landsburg Mine Site. You will have an opportunity to ask questions about the Site.

Date: October 24, 2013

Time: 6:30 – 7:00 p.m. Open House
7:00 – 8:30 p.m.
Presentation and Questions and Answers

Location: Tahoma Jr. High School
25600 SE Summit Landsburg Rd
Ravensdale, WA 98051

Comments Accepted
October 11 – November 11, 2013

Submit Comments and Technical Questions to:

Jerome Cruz - Site Manager
Washington State Department of Ecology –
Toxics Cleanup Program
3190 160th Ave SE
Bellevue, WA 98008
Phone: (425) 649-7094
E-mail: jerome.cruz@ecy.wa.gov

Public Meeting

Date: October 24, 2013
Time: 6:30 – 7:00 p.m. – Open House
7:00 – 8:30 p.m. – Presentation and
Questions and Answers
Place: Tahoma Jr. High School
25600 SE Summit Landsburg Rd
Ravensdale, WA 98051

Document Review Locations

Maple Valley Public Library
21844 SE 248th Street
Maple Valley, WA 98038
Phone: (425) 432-4620

**Washington State Department of Ecology
Northwest Regional Office**
3190 160th Ave SE
Bellevue, WA 98008

Call for an appointment: Sally Perkins
Phone: (425) 649-7190
Fax: (425) 649-4450
E-mail: sally.perkins@ecy.wa.gov
Hours: Tuesday – Thursday
8:00 a.m. – 12:00 p.m.
1:00 p.m. – 4:30 p.m.

Ecology's Landsburg Mine Website:
[https://fortress.wa.gov/ecy/gsp/
Sitepage.aspx?csid=60](https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=60)

Cleanup ID #: 60

FSID#: 2139

Public Comment Invited

Ecology seeks your input. You are invited to review and comment on the following documents:

- Consent Decree and exhibits, including the Draft CAP which describes the preferred remedial alternative chosen for the Site and how the cleanup will be conducted with Ecology oversight.
- State Environmental Policy Act (SEPA) Checklist and Determination of non-significance.
- Updated Public Participation Plan.

Send your written comments to Jerome Cruz, Ecology Site Manager, by e-mailing jerome.cruz@ecy.wa.gov or mail to 3190 160th Ave SE, Bellevue, WA 98008. Comments will be accepted October 11 – November 11, 2013.

Draft Cleanup Action Plan

Based on Site work and previous investigations, the wastes are located only in the northern trench and possibly within the former mine beneath this area of the trench, but have not spread.

Groundwater is the primary pathway for any contaminants to migrate. To date, there have been no impacts to groundwater at the Site. No contaminants have been detected in over 20 years of water testing. This cleanup action will confine the areas of known waste, maintain the contingency plans and detection systems, and keep funds in place should groundwater contamination ever be detected at the Site.

The Cleanup Action Plan calls for covering the wastes in the northern portion of the trench with clean fill to bring the grade to the surface. A low-permeability soil cap, with vegetation, will be placed as the final surface of the trench to minimize water infiltration. This final surface will be graded to direct surface water away from the trenches. Long-term groundwater monitoring will be performed indefinitely to test for any contamination from the mine in the future. Contingency plans will be put in place to prevent contaminated groundwater from leaving the Site if it is detected. Infrastructure will be installed for a Contingent Groundwater Treatment System in order to treat and safely dispose of the water after treatment, if necessary.

In order to protect human health and the environment, the following measures will be implemented:

- Isolate and contain the wastes in the trench,
- Prevent or reduce leaching of the wastes by rain and groundwater,
- Maintain water levels within the former mine so that Rock Creek (located south of the Site) is protected, and
- Contingency plans in case contaminants are detected in groundwater discharging from the mine, in the future.

Public Participation Plan

An updated Public Participation Plan is one of the exhibits to the Consent Decree for your review and comment. The plan is designed to promote meaningful community involvement during the cleanup process. The plan outlines and describes the methods that Ecology will use to inform the public about Site activities. It also identifies opportunities for the community to become involved in this process.

State Environmental Policy Act (SEPA) Determination

The SEPA environmental checklist and determination of non-significance are available for public review. Ecology has reviewed this checklist and has determined that no significant adverse environmental impacts will be caused by implementing this cleanup.

What Happens Next?

After the public comment period ends on November 11, 2013, Ecology will review and respond to all comments in a responsiveness summary. If no significant changes are made to the Consent Decree and its exhibits, these documents will be final and filed in court. If significant changes are recommended, then Ecology will conduct another public comment period for the revised documents.

Where can I find more information about Landsburg Mine?

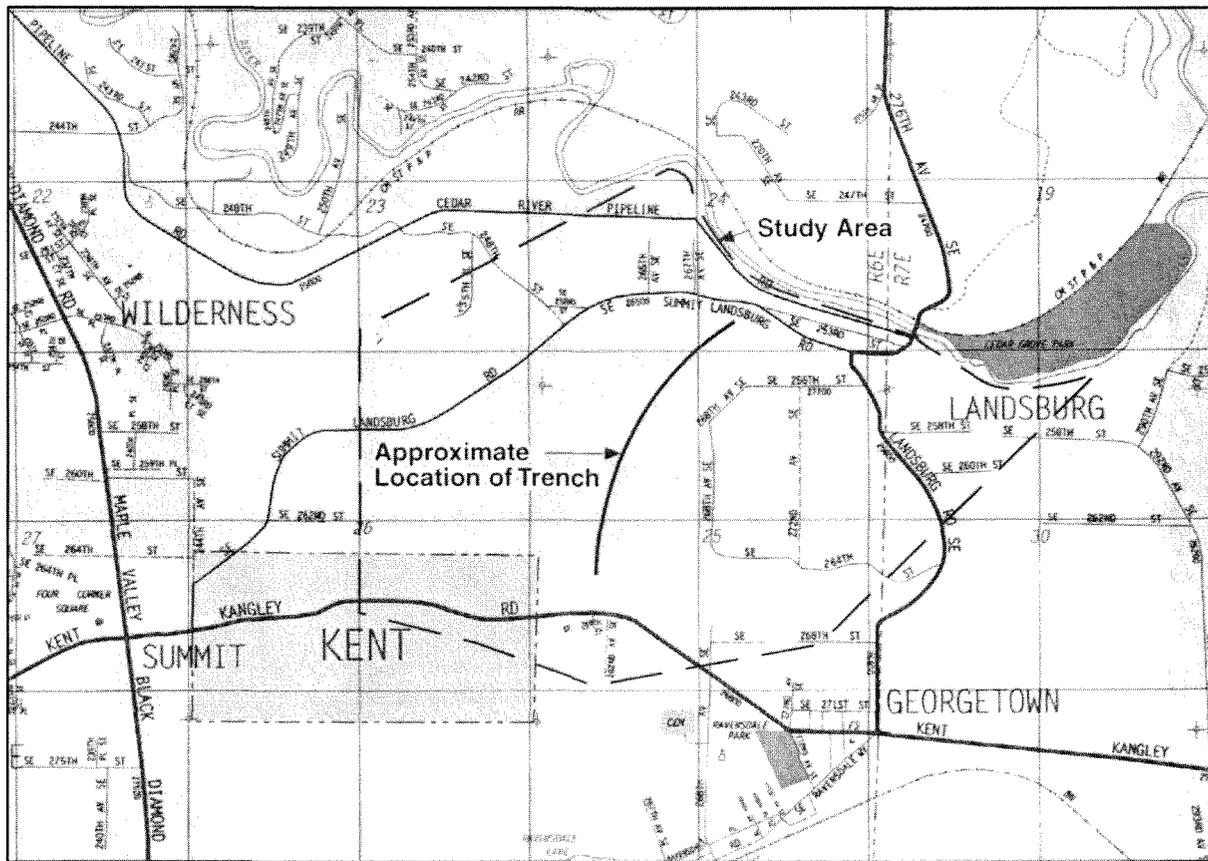
See the “Questions and Answers on the Landsburg Mine Site” section on the next page to learn more about this site.

Questions and Answers on the Landsburg Mine Site

Q: What is the Landsburg Mine Site?

A: The Landsburg Mine Site is a former underground coal mine located approximately 1.5 miles northwest of Ravensdale in southeast King County. The Site is located directly south of the S.E. Summit-Landsburg Road and north of S.E. Kent-Kangley Road.

Underground mining methods were used to extract the coal from the Rogers coal seam, one of three coal seams mined in this location. These methods resulted in the ground sinking above the abandoned mine and forming a trench. This trench is roughly three-quarters of a mile long, 20-60 feet deep, and 60-100 feet wide. Later, industrial wastes were disposed in the trench during the late 1960s to the late 1970s.

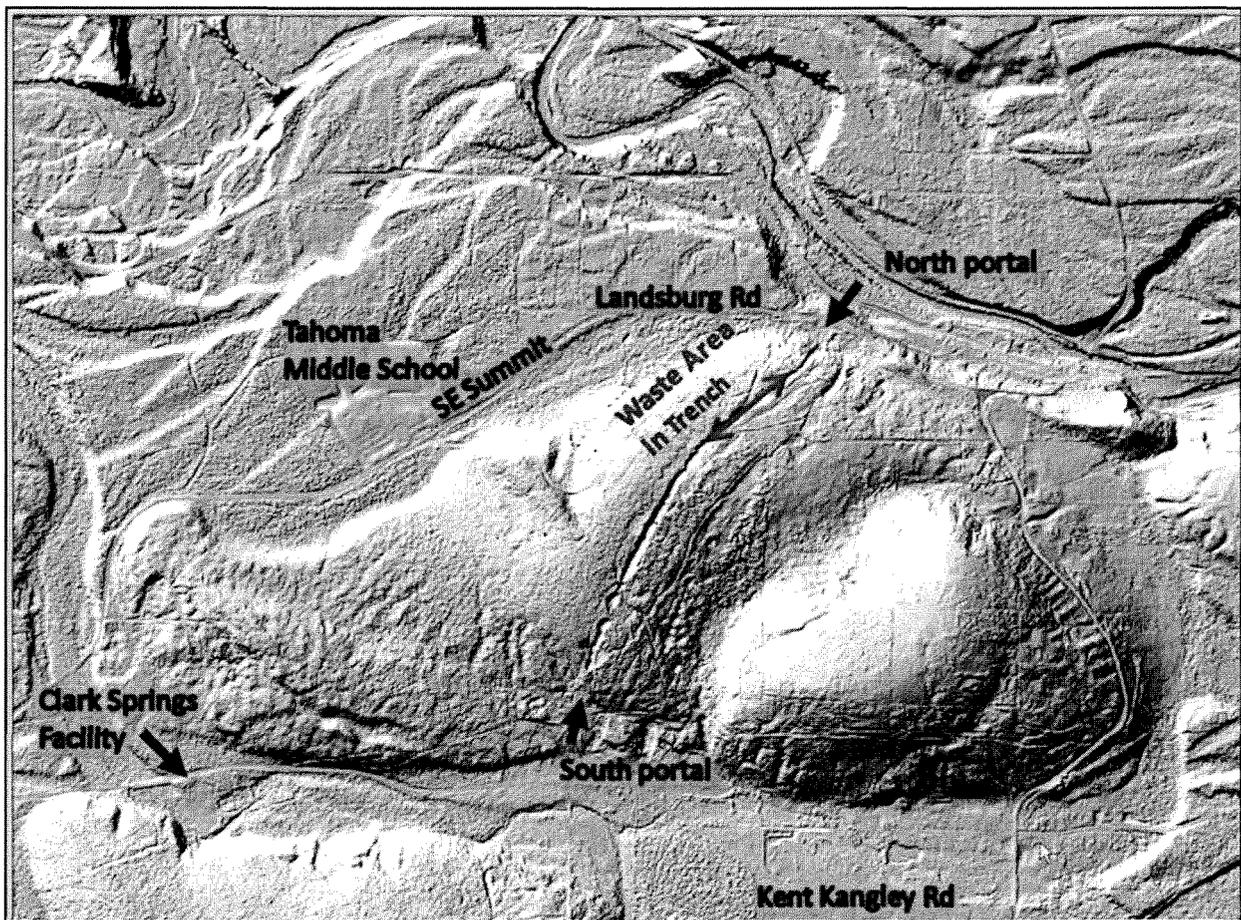


Landsburg Mine Site

Q: What is the nature and history of contamination at the Site?

A: From the late 1960s to the late 1970s, the northern part of the trench was used as a disposal site for a variety of industrial wastes. The wastes either were contained in drums or were drained from tanker trucks. Records indicate that about 4,500 drums and 200,000 gallons of oily waste water and sludge were disposed of in this portion of the trench.

Samples taken from recovered drums indicate that the contents were organic and inorganic industrial waste, including paint waste, polychlorinated biphenyls (PCBs), solvents, cyanide, metals, and oily sludge. A portion of the waste may have been burned during fires in the early 1970s. Disposal of land-clearing debris and construction debris in the trench continued until the early 1980s.



Lidar (Light radar) image of the Site, showing the "bare earth" surface without trees or vegetation. Lidar uses lasers to image land surfaces in great detail. At the center of this figure, the trench that formed above the former coal mine can be seen as a dark line and pits on top of the hill and bordered by the former north and south mine portals.

Landsburg Mine Site

Q: Who are the Potentially Liable Persons (PLPs) for cleaning up Landsburg Mine Site?

A: They are: Browning-Ferris Industries of Illinois, Inc., BNSF Railway Company, PACCAR Inc, Plum Creek Timberlands, L.P., TOC Holdings Co., and Palmer Coking Coal Company. Burlington Environmental Inc., a subsidiary of Philip Services Corporation or PSC, settled its liability under a 2003 bankruptcy settlement.

Q: Who pays for the cleanup?

A: The Potentially Liable Persons are responsible for paying all costs associated with cleaning up the Landsburg Mine Site, including state oversight costs.

Q: Who oversees the cleanup at this site?

A: The Department of Ecology Toxics Cleanup Program in the Northwest Regional Office. The assigned site manager is responsible for ensuring the cleanup follows state cleanup regulations.

Q: Who investigated the contamination at the Site?

A: The United States Environmental Protection Agency (EPA) conducted a preliminary assessment of the Site in 1984 under the federal "Superfund" law. In 1989, the Washington State Model Toxics Control Act (MTCA) went into effect. Based on records, about ten years elapsed from the time of the disposals to the time when state laws on hazardous waste cleanup were adopted and preliminary investigations took place. MTCA is the state law governing the cleanup of hazardous waste sites. That same year, an initial investigation was conducted by the Department of Ecology. In 1990, surface water was sampled by Geraghty and Miller, and Applied Geotechnology sampled soil gas at the Site.

In 1990, the Washington State Department of Health (WDOH) evaluated the drinking water quality of water wells in the area. DOH concluded that the drinking water wells have not been impacted by any wastes from the mine.

In 1993, the EPA transferred the Site to state authority under Ecology and in the same year, an Agreed Order to study the Site was signed by Ecology and the PLPs.

Under the Agreed Order, the Remedial Investigation and Feasibility Study (RI/FS) was carried out from 1993 to 1996. The RI/FS investigated the nature and extent of contamination, the risks, and cleanup alternatives at the Site. The RI/FS report was made final after it went through a public comment period in 1996. Around the same time, a Draft Cleanup Action Plan (DCAP) was first written. The current DCAP provides a plan for cleaning up the Site based on the results of the RI/FS and additional work.

The PLPs have been monitoring groundwater at the Site while the DCAP was being finalized under Ecology's continued oversight.

Q: Is the contamination at the Site dangerous?

A: Based on the results of the remedial investigation, the wastes are confined to the northern part of the trench and within the former mine. This area is fenced off and not accessible to the public. It was determined that the main potential pathway for pollution is from groundwater that comes out of the former mine. However, there has been no contamination detected in groundwater at the Site to date. The RI/FS report provided possible reasons for this.

Given these conditions, the preferred approach is to cap the wastes in the northern trench area and add contingent safety precautions. The approach also includes regularly monitoring groundwater with a contingency plan in place to contain, treat, and safely dispose of contaminated groundwater in case of a possible future detection of contaminated groundwater at the Site.

Q: Why has groundwater contamination not been detected at this site?

A: In the 1996 Remedial Investigation, four possible reasons were proposed. They include:

- 1) Wastes disposed in the trench are no longer present, either because they were consumed in the fires that were known to have occurred, or they already discharged to Cedar River through the mined-out Rogers Seam.
- 2) The chemicals from the wastes were absorbed in place by the leftover coal in the abandoned mine, effectively immobilizing them.
- 3) Some of the drums were either empty when disposed of or filled with relatively non-reactive or harmless substances. Much of the 200,000 gallons of oily wastewater would have had very low concentrations of chemicals, based on the description from invoice records.
- 4) Wastes are still contained within intact drums and have not yet been released.

Q: Why hasn't contamination been detected outside of the area of disposal, given that the wastes are known to be within the northern trench?

A: Available records and maps show that the disposals only took place in the northern portion of the trench. The 1996 RI/FS gave a number of potential scenarios which may help explain the lack of chemicals in groundwater at the Site (see previous question).

Soil sampling conducted in and outside of the northern areas of the trench and at the portal areas showed no contamination. This and other data from the RI/FS would indicate that the contamination is confined to the northern trench area and possibly the portion of the mine beneath this zone.

Q: Why did the 1995-1996 investigations not go deeper into the mine? Was the RI/FS sufficient?

A: The former mine is over 700 feet deep and about 20 feet across. The trench is steep walled and up to 70 feet deep, making it difficult to access. The mine workings may contain empty spaces and consist of collapsed rubble from bedrock and extracted coal remnants, making it a dangerous space to work in.

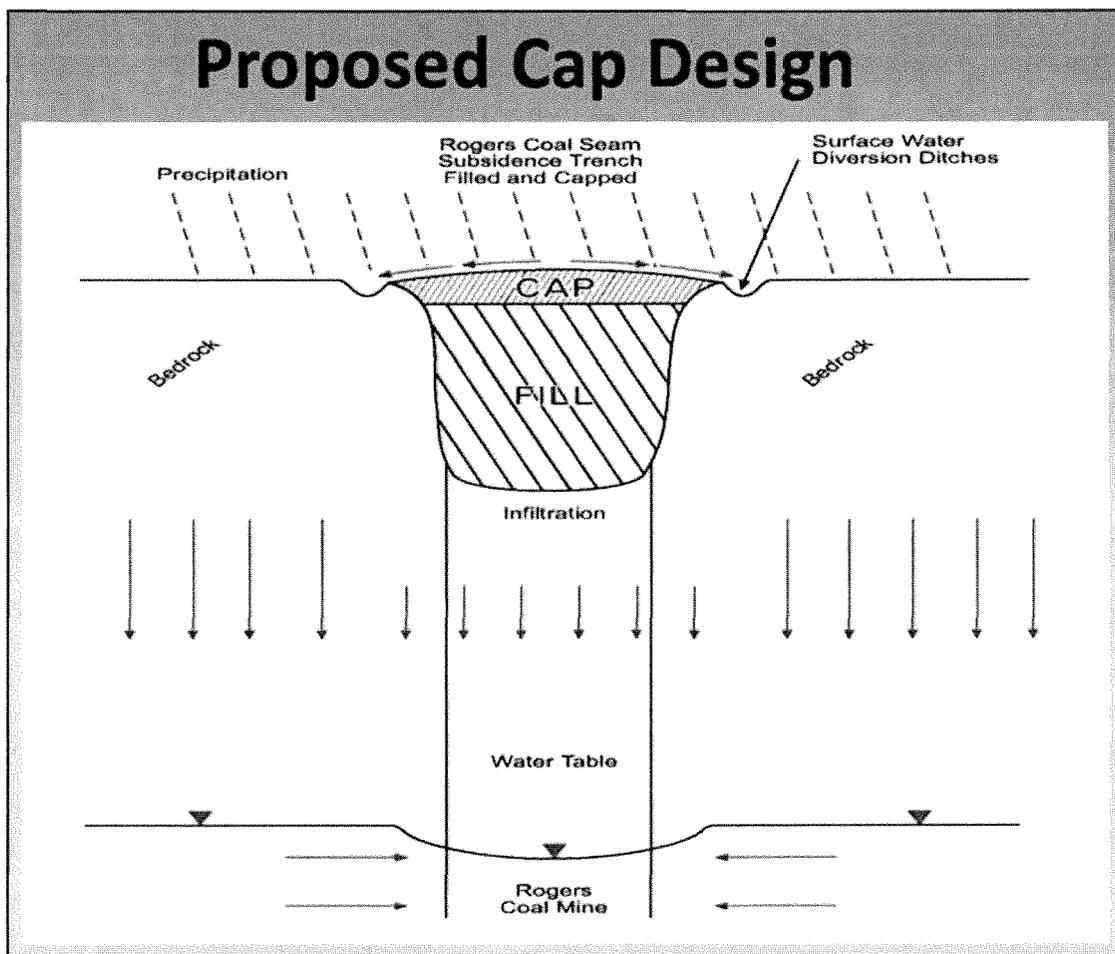
Landsburg Mine Site

The 1996 RI/FS report acknowledged that there is waste in the northern trench. Ecology determined that the RI/FS was sufficient after its review, and after considering public comments on the document. In 2006, a well was drilled which penetrated the deepest portion of the mine to determine whether contaminants were migrating at its south end (the direction where Rock Creek and the downstream Clark Springs is located). This deep well has been regularly sampled and monitored and shows no sign of contamination.

Q: What is the proposed clean up at the Site in the Draft Cleanup Action Plan?

A: Essentially, the cleanup will consist of the following:

- Filling in the northern portion of the mine trench where the wastes are located.
- Capping the northern portion with a low permeability soil cap.
- Applying institutional controls on land and groundwater use.
- Installing infrastructure for contingent groundwater capture and treatment should contamination be detected at Site wells.
- Monitoring groundwater indefinitely.



Further components of the Draft Cleanup Action Plan include:

- Additional sentinel wells installed as an early warning for detecting groundwater contamination from the mine if it occurs in the future.
- Frequent monitoring of groundwater based on computer modeling of travel times of the fastest moving potential contaminants.
- A Contingent Groundwater Treatment System Plan with infrastructure facilities at the north and south portal areas that will be readily available to contain, safely treat, and dispose of contaminated groundwater should it be detected at the Site.
- Financial assurances and controls to fund long-term groundwater compliance monitoring, maintenance of the cap, surface water drainage system, and contingencies indefinitely with Ecology oversight.

Q: Why can't you just dig out the wastes in the former mine?

A: This was one of the cleanup alternatives evaluated in the RI/FS (Alternative 9). Although this is theoretically a permanent solution, it was not selected for the following reasons:

- The mine is not easily accessible due to its dimensions, depths and orientation.
- Excavation and disposal would likely be much more dangerous to site workers. The dangers include:
 - Difficult and dangerous excavations with the potential for the sidewalls and ground to sink or collapse,
 - Chemical exposure and release of contents from rusted and deteriorated drums, potentially spreading to the environment, and
 - Increased risks from accidents at the site and traffic accidents in the community.
- Remediation workers would also be more likely to be exposed to waste constituents, than from the other alternatives that were evaluated.
- It is technically very difficult and impracticable to completely remove all the waste materials in the former mine. The mine debris combined with groundwater tends to flow like a slurry. Attempting to remove wastes in the mine would create a constant flow of mine debris to the excavation, rendering it impracticable to extend the excavation deeper into the mine workings.
- It would be very difficult to confirm that wastes have been completely removed from the former mine. As a result of the inability to confirm total waste removal, another alternative involving a cap on the waste area would still have to be installed in order to be protective. Any amount of residual contamination left behind would still be a potential source of contamination to groundwater from the mine. Therefore, since capping and groundwater monitoring will still have to be done after excavations, there would be little added benefit to this approach.

Q: Is the Clark Springs water supply at risk from the Landsburg Mine Site?

A: There is no known threat to the Clark Springs water supply from the Site based on over 20 years of investigations and monitoring. No groundwater contamination that can be traced to the wastes exists at the Site. The cleanup plan adopts a precautionary approach by assuming that wastes might impact groundwater in the future.

Q: What happens if there is any detection of groundwater contamination? How will you protect human health and the environment?

A: If groundwater contaminants are detected above state cleanup levels at the Site, groundwater will be pumped from Site wells to prevent it from leaving the Site. The water will be stored on the Site, treated at the Contingent Groundwater Treatment System infrastructure areas, and then disposed into the sanitary sewer system.

Groundwater extraction is protective of human health and the environment because it prevents contaminated water from coming in contact with people and the environment outside of the Site. The Contingency Plan contains procedures for more frequent monitoring and investigation.

Q: What is the Contingent Groundwater Treatment System infrastructure and where is it located?

A: Infrastructure consists of a gravel pad, an electrical connection with transformer and fencing, an access gravel drive, a fenced treatment area, and buried three inch pipeline for treatment discharge. The infrastructure will be constructed at two locations. One will be near the former north portal of the mine, also known as portal number 2. The other will be near the south portal (portal number 3), at the south end of the former mine at the Site.

Q: How often are the monitoring wells at the Site tested?

A: Presently, the wells are being sampled twice a year - in the spring (typically high groundwater levels) and fall (typically low groundwater levels).

Q: Where are all the wells located and how deep are they?

A: Presently, there are 11 wells at the Site ranging in depths from 13 to 700 feet. Upon completion of the construction phase of the cleanup, there will be 15 wells at depths ranging from 13 to 700 feet.

Q: Why won't private wells be sampled?

A: This was already done on a quarterly basis from 1994 to 1995 for 13 selected private wells and the City of Kent Clark Springs facility. Results from the sampling did not show any contaminants that can be traced to the wastes. Prior to that, in 1990, the surface waters from mine portals (Rogers #2 and #3 which are at the north and south ends of the former mine), nine private wells, and the Clark Springs well were sampled and analyzed (Geraghty and Miller, 1990; Washington State Department of Health WDOH, 1992). There were no contaminants above drinking water standards. The WDOH report concluded that, at the time of sampling, the quality of drinking water in the area had not been adversely affected by mine disposal activities.

Q: Where can I find copies of the Consent Decree and exhibits including the Draft Cleanup Action Plan?

A: Documents are located at Maple Valley Public Library and at the Department of Ecology Northwest Regional Office Central Records located at 3190 160th Ave. SE, Bellevue, WA 98008.

Landsburg Mine Site

For Ecology, please contact Sally Perkins to schedule an appointment:

Email: sally.perkins@ecy.wa.gov

Phone: (425) 649-7190

Appointment hours are available on Tuesday, Wednesday or Thursday at 08:00 a.m. –12:00 p.m. and 1:00 p.m. – 4:30 p.m.

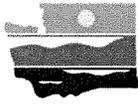
Or you may also download the documents by going to Ecology's website for the Landsburg Mine Site at: <https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=60>

Q: How can I be involved with the Landsburg Mine Site Cleanup process?

A: To be involved you can:

- 1) Sign up to be on the Landsburg Mine Site mailing list.
- 2) Attend Ecology's public meetings.
- 3) Provide feedback during this public comment period and future comment periods.
- 4) Visit the Landsburg Mine website at: <https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=60>

If you need this publication in an alternative format, call (425) 649-7117. Persons with hearing loss, call 711 for Washington State Relay Services. Persons with speech disability call (877) 833-6341.



DEPARTMENT OF
ECOLOGY
State of Washington
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Bellevue, WA 98008

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Landsburg Mine Site King County

Ecology Seeks Comments on Proposed Cleanup Documents

**Public Comment Period:
October 11 – November 11, 2013**

If you need this document in a format for the visually impaired, call (425) 649-7117. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call (877) 833-6341.

Landsburg Mine Public Meeting

A public meeting will be held to provide information on the proposed cleanup of the Landsburg Mine site. You will have an opportunity to ask questions, talk with Ecology, and discuss concerns you may have about the site.

Date: October 24, 2013

Time: 6:30 – 7:00 p.m. Open house
7:00 – 8:30 p.m. Presentation and
Questions & Answers

Location: Tahoma Jr. High School
25600 SE Summit Landsburg Rd
Ravensdale, WA 98051

**Landsburg Mine Site, Ravensdale
Public Comment Period
For Proposed Cleanup**

October 2013



Agenda

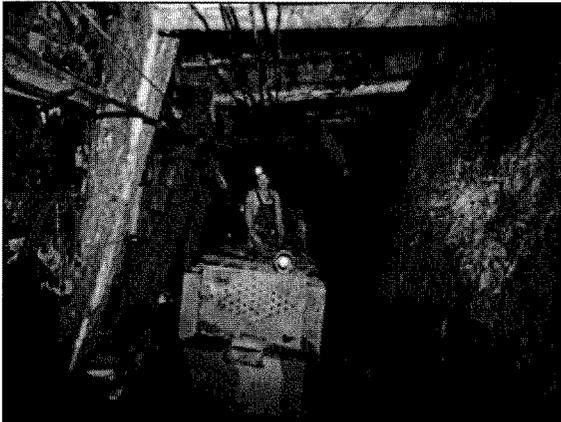
6:30 – 7:00 pm: Open House

7:00 – 7:30 pm: Presentation

Jerome Cruz (Department of Ecology)

Douglas Morell (Golder Associates)

**7:30 – 8:30 pm: Open Forum (Questions
and Answers)**

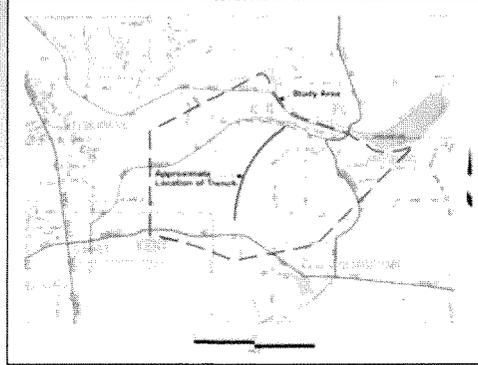


Landsburg Mine site

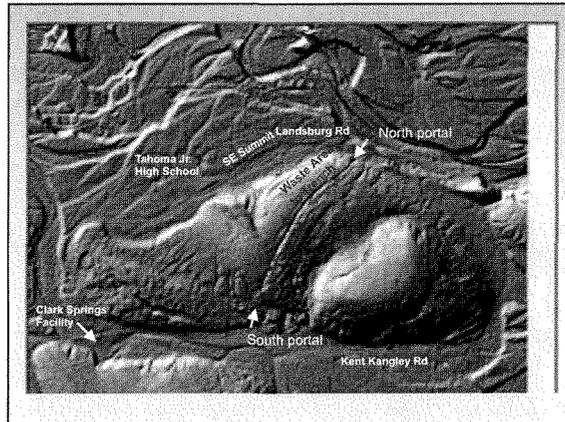
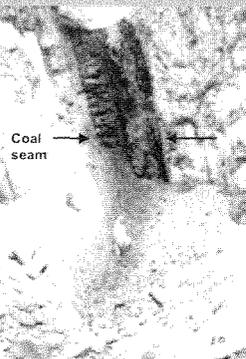
- Draft Cleanup Action Plan completed.
- Groundwater coming from mine remains clean.
- No change for the last 20 years of monitoring and investigation.

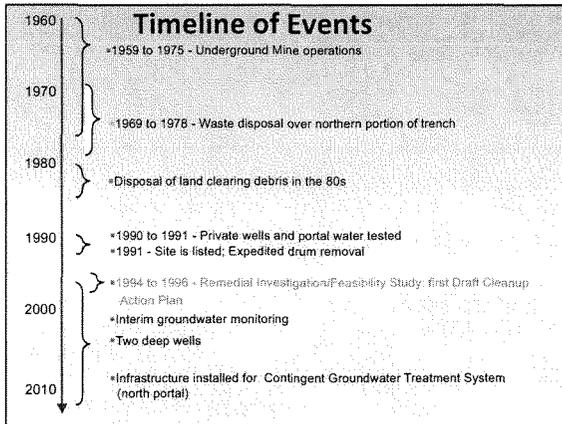
Site Background and History

Site Location and Background

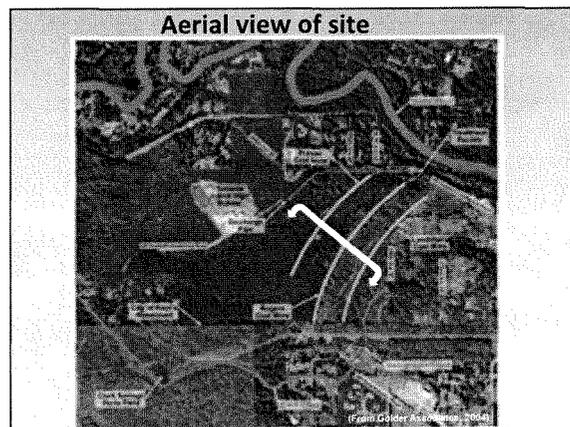


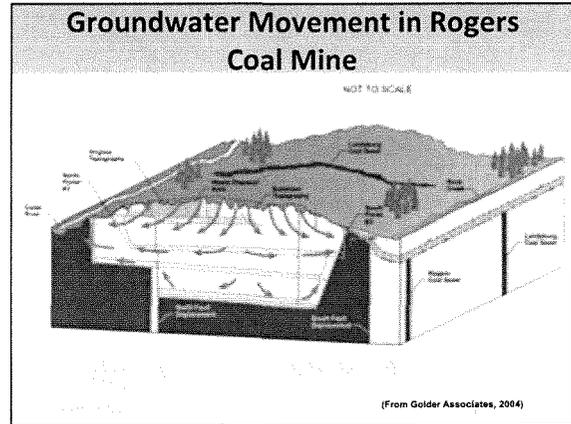
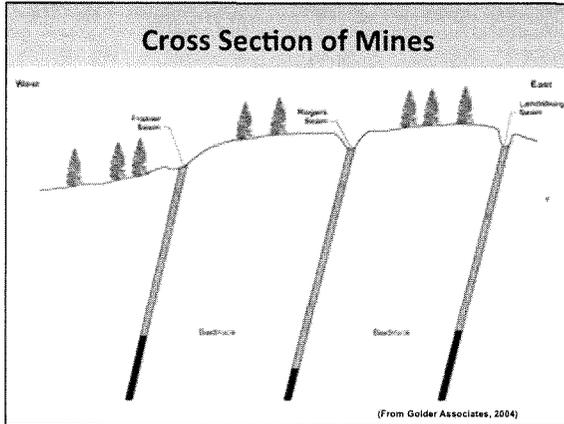
Rogers Coal Seam





- ### Landsburg Mine Original Potentially Liable Persons (PLPs)
- Browning-Ferris Industries/Allied Waste
 - BNSF Railway Company
 - PACCAR Inc
 - Plum Creek Timberlands, L.P.
 - TOC Holdings Co.
 - Palmer Coking Coal Company, LLP





Key Investigative Results

- Wastes were disposed in the northern trench area.
- 20 years of groundwater monitoring.
- No groundwater contamination coming out of the mine.
- No threat to human health and the environment outside of northern trench area.

Ready for cleanup

- Hydrogeology known
- Cleanup Action Plan ready



Key Cleanup Concepts

- Precautionary assumption that wastes could migrate out via groundwater.
- Groundwater travels predominantly toward the former mine portals.
- Waste removal not practical.

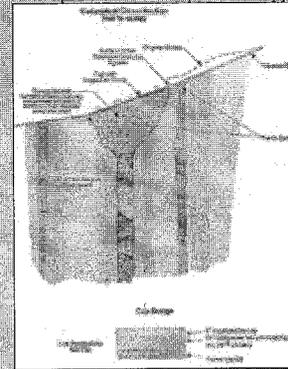
Proposed Cleanup Action

- Cap and diversion trenches
- Monitoring wells
- Institutional controls
- Contingency plans and infrastructure

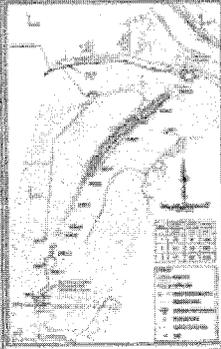
Proposed Remediation System

- Low permeability cover cap over waste
- Surface water diversion around mine trenches

Proposed Cap Design

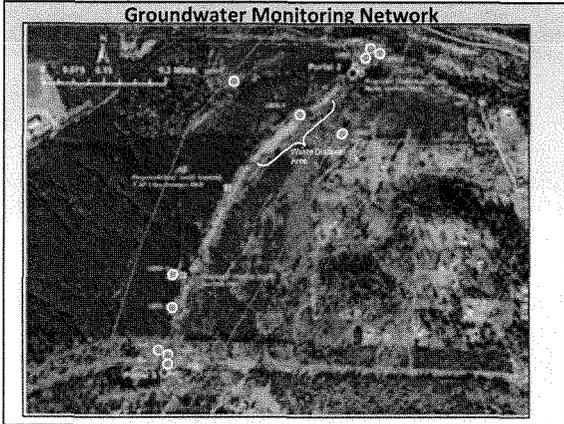


Proposed Cap & Drainage Diversion



Proposed Remediation System (continued)

- Additional early warning monitoring wells
- Groundwater monitoring indefinitely
- Funding indefinitely by potentially liable persons.

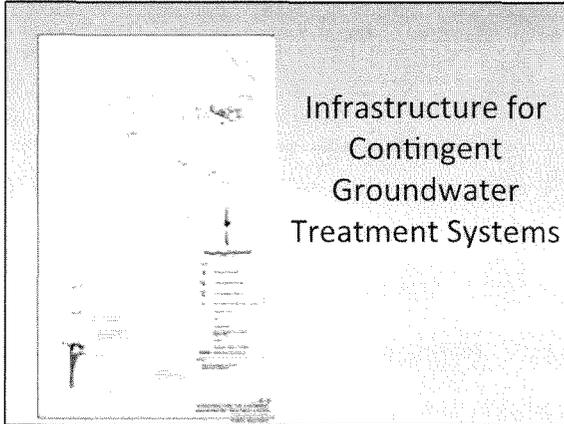


Groundwater monitoring schedule

Period	When	What
CONSTRUCTION	Every two weeks	General parameters (pH, turbidity, dissolved oxygen, etc.)
	Every month	General & Volatile organics
POST-CONSTRUCTION		
Year 1	Every three months	Full suite (1st round) Partial suite (rest of year)
Years 2 to 5	Twice a year	Full (1st round) Partial (rest of year)
Years 6 to 10	Once a year	Full suite
Years 11 and beyond	Once every 2 ½ years	Partial suite (North)
	Once every 5 years	Full suite (North) Partial suite (South)
	Once every 10 years	Full suite (South)

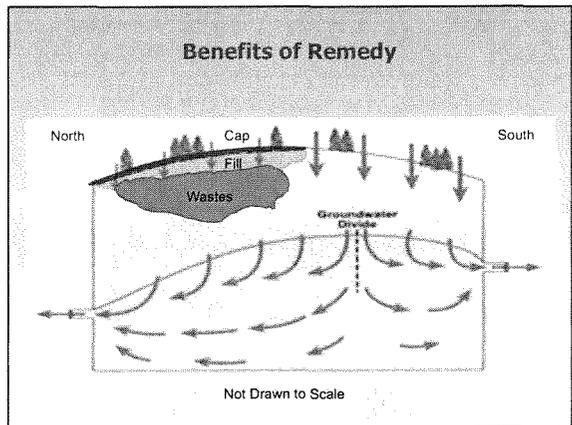
- ### Proposed Remediation System (continued)
- Institutional controls on groundwater use at property
 - Institutional controls on mine site use and capped areas

- ### Proposed Remediation System (continued)
- Contingent groundwater treatment system
 - Contingency plans in case of detection



Benefits of Proposed Remedy

- Wastes isolated.
- Less water entering the mine.
- Less outflow from the mine.
- Groundwater divide will be maintained.
- Contingency plans.



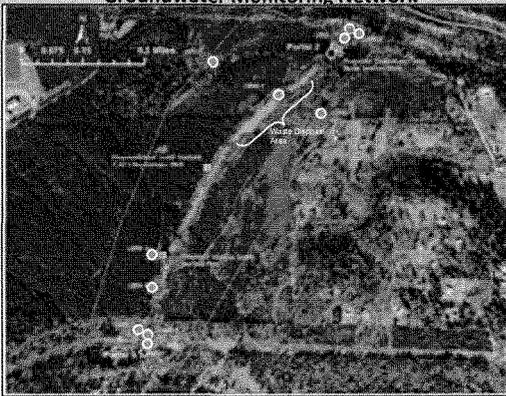
SUMMARY

- Studies are done.
- Confidence in results.
- No detections in 20 years.
- Cleanup actions will work.

It is time to get the cleanup done.

Question and Answer

Groundwater Monitoring Network



[Ecology home](#) > [Toxics Cleanup](#) > [Sites](#) > LANDSBURG MINE

LANDSBURG MINE

PUBLIC COMMENT PERIOD EXTENSION FOR PROPOSED CLEANUP: OCTOBER 11, 2013 - DECEMBER 12, 2013

The draft plan to clean up the Landsburg Mine site is now available for public review and comment. Ecology and the group of companies responsible for the cleanup will enter into a Consent Decree which is a legal agreement filed in court. In the agreement, cleanup will occur in accordance with the draft Cleanup Action Plan, an exhibit in the Consent Decree. Ecology has made available the following documents:

Consent Decree and exhibits

EXHIBIT A. Site Diagram

EXHIBIT B. Cleanup Action Plan, (CAP) [July 31, 2013]

(includes State Environmental Policy

Act or SEPA Checklist and Determination of Non-Significance)

EXHIBIT C. Schedule, [July 31, 2013]

EXHIBIT D. Public Participation Plan

EXHIBIT E. Introduction to Parts A, B, and C, [July 31, 2013]

Part A – Compliance Monitoring Plan, [July 31, 2013]

Part B – Operation and Maintenance Plan, [July 31, 2013]

Part C – Contingent Groundwater Extraction and Treatment

System Plan,

[July 31, 2013]

EXHIBITS F-1 & F-2 Environmental Covenants

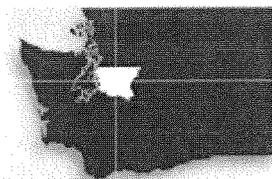
EXHIBIT G. Applicable and Potentially Applicable Permits and Requirements

Documents are located at:

Maple Valley Public Library, 21844 SE 248th Street Maple Valley, WA 98038

Department of Ecology Northwest Regional Office Central Records, 3190 160th Ave. SE, Bellevue, WA 98008. For Ecology, please contact Sally Perkins to schedule an appointment: Email: sally.perkins@ecy.wa.gov. Appointment hours are available on Tuesday, Wednesday or Thursday at 8:00 a.m. –12:00 p.m. and 1:00 p.m. – 4:30 p.m.

Send your written comments to Jerome Cruz, Ecology Site Manager, by emailing jerome.cruz@ecy.wa.gov or by mail to 3190 160th Ave SE, Bellevue, WA 98008. For special accommodations or documents in alternative format, call (425) 649-7117, 711 (relay service), or (877) 833-6341 (TTY).



SITE INFORMATION

Facility Site ID: # 2139

Cleanup Site ID: 60

Location:

Ravensdale, King County

Status: Cleanup Started



[View Electronic Documents](#)

[ISIS Site Summary Report](#)

Contacts:

[Jerome Cruz](#)

Site Manager

425-649-7094

[Nancy Lui](#)

Public Involvement

Coordinator

425-649-7117

Document Repositories:

Northwest Regional Office

3190 160th Ave SE
Bellevue, 98008-5452
(425)649-7190

Maple Valley Public Library

21844 SE 248th Street
Maple Valley, 98038
(425)432-4620

- [Consent Decree Fact Sheet](#)
- [Consent Decree and Exhibits](#)
- [Updated Public Participation Plan](#)
- [State Environmental Policy Act Determination of Nonsignificance](#)
- [State Environmental Policy Act Checklist](#)

LANDSBURG MINE PUBLIC MEETING OCTOBER 24, 2013

A public meeting will be held to provide information about the proposed cleanup actions and other documents for Landsburg Mine Site. You will have an opportunity to ask questions about the Site.

Date: October 24, 2013

Time: 6:30 –7:00 p.m. Open House
7:00 – 8:30 p.m. Presentation and Questions and

Answers

Location: Tahoma Jr. High School
25600 SE Summit Landsburg Rd
Ravensdale, WA 98051

- [Landsburg Mine Presentation](#)

GENERAL QUESTIONS AND ANSWERS ABOUT LANDSBURG MINE SITE

Q: What is the nature and history of contamination at the Site?

A: From the late 1960s to the late 1970s, the northern part of the trench was used as a disposal site for a variety of industrial wastes. The wastes either were contained in drums or were drained from tanker trucks. Records indicate that about 4,500 drums and 200,000 gallons of oily waste water and sludge were disposed of in this portion of the trench.

Samples taken from recovered drums indicate that the contents were organic and inorganic industrial waste, including paint waste, polychlorinated biphenyls (PCBs), solvents, cyanide, metals, and oily sludge. A portion of the waste may have been burned during fires in the early 1970s. Disposal of land-clearing debris and construction debris in the trench continued until the early 1980s.

Q: Is the contamination at the Site dangerous?

A: Based on the results of the remedial investigation, the wastes are confined to the northern part of the trench and within the former mine. This area is fenced off and not accessible to the public. It was determined that the main potential pathway for pollution is from groundwater that comes out of the former mine. However, there has been no contamination detected in groundwater at the Site to date. The RI/FS report provided possible reasons for this.

Given these conditions, the preferred approach is to cap the wastes in the northern trench area and add contingent safety precautions. The approach also includes regularly monitoring groundwater with a contingency plan in place to contain, treat, and safely dispose of contaminated groundwater in case of a possible future detection of contaminated groundwater at the Site.

Q: Why has groundwater contamination not been detected at this site?

A: In the 1996 Remedial Investigation, four possible reasons were proposed. They include:

- 1) Wastes disposed in the trench are no longer present, either because they were consumed in the fires that were known to have occurred, or they already discharged to Cedar River through the mined-out Rogers Seam.
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installed in order to be protective.

Any amount of residual contamination left behind would still be a potential source of contamination to groundwater from the mine. Therefore, since capping and groundwater monitoring will still have to be done after excavations, there would be little added benefit to this approach.

Q: Who are the Potentially Liable Persons (PLPs) for cleaning up Landsburg Mine Site?

A: They are: Browning-Ferris Industries of Illinois, Inc., BNSF Railway Company, PACCAR Inc, Plum Creek Timberlands, L.P., TOC Holdings Co., and Palmer Coking Coal Company. Burlington Environmental Inc., a subsidiary of Philip Services Corporation or PSC, settled its liability under a 2003 bankruptcy settlement.

Q: Who pays for the cleanup?

A: The Potentially Liable Persons are responsible for paying all costs associated with cleaning up the Landsburg Mine Site, including state oversight costs.

Q: Who oversees the cleanup at this site?

A: The Department of Ecology Toxics Cleanup Program in the Northwest Regional Office. The assigned site manager is responsible for ensuring the cleanup follows state cleanup regulations.

SITE DESCRIPTION

The Landsburg Mine site is a former underground coal mine located approximately 1.5 miles northwest of Ravensdale in southeast King County. The site is located directly south of the S.E. Summit-Landsburg Road and north of S.E. Kent-Kangley Road. The Cedar River is approximately 500 feet north of the site. The former mine site occupies property currently owned by Palmer Coking Coal Company and formerly by the Plum Creek Timber Company, L.P. During the late 1960s to late 1970s, industrial wastes were disposed in the trench that formed above the former mine.

The 1996 remedial investigation and subsequent interim, ongoing groundwater monitoring have shown no impacts to groundwater at the site or surrounding areas.

SITE DOCUMENTS

For a complete list of documents please see "View Electronic Documents" on the right.

RELATED INFORMATION

- [Watershed Information for WRIA 8](#)

- [Landsburg Mine Flyover video](#) This is a map coverage using Lidar, or light radar imaging, which strips off vegetation including tree cover to give a view of the terrain as “bare earth”.
- [King 5 News: Old Mine near Ravensdale](#)

ADDITIONAL RESOURCES

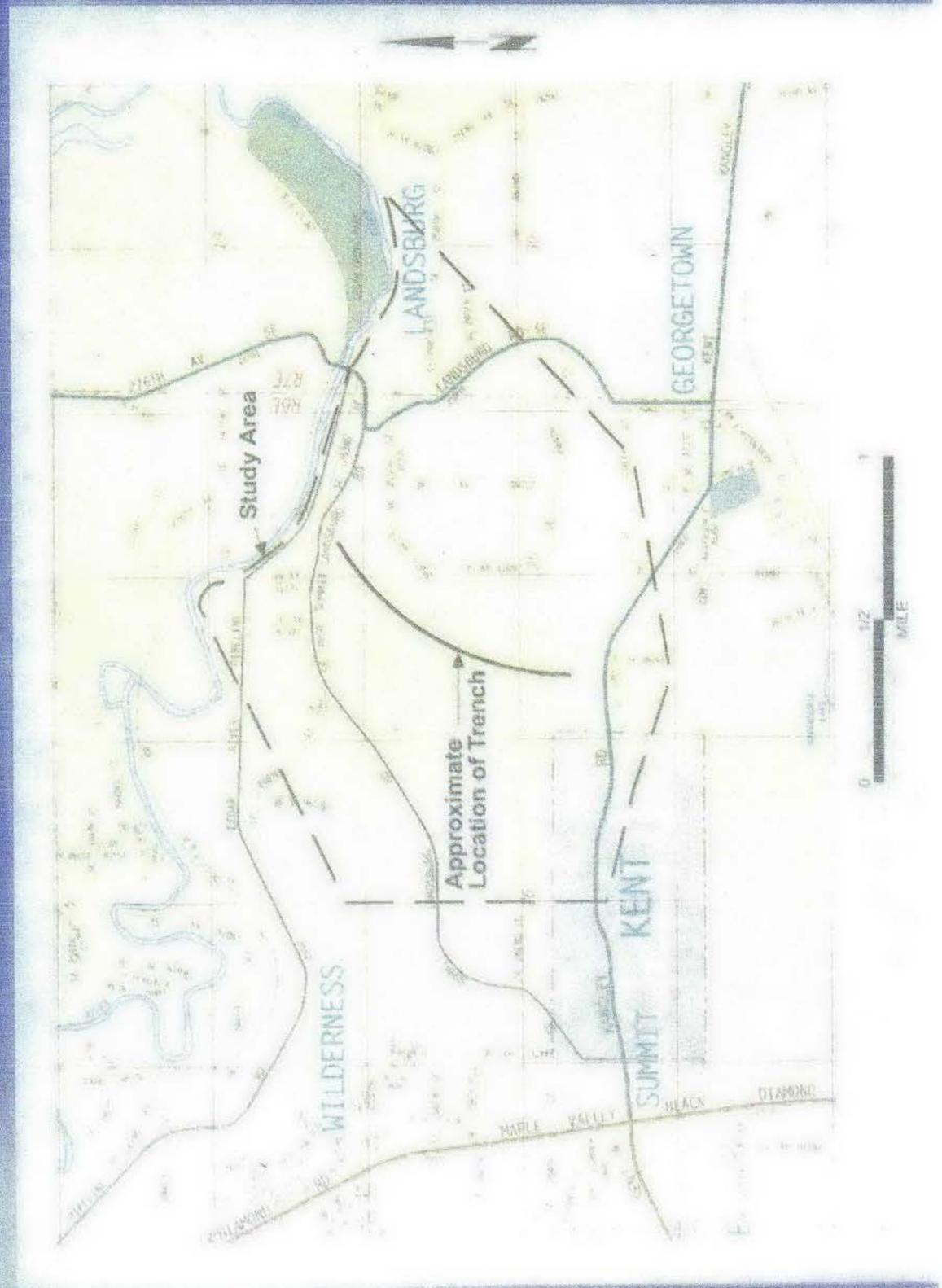
- [Acronyms used by the Toxics Cleanup Program](#)
- [Cleanup Process: Major Steps & Definitions](#)
- [Data Submittal Requirements for All Cleanup Sites](#)
- [Toxics Cleanup publications](#)

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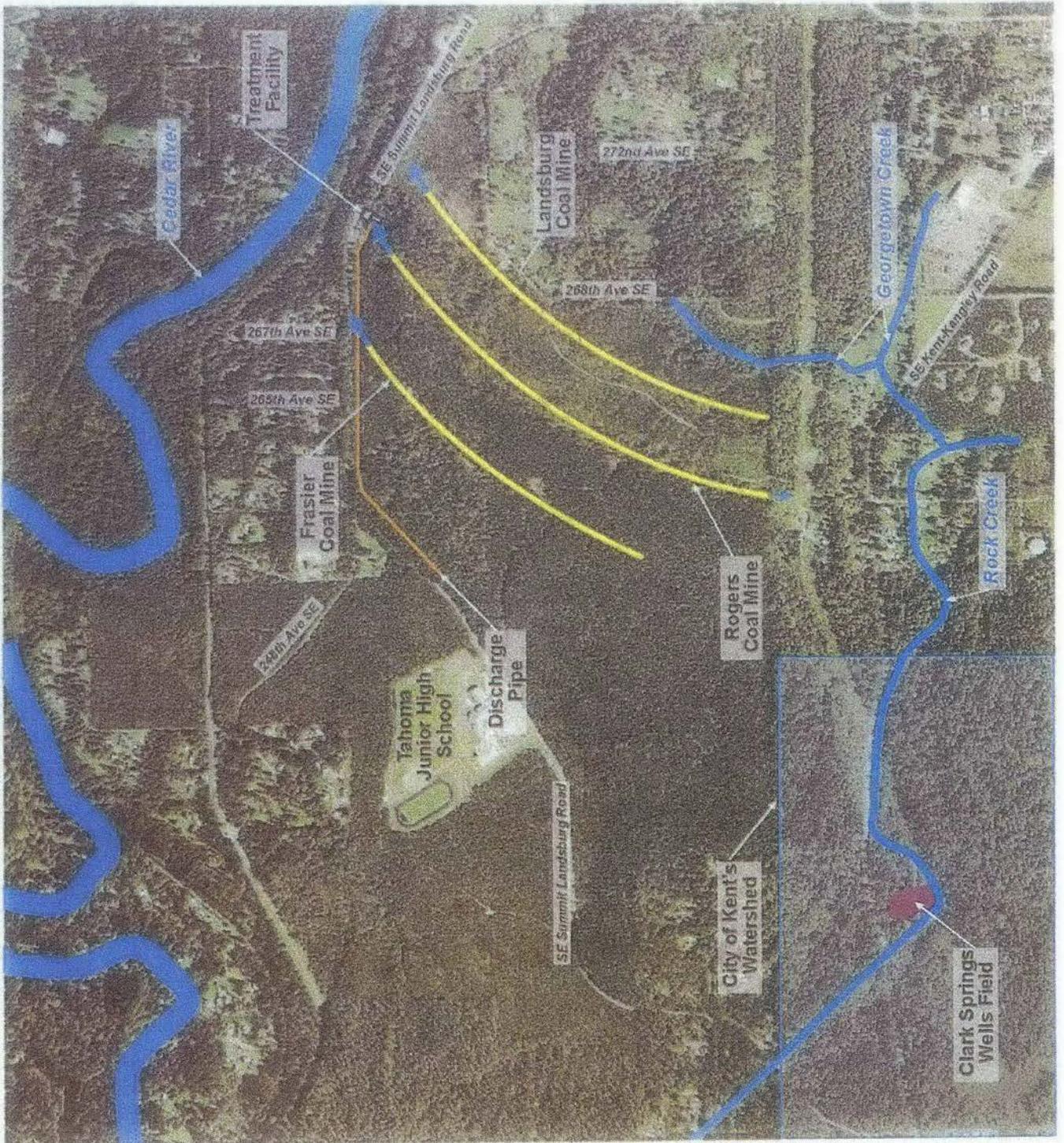
ATTACHMENT C

Maps of Landsburg Mine Site and Surrounding Water Resources

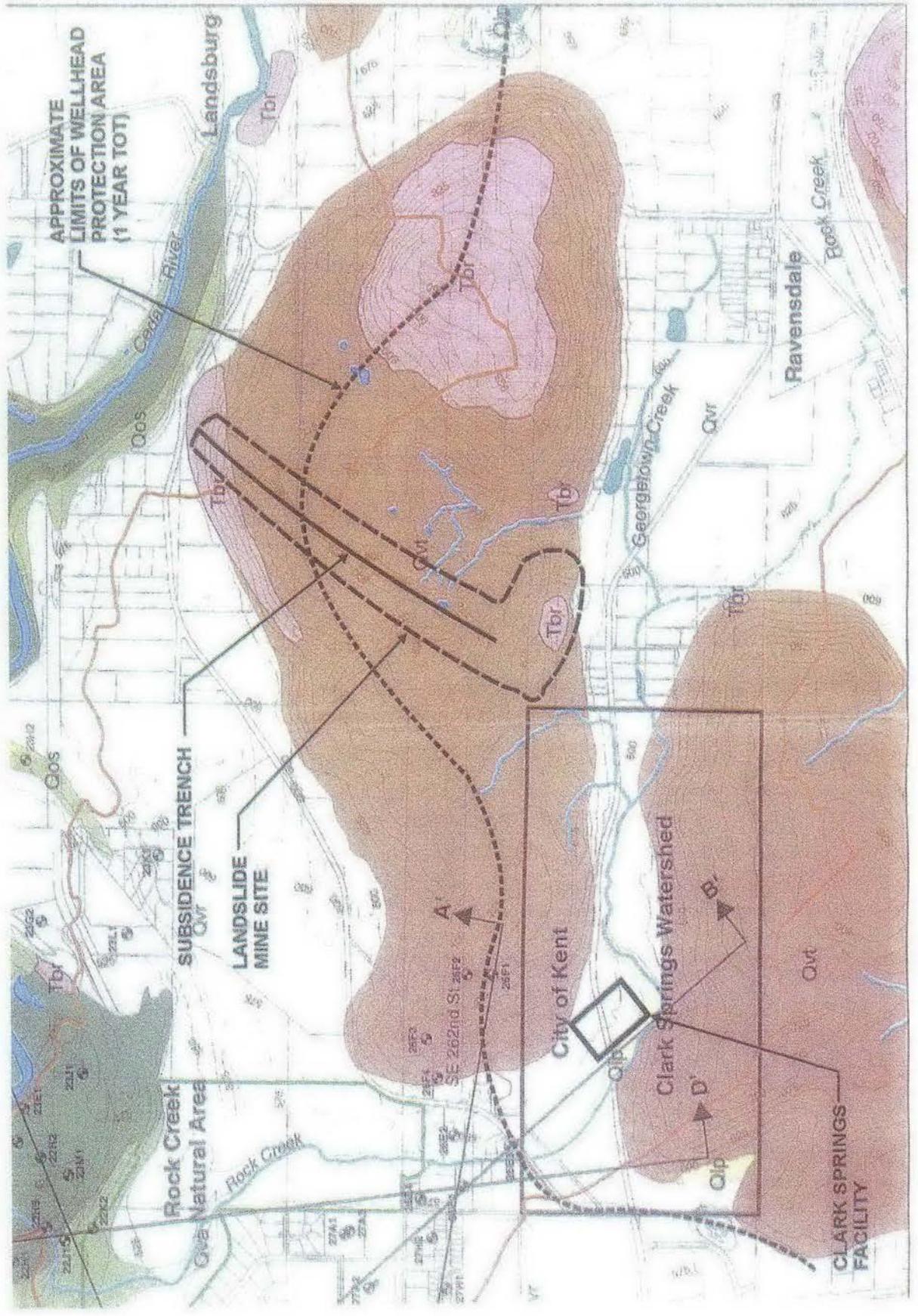
Site Location



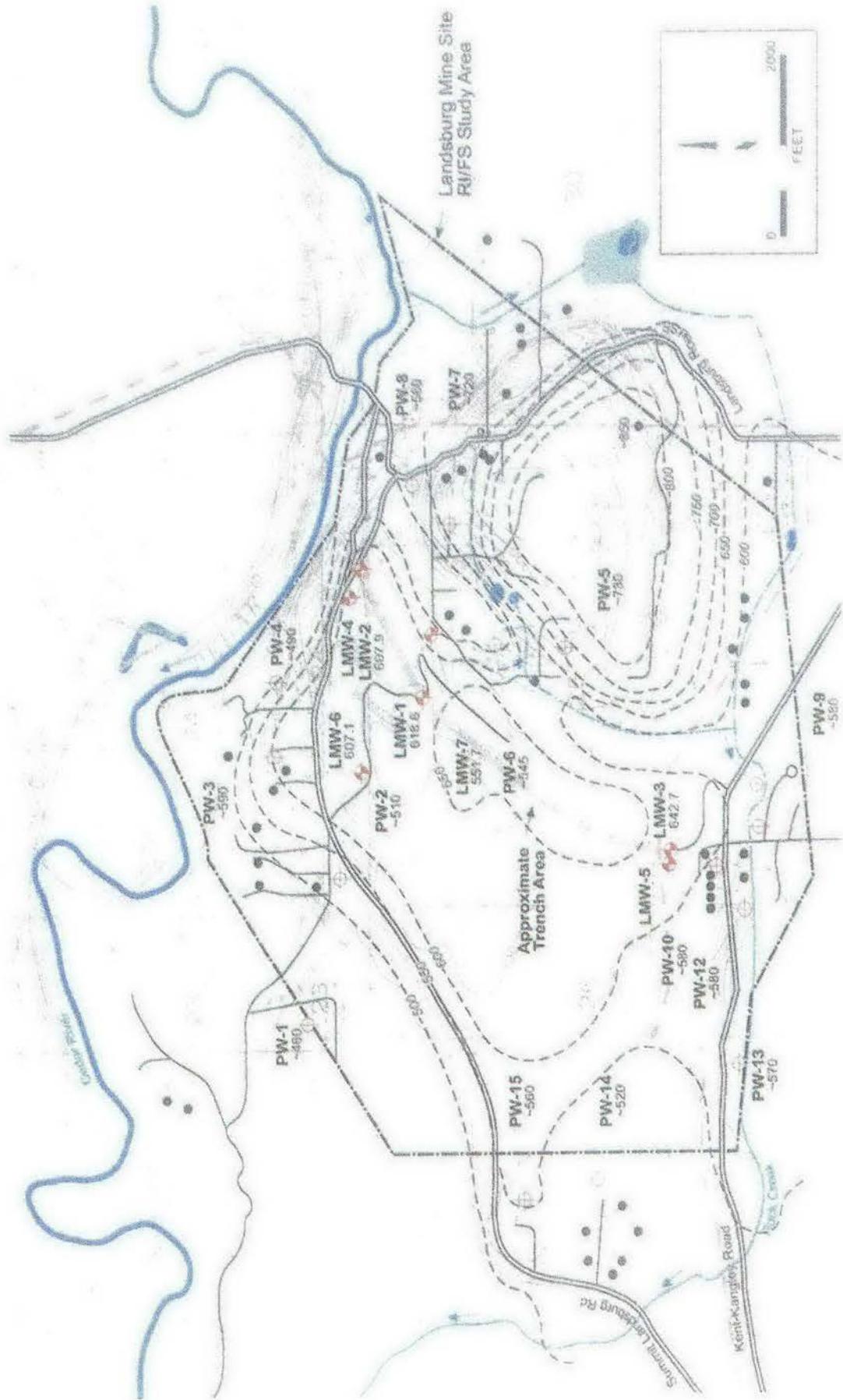
Aerial view of site



Site Location of Kent Water Supply



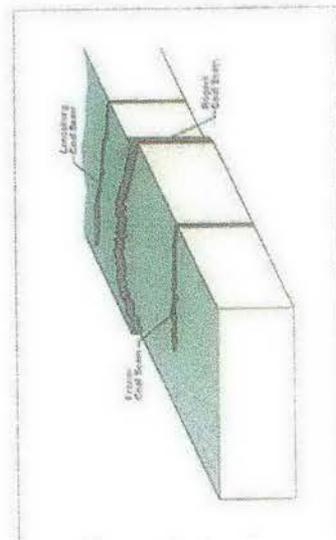
Private Wells Monitored (1990)



ATTACHMENT D

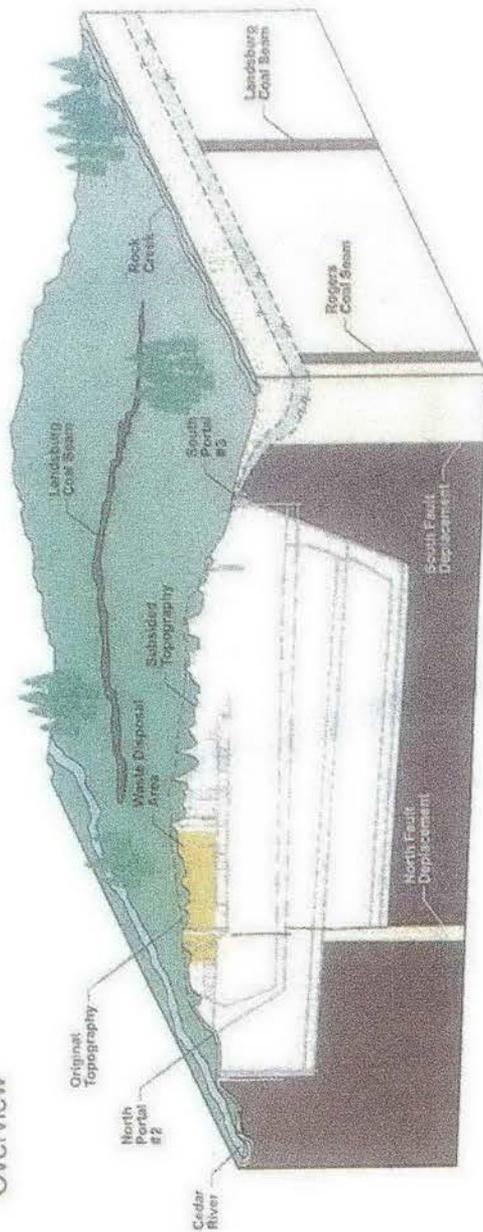
Landsburg Mine Cross-Section Illustration

3-D View of Mine Site



Overview

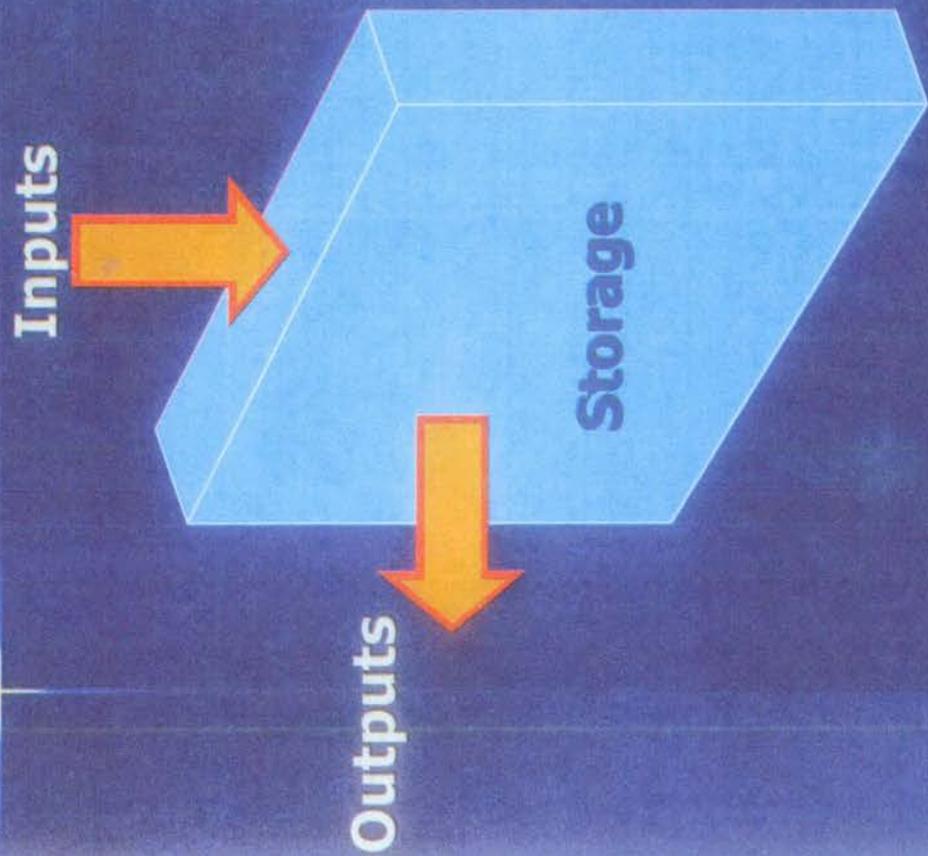
NOT TO SCALE



ATTACHMENT E

“Black Box” Illustrations

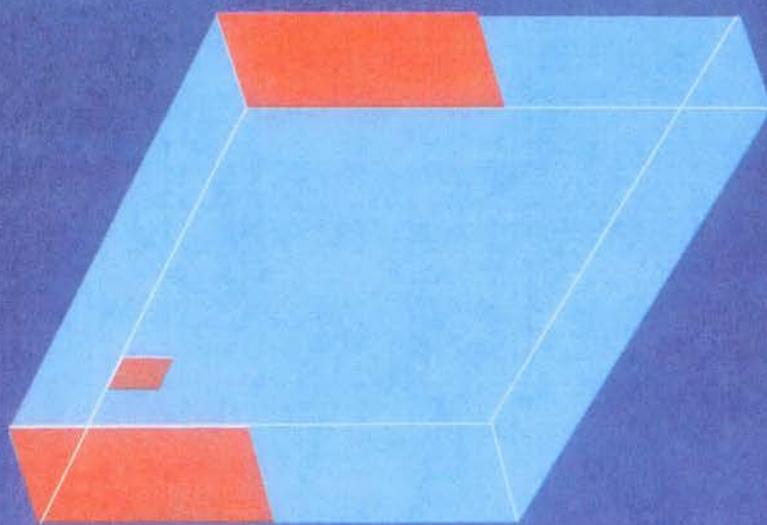
What is a "Black Box"?



"The term "Black Box" is used to describe a undefined system where internal characterization is difficult"

– Phase I RI Work Plan, GAI, 1992

What Portions of the "Black Box" Were Evaluated?



ATTACHMENT F

Aspect Consulting's Comments Regarding The Proposed Plan

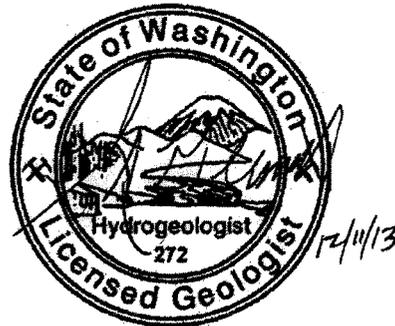
MEMORANDUM

Project No.: 090015-001

December 11, 2013

To: City of Kent—For Submission to Washington Department of Ecology

From:



Steve J. Germiot

Steve Germiot, LHG, CGWP
Senior Associate Hydrogeologist



Peter Bannister, PE
Senior Groundwater Resources Engineer

Re: **Comments on Final Draft Exhibits to Proposed Consent Decree for Landsburg Mine Site (dated July 31, 2013)**

This memorandum provides Aspect Consulting's comments on the Final Draft Exhibits to the Proposed Consent Decree for the Landsburg Mine Site (Site), dated July 31, 2013 (collectively described in these comments as the "Proposed Plan" unless clarity requires reference to specific exhibits). The Proposed Plan was issued by the Washington State Department of Ecology (Ecology) for public comments to be submitted between October 11 and December 12, 2013. We provide these comments with the understanding that the City of Kent (Kent) will submit them to Ecology as part of the public comment process.

We respectfully submit these comments with the intent to assist Ecology with improving the Proposed Plan and ultimately require a Site remedy that will ensure protection of Kent's water supplies and other off-Site water resources in perpetuity.

General Comments

As indicated in more detail below, in our opinion the Proposed Plan fails to comply with the requirements of Washington's Model Toxics Control Act (MTCA). The Proposed Plan fails to provide sufficient certainty for long-term protection of nearby public water supplies and other off-Site water resources—including Kent's Clark Springs water supply, the Rock Creek watershed, the Cedar River watershed, and neighboring private domestic water wells. Ecology should reject the Proposed Plan as drafted, and should require revisions to the

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Proposed Plan necessary to achieve protectiveness required by MTCA. Our general comments are outlined below, followed by specific comments.

A. The Remedy Must Include The Ability To Respond Immediately With An Installed, Tested, And Robust Groundwater Containment System If Contaminated Groundwater Threatens To Migrate From The Site. The Proposed Plan Must Be Revised To Define Timelines And Deadlines For Ecology's Oversight and Enforcement Activities.

While the Proposed Plan contains many flaws, the Contingency Plan is its most fatal flaw. The Proposed Plan includes a misnamed "Contingent Groundwater Treatment System" with an undue emphasis upon the treatment of contaminated groundwater extracted from the Site and zero emphasis on the extraction component of the system that would actually accomplish containment. The appropriate name is the "Contingent Groundwater Containment System" because its sole objective would be hydraulic containment at the Site. We refer to the system as such throughout our comments.

The Proposed Plan anticipates that, if contaminated groundwater is detected in certain monitoring wells, the contingency response action will be groundwater pumping to achieve hydraulic containment (i.e., prevent migration of contaminated groundwater from the Site). However, the Proposed Plan fails to require up-front design, approval, permitting, construction, and testing of the Contingent Groundwater Containment System. Instead, the Plan anticipates that the many activities necessary to achieve hydraulic containment would wait until contaminated groundwater is detected at the edges of the Site. And then, the Proposed Plan speculates that those many activities can be accomplished in "a relatively short time."¹ The Proposed Plan fails to provide a complete list of the necessary activities or describe how they would be achieved. Based on our experience, the Proposed Plan is unrealistic in its hope that design, approval, permitting, construction, and hydraulic containment all can be done in a sufficiently "short time", once contaminants are already at the edge of the Site, to prevent off-Site migration of contaminated groundwater. Note that once contaminants are already at the edge of the Site, if not actively contained, they would migrate off-Site and degrade off-Site water quality. Thus, the Proposed Plan as drafted anticipates that degradation of off-Site water resources will be allowed to occur as part of the Contingency Plan.

As discussed further below, the Proposed Plan also fails to establish any timelines or deadlines for the many activities necessary to achieve installation of the Contingent Groundwater Containment System—whenever it is installed. There are no established timelines or deadlines for design, approval, permitting, construction, operation, or achieving hydraulic containment. See Proposed Consent Decree, Exhibit C ("Schedule"). Without such timelines and deadlines, Ecology cannot oversee and enforce remedy implementation as required by MTCA. The hope for accomplishing something within "a relatively short time" is not an enforceable deadline. In order for Ecology to exercise its enforcement powers under RCW 70.105D.050, enforceable timelines/deadlines must be established. WAC 173-340-380(1)(a)(v) requires that a CAP include the schedule for implementation of the CAP.

¹ Final Draft CAP, p. 3.

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Furthermore, the Proposed Plan relies upon unproven assumptions regarding the groundwater extraction rates required to achieve hydraulic containment at the Site. The Proposed Plan is based only upon anecdotal information about historical dewatering of the mine at approximately 40 gallons per minute (gpm), a rate that is contradicted by pumping test information presented in the RI/FS. We expect that mine dewatering occurred gradually over many years, as mining gradually proceeded to greater depth, but many years of pumping would not be acceptable if containment of off-Site contaminant migration is needed. There is now, and will be in the future, a complete lack of understanding of groundwater extraction rates and duration required to achieve hydraulic containment unless and until the extraction system is actually installed and tested. The failure to require up-front design, approval, permitting, construction, and testing of the extraction components of the Contingent Groundwater Containment System is the most fatal flaw in the Proposed Plan as written.

Immediate response will be necessary if contaminated groundwater threatens to migrate beyond where the institutional control (prohibiting groundwater use) can provide protectiveness for human health and the environment. The determination of the groundwater extraction rates and durations required to achieve hydraulic containment at each portal cannot wait until after the containment system is actually needed. Such a critical determination is routinely made during remedial design and construction at MTCA sites, and must be required in the Final CAP for this Site.

Therefore, in order to be sufficiently protective, the Proposed Plan must be revised to require, as part of remedial design following Consent Decree execution, the up-front installation and testing of the full Contingent Groundwater Containment System, including a demonstration of its ability to extract groundwater and to achieve hydraulic performance standards for containment at both portals (described below). Designing the groundwater treatment component of the Contingent Groundwater Containment System can reasonably be delayed until the specific contaminants in extracted groundwater are understood, as the Proposed Plan states. However, that logic does not apply to the extraction component of the System, which is independent of contaminant type.

In its January 25, 2010, email to the PLP Group and Kent, Ecology stated that an element of the DCAP would be “pre-positioning at the south portal area of the components needed for timely emergency pumping and conveyance of groundwater to the north portal groundwater treatment system.” Lacking installation and testing of an extraction well at the south portal, the Proposed Plan does not keep this prior commitment to provide for timely emergency pumping.

B. The Remedy Must Define Enforceable Deadlines For The Contingent Groundwater Containment System’s Installation, Operation, and Achievement Of Hydraulic Containment.

As discussed above, the Proposed Plan fails to define any timelines or deadlines for design, approval, permitting, construction, or operation of the Contingent Groundwater Containment System. The Proposed Plan also fails to define any enforceable timeframes and deadlines for the Contingent Groundwater Containment System’s achievement of hydraulic containment once system operation is “triggered” by detection of contaminants of concern in Site groundwater.

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The Proposed Plan includes no such information despite prior assurances from Ecology that it would. In 2008, the PLP Group submitted responses to Ecology's review comments on a 2002 draft cleanup action plan, in which the PLP Group stated, "The emergency groundwater capture and pump-back system could be installed and operational in less than a month." Ecology responded, "Ecology suggests a response time within a week to get the needed groundwater capture system in place and operating." Subsequently, Ecology's October 7, 2008 letter to the City, and Ecology's January 25, 2010 email to the PLP Group and Kent, stated that the CAP would include the time to initiate groundwater extraction for containment. No such information is provided in the Proposed Plan, which is a fatal flaw as written. Without defining enforceable timeframes and deadlines, Ecology will lack the mechanisms needed to oversee and enforce implementation of the Contingent Groundwater Containment Plan and thus will not be able to ensure remedy protectiveness as required by MTCA. In order for Ecology to exercise its enforcement powers under RCW 70.105D.050, enforceable timelines/deadlines must be established. WAC 173-340-380(1)(a)(v) requires that a CAP include the schedule for its implementation.

The Final CAP must include enforceable deadlines for achieving defined hydraulic containment performance standards (described below) within one (1) month of the operational "trigger" (also discussed below).

C. The Proposed Plan's "Trigger" For Initiating Operation Of The Contingent Groundwater Containment System Is Not Sufficiently Protective Because The Proposed Plan Could Allow Contaminated Groundwater To Migrate From The Site And Degrade Adjacent Water Resources.

In addition to waiting until it is too late to install the extraction components of the Contingent Groundwater Containment System, the Proposed Plan would delay operation until after detection (and then resampling) of contaminants exceeding MTCA cleanup levels at the compliance wells located at the edge of the Site. Coupled with the infrequent and insufficiently protective monitoring conducted in the later years of the proposed monitoring program (discussed below), this means that the Proposed Plan could allow contaminated groundwater to migrate off-Site into adjacent water resources—perhaps for years given the long intervals between sampling events—before containment would even be attempted.

Instead of allowing the consequences anticipated by the Proposed Plan to occur (degradation of off-Site water resources), Ecology must require that the "trigger" for operation of the Contingent Groundwater Containment System be the detection of any contaminant of concern at or above 0.5 MTCA cleanup levels, not exceeding the cleanup levels, at a monitoring well located near the portals of the Site. This is a reasonable and necessary precaution to comply with MTCA's protectiveness requirements—and particularly necessary if the "Black Box Approach" to remedy selection is to be consistently applied at this Site.

The operation of the System should not await installation of appropriate treatment technology for the extracted groundwater since it can be reasonably expected that extracted groundwater quality would comply with chemical criteria for discharge to sanitary sewer without treatment for at least some period of time after initial detection and System startup. However, requirements and specific plans should be established for interim handling and disposal of

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untreated groundwater if that is necessary. Timeframes/deadlines also should be established in the Final CAP to implement the appropriate treatment technology, as necessary.

The Final CAP also should specify the conditions for termination of operation of the Contingent Groundwater Containment System. The System should be required to operate until groundwater at all monitoring wells at the affected portal(s), and the pumped groundwater effluent, contain contaminant concentrations less than 0.5 MTCA cleanup levels for four consecutive quarterly monitoring events.

D. The Remedy Must Include Defined And Enforceable Hydraulic Performance Standards For Achieving Groundwater Containment.

A related flaw in the Proposed Plan as written is the lack of defined and enforceable performance standards for achieving hydraulic containment at the Site (i.e., what specifically must occur and where). Therefore, the Proposed Plan must include the following hydraulic performance standards for achieving containment by operation of the Contingent Groundwater Containment System:

- North Portal: Draw down and continuously maintain groundwater levels in all north portal monitoring wells (not pumping wells) at an elevation below that of the Cedar River (elevation approximately 500 feet) within one (1) month of confirming a contaminant concentration exceeding 0.5 the MTCA cleanup level at a north portal monitoring well.
- South Portal: Draw down and continuously maintain groundwater levels in all south portal monitoring wells (not pumping wells) at an elevation below that of Rock Creek (elevation approximately 580 feet) within one (1) month of confirming a contaminant concentration exceeding 0.5 the MTCA cleanup level at a south portal monitoring well.

The Contingent Groundwater Containment System should operate until groundwater at all monitoring wells at the affected portal, and the pumped groundwater effluent, are below 0.5 MTCA cleanup levels for four consecutive quarterly monitoring events.

Without such clearly defined performance standards, the Contingent Groundwater Containment System cannot be implemented by the PLP Group, and the Proposed Plan cannot be overseen or enforced by Ecology so as to achieve protectiveness as required by MTCA.

E. The Proposed Plan Anticipates That Monitoring, Maintenance, And Institutional Controls Will Terminate In The Future, Contrary To Many Past Promises Made By Ecology And The PLP Group. For This Site, MTCA Requires Monitoring, Maintenance, And Institutional Controls In Perpetuity.

The Proposed Plan's text to define the duration of monitoring and maintenance anticipates termination of those essential activities in the future:

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“Long-term confirmational groundwater monitoring and Site inspections and maintenance will continue until residual hazardous substance concentrations no longer exceed cleanup or remediation levels as described in the CAP resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment.”

Termination of monitoring/maintenance would be contrary to many past promises made to the public by Ecology and the PLP Group that monitoring/maintenance will occur “in perpetuity.”² Only recently has the “in perpetuity” promise changed into the vague and ambiguous word “indefinitely” now used in Ecology’s October 2013 Fact Sheet, public presentation materials, and website.³

In “ordinary” circumstances MTCA may provide an opportunity to terminate monitoring/maintenance if “residual hazardous substance concentrations no longer exceed cleanup or remediation levels” as provided in WAC 173-340-410(3): “Long-term monitoring shall be required if on-site disposal, isolation, or containment is the selected cleanup action for a site or a portion of a site. Such measures shall be required until residual hazardous substance concentrations no longer exceed site cleanup levels....”

However, as discussed below, this Site is “extraordinary” due to the “Black Box Approach” adopted by Ecology in 1993. Termination of monitoring/maintenance cannot possibly occur given the containment remedy and the “Black Box Approach.” Residual hazardous substance concentrations cannot possibly “no longer exceed cleanup or remediation levels” because the Proposed Plan includes no means whatsoever for demonstrating the levels of “residual hazardous substance concentrations”.

Furthermore, clause (2) quoted above is vague and ambiguous in anticipating that termination may occur in the situation described as “other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment.” What does that text mean? What are those vague “circumstances or conditions”? Those

² All of the following materials are located in the Ecology Site File: (a) Ecology Letter from Jerome B. Cruz, Site Manager, Toxics Cleanup Program, Northwest Regional Office to Douglas Morell, Golder Associates Inc. (February 2, 2004), p. 2; (b) PLP Group’s Presentation Materials for Ecology Technical Meeting (September 29, 2004), pp. 7, 29, and 47; (c) Ecology’s Questions and Answers Handout at Public Meeting Regarding Proposed Landsburg Mine Infrastructure Installation (February 7, 2006), p. 5; (d) Ecology’s Responsiveness Summary for Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System for the Landsburg Mine Site (June 2006), p. 36; (e) Ecology Presentation Materials for Landsburg Mine Background and Status Update (September 2008), p. 32; (f) Ecology Letter from Robert W. Warren, Section Manager, Toxics Cleanup Program, Northwest Regional Office to Larry Blanchard, Public Works Director, City of Kent (October 7, 2008), p. 2; (g) Ecology Presentation Materials for Cedar River Council Meeting (November 25, 2008), pp. 4 and 5; (h) Ecology Letter from Jerome B. Cruz, Site Manager, Toxics Cleanup Program, Northwest Regional Office to Douglas Morell, Golder Associates Inc. (January 25, 2010), p. 2; and (i) Ecology Presentation Materials for Landsburg Mine Brief Overview of the Site and Status Update Since 2008 (May 2011), pp. 4 and 5.

³ Ecology Fact Sheet for Landsburg Mine Site, “Consent Decree and Draft Cleanup Action Plan Now Available for Review” (October 2013), p. 8; and Ecology Website section dedicated to the Landsburg Mine Site, accessible at: <http://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=60>.

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“circumstances and conditions” cannot possibly occur because the Proposed Plan establishes no means of assessing the residual concentrations or the risks they pose. The concept is contrary to the “Black Box Approach”, which is supposed to assume the worst case in the “Black Box” and is supposed to conservatively protect against the “Black Box’s” unknowns—forever.

Thus, by including the ambiguous language above, the Proposed Plan is fatally flawed in its approach to defining the duration of monitoring and maintenance. The remedy must require “in perpetuity” monitoring and maintenance—the words that have been used by Ecology and the PLP Group for nearly ten years to assure the public about the protectiveness of the Site remedy.

The Proposed Consent Decree also anticipates that institutional controls may be terminated in the future.⁴ Institutional controls must remain in perpetuity for the same reasons that monitoring and maintenance can never be terminated—under the containment remedy and “Black Box Approach,” the elimination of institutional controls is impossible. The Proposed Consent Decree and exhibits must be revised to impose these requirements clearly and without ambiguity.

F. The Remedy Must Include More Protective Monitoring Frequencies.

In our opinion, the Proposed Plan’s monitoring frequencies are not sufficiently protective, undermine the supposedly conservative “Black Box Approach,” and cannot be justified by BIOSCREEN contaminant transport modeling. As contemplated by the Proposed Plan, the hazardous substances in up to 500,000 gallons of waste⁵ disposed inside the “Black Box” could migrate out of the Site for many years before monitoring would occur to detect the migration (assuming the monitoring wells will be located in the right pathways necessary to detect the migration).

The “Black Box Approach” to the conceptual site model is based upon very limited waste characterization data.⁶ Simulating a “Black Box” with the BIOSCREEN model requires use of numerous unproven assumptions, in this case including the most fundamental parameters (e.g., which way is groundwater flowing from the waste disposal area). BIOSCREEN is not a calibrated predictive tool, nor can it be in the circumstances of the Site, where the constituents and distribution of contaminants have not been characterized. As is often said in

⁴ Proposed Consent Decree, both Exhibits F (“Restrictive Covenant”), Environmental Covenant, Section 6 (“The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Covenant shall no longer limit use of the Property or be of any further force or effect.”).

⁵ The Final Draft CAP, p. 6, indicates that “an estimated 4,500 drums of waste and about 200,000 gallons of oily wastewater and sludges were disposed into the trenches.” The Final Draft CAP, p. 6, speculates that “[i]t is expected that many of the drums were only partially full.” Given that the “Black Box Approach” must assume the worst case, the estimated 4,500 drums at 55 gallons each would total 247,500 gallons. When added to the “about” 200,000 gallons of oily wastewater, the total approaches 500,000 gallons.

⁶ As discussed below, in our opinion, in the circumstances of this Site, the “Black Box Approach” and existing Site data cannot be reconciled with MTCA’s requirement that investigation be accomplished “to collect data necessary to adequately characterize the site for the purpose of developing and evaluating cleanup alternatives.” (WAC 173-340-350).

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referring to modeling efforts inadequately supported by data, “garbage in = garbage out.” In these circumstances, the saying applies.

Contaminant distribution and transport within the Site is not understood, so unfortunately there can be little confidence that the Proposed Plan’s “sentinel” wells are appropriately positioned to detect migrating contaminants. The Proposed Plan’s monitoring frequencies would not be protective of groundwater at the identified “compliance” wells if “sentinel wells” were to “miss” an advancing contaminant plume.⁷

We continue to maintain our opinion that the alternative set of confirmational monitoring frequencies justified in our November 9, 2009, memorandum provided to Ecology are necessary to account for very significant uncertainties in the “Black Box Approach”, and thus are necessary to provide the remedy protectiveness required by MTCA. More frequent monitoring, not less, is a necessary consequence of the “Black Box Approach.” The necessary monitoring frequencies are the following:

Protective Confirmational Monitoring Frequencies

Contaminants	Southern Pathway	Northern Pathway
VOCs; Diesel-range and Gasoline-range TPH; 1,4-Dioxane	0.25 year	0.25 year
Metals; SVOCs; Pesticides	5 years	2 years

If the Contingent Groundwater Treatment System is operated, groundwater monitoring should be conducted until groundwater at all monitoring wells at the affected portal(s), and the pumped groundwater effluent, contain contaminant concentrations less than 0.5 MTCA cleanup levels for four consecutive quarterly monitoring events.

G. The Proposed Plan Undermines The “Black Box Approach” By Relying Upon Speculation And Unproven Assumptions.

The Proposed Plan supposedly relies upon a unique “Black Box” conceptual site model. If there is a precedent for this approach, Ecology should reveal it when responding to these comments. If a “Black Box Approach” has been used by Ecology previously at other sites, it is unlikely that the circumstances involved a site where the primary drinking water supply for a city of 120,000 people is located immediately downgradient from the “Black Box.”

This “Black Box Approach” was adopted by Ecology in 1993, in approving the PLP Group’s work plan for the Site Remedial Investigation and Feasibility Study (RI/FS). In essence,

⁷ As indicated in the specific comments below, the Proposed Plan does not include the practicability demonstrations required by MTCA to justify the approval of any conditional points of compliance for this Site. WAC 173-340-720. Furthermore, existing Site data cannot substantiate such practicability demonstrations. As such, the standard point of compliance must be established throughout the Site at all monitoring wells (including all “sentinel” wells).

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Ecology determined that the hazardous substances disposed into the Landsburg Mine (into the "Black Box") would not be investigated or characterized to determine their chemical compositions, concentrations, masses, or locations. Ecology also determined that the hydrogeology inside the "Black Box" would not be investigated to assess pathways or propensities for the migration of contaminants with groundwater flow. Instead, Ecology decided that those hazardous wastes must be assumed to reside within the uninvestigated "Black Box," and it must be assumed hazardous substances will be released to groundwater inside and outside the Site.

Thus, the "Black Box Approach" supposedly assumes the worst case in the uninvestigated contents/hydrogeology of the mine, and supposedly requires a very conservative approach to remedy selection. In Ecology's words (as of 1996): "Regardless of the information available, the remedy at the site will be protective because it conservatively assumes that waste remains in the mine workings." In Ecology's words (as of 2006): "Thus, the remedy at the site will conservatively assume that there is waste in the trench and mine workings." Since the approval of the conceptual Site model for the RI/FS in 1993, Ecology has repeatedly relied upon the "Black Box Approach" to justify Ecology's determinations regarding the Site.

As indicated elsewhere in these comments, in our opinion, the application of the "Black Box Approach" to the circumstances of the Site cannot be reconciled with all of MTCA's requirements.

Even if the "Black Box Approach" were to comply with MTCA requirements, the Proposed Plan repeatedly misuses speculation and unproven assumptions to justify the proposed components for the Site remedy. The Proposed Plan's reliance upon speculation and unproven assumptions has undermined the very conservative approach that was supposed to frame a protective remedy in the context of the "Black Box Approach". Some of the most significant examples are the speculation and unproven assumptions used to justify the following components of the Proposed Plan:

- (1) the locations of the monitoring wells (without sufficient Site investigation, it is not known whether the wells are placed in locations and at depths where they will detect migrating contaminants in the groundwater);
- (2) the inadequate frequency of groundwater monitoring (which assumes that BIOSCREEN contaminant transport modeling results are accurate, when that model is only a mathematical simulation of the "Black Box Approach" relying upon speculative assumptions);
- (3) the anticipated termination of monitoring, maintenance, and institutional controls in the future (contrary to many assurances made to the public in the past by Ecology and the PLP Group that monitoring, maintenance, and institutional controls will occur in perpetuity);
- (4) the plan to delay the design, construction, and testing of the Contingent Groundwater Containment System until after groundwater contamination has been detected (assuming that, after it is too late, the System can be installed "relatively quickly," and then the System can actually accomplish hydraulic containment);

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- (5) the lack of delineated timeframes/deadlines and performance standards for the Contingent Groundwater Containment System operation (the Proposed Plan lacks the necessary specificity and requirements for Ecology to enforce compliance).

Individually and collectively, these deficient components of the Proposed Plan result in a fatally flawed proposed remedy for the Site.

H. If The “Black Box Approach” Is To Be Used For Remedy Selection, MTCA Requires More Conservative (Protective) Remedy Components Than Those Provided By The Proposed Plan.

If Ecology actually requires remedy selection based upon the unique “Black Box Approach,” and thus really “assumes the worst and hopes for the best,” it will be necessary to require a unique approach to the remedy’s component parts. Specifically, as Ecology has repeatedly assured the public previously, the design and implementation of each remedy component must err toward the conservative (i.e., toward protectiveness) to ensure the long-term protectiveness required by MTCA. A Site remedy relying upon contaminant containment with institutional controls, monitoring, and a Contingent Groundwater Containment System must include conservative measures to anticipate the worst-case scenario of contaminated groundwater migration from the Site.

In our opinion, the Proposed Plan fails to provide sufficient conservatism to address the Site’s significant unknowns and uncertainties. As such, the Proposed Plan fails to comply with MTCA’s requirements to provide for the protection of human health and the environment. See, e.g., RCW 70.105D.020(33) (“remedy” defined as action “consistent with the purposes of [MTCA] to identify, eliminate, or minimize any threat or potential threat posed by hazardous substances to human health or the environment...”); WAC 173-340-360(2)(a)(a cleanup action shall protect human health and the environment). As summarized below, significant revisions to the Proposed Plan must be accomplished to achieve a robust containment system and monitoring plan to provide the requisite protectiveness. The most significant revisions are addressed above—other significant revisions that are needed are the following:

- (1) Surface Sludge Removal. Removal of the chlorinated solvents sludge from the trench surface prior to capping (see General Comment I, below).
- (2) Additional Monitoring Wells: Addition of two new monitoring wells beneath the cap area (north and south of the fault—the “rock bridge”) that are necessary to assess cap performance (changes in groundwater hydraulics), and addition of a monitoring well properly positioned to address the north groundwater pathway discharging from the Site (addressed in Specific Comments, below).
- (3) Immediate Response Activities—Earthquakes. Require immediate and protective response activities if and when major earthquakes occur (specific monitoring requirements triggered by more clearly delineated events) (addressed in Specific Comments, below).

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- (4) Increased Financial Assurance. Increase financial assurance requirements, to comply with MTCA's requirements and, consistent with the "Black Box Approach", to assume the worst case scenario and require a more protective remedy (the Proposed Consent Decree's \$775,000 financial assurance requirement is inadequate even for the Proposed Plan because the \$775,000 covers only Site monitoring costs and fails to include any costs of the design/approval/permitting/installation/operation of the Contingent Groundwater Containment System) (see General Comment K, below), as well as agency oversight costs, 5-year reviews, etc.

Where appropriate these issues are addressed further below in our specific comments focusing upon particular text describing the Proposed Plan.

I. The Proposed Plan To Leave Chlorinated Solvents Sludge ("Free Product") In Place at the Surface Violates MTCA's Requirements. The Sludge Must Be Removed From The Trench Surface.

There is no impracticability determination set forth in the Proposed Plan to justify leaving "free product" in place, and such a determination cannot be made for the reasons discussed below. The estimated seventy (70) cubic yards of chlorinated solvent sludge at the surface of the Area 2 trench constitutes "free product" and must be removed as required by MTCA. We identify this material separate from larger volumes of waste at the Site because it is easily accessible at the surface of a shallow trench, is documented to extend only a few feet deep, and is an obvious long-term source of groundwater contamination.

In 1991, a 30-ton crane was positioned near the sludge area to remove drums containing wastes that were located in the sludge and adjacent to the sludge area. Furthermore, the Proposed Plan calls for removing trees and large shrubs from the trenches prior to backfilling. MTCA requires removal of free product to the extent practicable, and allows containment if source material "...cannot be recovered after reasonable efforts have been made." (WAC 173-340-360(2)(c)(ii)(A)). No reasonable effort has been made to remove this small volume of highly concentrated waste.

In our opinion, removal of such chlorinated solvent sludge would routinely be required in remedies for other MTCA sites. Past Site activities and the Proposed Plan both demonstrate the practicability of sludge removal; therefore, leaving the sludge in place violates MTCA's requirements in our opinion.

J. Other Deficiencies Of The Proposed Plan Are Discussed In The "Specific Comments" Below.

As indicated above, it is also our opinion that in the circumstances of this Site, the "Black Box Approach" and existing Site data cannot be reconciled with MTCA's requirement that investigation be accomplished "to collect data necessary to adequately characterize the site for the purpose of developing and evaluating cleanup alternatives (WAC 173-340-350). The City and its consultants have repeatedly expressed concerns about inadequate Site characterization, and the resulting poor understanding regarding what/where contamination exists, and how/where it moves, within the Site. We will not repeat those specific concerns here, but they are directly relevant to our comments about the specific unknowns and

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uncertainties that must be addressed, if not with additional Site investigation, then with more protective remedy components than those provided by the Proposed Plan. As indicated in our specific comments below, the Proposed Plan repeatedly acknowledges significant unknowns and uncertainties but relies upon speculation and unproven assumptions to dismiss or minimize them.

The Proposed Plan contains many false statements, misleading statements, over-statements, omissions, errors, and analytical inconsistencies that are identified and addressed below in our specific comments. When combined with the speculation and unproven assumptions described above, the Proposed Plan's text dismisses Site unknowns, uncertainties, and risks in ways that cannot be justified technically. Dismissing (or minimizing) Site unknowns, uncertainties, and risks undermines the supposedly conservative "Black Box Approach," and mischaracterizes the Proposed Plan as conservative and protective. Given the large uncertainties at the Site, Ecology should reject the Proposed Plan as drafted, and should require revisions to the Proposed Plan necessary to achieve the requisite protectiveness required by MTCA.

K. The Proposed Consent Decree's Financial Assurance Cost Estimate Violates WAC 173-340-440(11)'s Requirement To Require Financial Assurance Mechanisms To Cover All Costs Associated With The Operation And Maintenance Of The Remedial Action, Including Corrective Measures.

The Proposed Consent Decree's Section XXI would require that the PLP Group provide financial assurance in the amount of \$775,000. According to the Proposed Consent Decree's text, the amount is based upon "the initial [cost] estimate dated September 17, 2012" prepared by the PLP Group." We have reviewed the cost estimate information provided by Ecology on December 4, 2013, and have concluded that the amount is not sufficient to comply with the requirement of WAC 173-340-440(11), which states "Financial assurances shall be of sufficient amount to cover all costs associated with the operation and maintenance of the cleanup action, including institutional controls, compliance monitoring, and corrective measures."

The \$775,000 cost estimate would not be sufficient to implement the Proposed Plan, because it covers only estimated long-term inspection and monitoring costs. The amount fails to include any costs of the design, approval, permitting, installation, and operation of the Contingent Groundwater Containment System—all part of an anticipated "corrective measure" that is part of the proposed cleanup action. It also fails to cover the long-term costs for agency oversight, 5-year reviews, etc. Given the uncertainties of the future, and the purpose of financial assurance under MTCA, it is essential that all costs of the Contingent Groundwater Containment System be included in the financial assurance amount.

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Specific Comments

Our comments specific to the Proposed Consent Decree's Exhibit B, Exhibit C, Exhibit E, and both Exhibits F are below. The specific comments addressing individual components of the Proposed Plan should not be construed in isolation to depart from our opinion that the Proposed Plan is fatally flawed and fails to provide the protectiveness required under MTCA, as indicated in the General Comments above. Please note that our comments regarding Proposed Consent Decree Exhibits B, C, E, and F apply to portions of the Proposed Consent Decree text, as well as to other portions of the Proposed Plan documents where text is repeated.

Exhibit B: Final Draft Cleanup Action Plan (CAP)

Section 1.1, entitled "Purpose and Objectives," first paragraph, Page 1. The text references MTCA being amended February 12, 2001. MTCA was last revised in November 2007.

1. Section 1.3, entitled "The CAP and the Cleanup Process," second paragraph, Page 1. The paragraph is misleading in its description of the RI/FS (emphasis provided): "The Remedial Investigation/Feasibility Study (RI/FS) Report presents results of investigations into the geology and hydrogeology of a site, the nature and extent of contamination, the risks posed by that contamination, and evaluates the feasibility and alternative methods of remediating a site. These investigations, assessments, and evaluations for the Landsburg Mine were performed according to an Ecology approved work plan....The PLP Group completed the RI/FS and submitted the report to Ecology on February 1, 1996, for public review and comment." The description is misleading in that it conveys the misimpression that the "nature and extent of contamination" at the Site were investigated to produce the RI/FS. In fact, the nature and extent of contamination (i.e., the hazardous materials disposed into the former coal mine) were intentionally not investigated. The text should be revised to clarify that fact, and to clearly explain the "Black Box" component of the conceptual site model that framed the RI/FS and remedy selection for the Site.
2. Section 1.3, entitled "The CAP and the Cleanup Process," fifth paragraph, last sentence, Page 2. The sentence "The Compliance Monitoring Plan document also contains a contingency treatment plan in the unlikely event that groundwater treatment may be required at a future date at the Site." The word "unlikely" is speculative and not needed in the sentence, so should be deleted. This is a global comment pertinent to all documents comprising the Proposed Plan. As indicated in our general comments, the Proposed Plan places inappropriate emphasis upon the treatment of contaminated groundwater extracted from the Site to the complete exclusion of the extraction component of the system. The system is appropriately named the "Contingent Groundwater Containment System" because its only objective would be hydraulic containment at the Site, not treating the source of contamination (i.e., not a conventional pump and treat system). Water treatment, whether on site and/or in the publicly owned treatment works (POTW), is one component of the containment system. Groundwater extraction and conveyance are more important elements of the containment system.

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3. Section 1.3.1, entitled “Additional Investigation Since DCAP Submission,” first paragraph, seventh sentence, Page 3, which states “...a groundwater divide exists and may be near the south end of the Rogers Seam.” The text is speculative since a groundwater divide is currently unknown, which is a prime example of incomplete and inadequate information about the hydrogeology of the Site.
4. Section 1.3.1, entitled “Additional Investigation Since DCAP Submission,” third paragraph, first sentence, Page 3. The sentence mischaracterizes the remedy as “conservative.” It is our opinion that the Proposed Plan, as written is not sufficiently conservative to address the vast uncertainties inherent with the “Black Box Approach” for cleanup of the Site, and is not sufficiently protective to comply with MTCA’s requirements. See also our general comments.
5. Section 1.3.1, entitled “Additional Investigation Since DCAP Submission,” third paragraph, second and subsequent sentences, Page 3. The second sentence states “In the summer of 2008, the infrastructure components for the contingent groundwater treatment system were installed at the Site.” The references in this and subsequent sentences to “the infrastructure components” are misleading since the full infrastructure is not in place (and the Proposed Plan does not require installation of the full infrastructure unless and until contaminants exceeds cleanup standards at the edge of the Site). This sentence should be revised along the lines of: “In the summer of 2008, some partial infrastructure components for addressing water generated by the Contingent Groundwater Containment System were installed at the northern portion of the Site, consisting of a concrete pad for a pump house, an electrical connection with transformer and fence, an access gravel drive, parking area, and an underground effluent discharge line that was not connected to a sewer system.” Similar clarification should be provided in subsequent sentences to indicate that the infrastructure will be incomplete, and to identify all components and activities necessary to design, approve, permit, install, test, and operate the system. As the Proposed Plan is currently written, it is important to acknowledge throughout all of the documents that the extraction wells—the most important components of the Contingent Groundwater Containment System—would not be installed/tested unless and until contaminants exceeds cleanup standards at the edge of the Site, and that it is uncertain with the existing information what the needed sizes/capacities of extraction well(s) are since the groundwater extraction rates needed to achieve containment at each portal are not known. This paragraph should also acknowledge that the discharge piping previously installed in 2008 to the north of the Site is not plumbed into the existing sewer line constructed by Tahoma School District No. 409 and is not connected to the facilities of Soos Creek Water & Sewer District and King County Metro. Therefore, the discharge piping is not yet operable. As indicated in our general comments, the remedy must include the ability to respond immediately with an installed, tested, and robust Groundwater Containment System if contaminated groundwater threatens to migrate from the Site. In any event, a paragraph or table should be added to the text to delineate all of the component steps that would be necessary to install the Contingent Groundwater Containment System, and the current status of those steps. Such steps include, but are not limited to, addressing the specific requirements and/or objections of King County, King County Metro, Soos Creek