B&L Woodwaste Site
Pierce County, Washington

Engineering Design Report (EDR) Addendum 1

Phase 1 Part 1 Remediation Design Report

Barrier Wall and Interceptor Trench

Appendix 1A
Design Basis Memorandum

FINAL

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Memorandum

To: Dom Reale, Ecology
Teri Floyd, Floyd|Snider

Copies: Dan Silver, Brett Beaulieu, Tina Gary, Koorus Tahghighi

From: Larry McGaughey

Date: March 3, 2009

Project No:

Re: **Design Basis, Barrier Wall & Groundwater Interceptor System, B&L Woodwaste Site Corrective Action Plan Implementation**

The purpose of this memo is to document the key assumptions and basis for design of the barrier wall and groundwater interceptor system components of the remedy described in the final Cleanup Action Plan (CAP) for the B&L Woodwaste Site (Site). The remedy specified in the CAP includes a barrier wall to contain affected groundwater beneath the Landfill and an interceptor trench for redirecting groundwater flow around the barrier wall. This memorandum applies only to the barrier wall and interceptor trench; the other remedy components included in the CAP will be addressed separately in future design documents. The assumptions and basis presented in this memorandum will be used for completing the design, engineering, plans, and specifications for the barrier wall and groundwater interceptor system. Any changes to the assumptions or basis after approval of this document will likely result in schedule delays and increased engineering costs.

As described in the Scope of Work included as Exhibit B to the Consent Decree, predesign studies and groundwater modeling have been performed to further characterize the Site and to collected information needed for design of the barrier wall and interceptor trench. The predesign studies have determined that the lower silt aquitard is not continuous beneath the Landfill; two discontinuities have been identified. The areal extent of one of the discontinuities was defined; the full areal extent beneath the landfill of the other discontinuity was not defined. The barrier wall and interceptor trench, in conjunction with the groundwater recovery system to be installed in Phase 2 of the CAP implementation program, will support the Remedial Action Objectives (RAOs) for the Landfill/Ditch Cleanup Action Area (CAA) identified in the CAP by preventing migration of arsenic-containing groundwater beyond the Landfill. The presence of aquitard discontinuities beneath the Landfill will affect pumping rates needed to achieve hydraulic control of groundwater beneath the Landfill and limit contaminant migration.

The design for the barrier wall and groundwater interceptor system will be based on the following:

1. The barrier wall alignment will follow the perimeter of the Landfill cap, as originally anticipated in the CAP and as shown on Figure 1. The barrier wall will be located along the existing perimeter runoff collection ditch at the base of the Landfill cap; this corresponds with the areal extent of woodwaste, as described in the 1994 Closure Report, B&L Landfill, prepared by Hydrometrics.
2. The existing Landfill cap will be extended over the barrier wall, into the existing perimeter access road.
3. Due to the known discontinuities in the lower silt aquitard,, the barrier wall cannot be continuously keyed into an aquitard and will be installed as a "hanging wall" surrounding the Landfill.
4. In areas where the lower silt aquitard is present, the wall will be keyed into the aquitard and the depth of the barrier wall will be based on the soil borings and cone penetrometer testing conducted in the predesign studies. The average depth of the barrier wall in these areas will be approximately 27 feet below ground surface (bgs).
5. The depth of the barrier wall in the two areas where the lower silt aquitard is absent (see Figure 1) will be approximately 35 feet bgs. Based on simulations using the groundwater model for the Site, the increased costs of extending the barrier wall to 35 feet in these areas would be more than offset in the future by reduced capital and operating costs, as the deeper wall would lower the pumping rates needed to achieve hydraulic control.
6. The barrier wall will be a conventional soil-bentonite slurry wall with a design hydraulic conductivity of 1×10^{-6} cm/s. Based on laboratory testing, a mixture of 5% bentonite by weight with native soil would achieve the design hydraulic conductivity.
7. Excess soil and "fluff" from barrier wall construction will be stockpiled onsite and placed within the Landfill footprint and covered by construction of additional Landfill cap. The additional Landfill cap will be consistent with the design of the existing cap.
8. The Landfill surface may be used as necessary for mixing barrier wall backfill material, so long as the cap is protected against damage or repaired to design conditions.
9. The extension of the Landfill cap to cover the barrier wall will be consistent with the existing Landfill cap system, and will include a PVC geomembrane and GCL layer.
10. A groundwater interceptor system will be designed and constructed to control mounding on the upgradient side of the barrier wall and promote infiltration and restoration of the existing groundwater flow pattern on the downgradient side of the barrier wall.
11. Groundwater will be intercepted on the upgradient side of the barrier wall using underground trenches located as shown in Figure 1. These locations were selected to avoid construction within wetland areas and to locate the system within the perimeter fence surrounding the Landfill.
12. Groundwater intercepted on the upgradient side of the barrier wall will be infiltrated to the upper sand aquifer using a detention/infiltration pond located along the

downgradient perimeter of the barrier wall, approximately as shown on Figure 1. The detention/infiltration pond will be constructed with a gravel base keyed into the upper sand aquifer to ensure the pond is in hydraulic contact with groundwater and to promote infiltration.

13. The upgradient interceptor trenches will be designed to transfer groundwater via both passive, gravity drains and lift stations equipped with pumps and level controls. The gravity drains and the lift stations will discharge to the detention/infiltration pond located along the downgradient side of the barrier wall. The lift stations will be activated by the level controls to activate when groundwater reaches a preset level. The passive drains will be active whenever the upgradient groundwater elevation exceeds the drain elevation. The gravity drains and lift station discharge lines will be placed below grade, beneath the existing Landfill cap perimeter road.

14. If necessary, portions of the perimeter access road may be relocated to portions of the Landfill cap to provide space for the detention/infiltration pond. If this is needed, the relocated sections of the road will be designed to maintain the integrity of the cap.

15. The detention/infiltration pond will receive stormwater runoff from the Landfill cap in addition to groundwater from the upgradient interceptor trench. The detention-infiltration pond design will include overflow lines discharging to the existing area drainage ditches, as is presently done for the existing detention pond, to handle excess stormwater flows.

16. Electrical service and control wiring for the lift stations will be located below grade, beneath the Landfill cap perimeter road.

17. The fence along the western side of the landfill will be relocated as part of the detention/infiltration pond construction so that the pond is within the fenced sections of the landfill.

By signing below, the Project Coordinators have approved this basis for design of the B&L Landfill barrier wall and groundwater interceptor system.

Dom Reale Date: 3-4-09
Dominick Reale
Project Coordinator
Washington Dept. of Ecology

Teri A. Floyd Date: **3/3/2009**
Teri Floyd
Project Coordinator
Floyd|Snider

Encl.:
Copies: