PES Environmental, Inc.
Engineering & Environmental Services

A Report Prepared for:

Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, Washington 98008

CONSTRUCTION REPORT
PHASE I AND II FINAL CLEANUP ACTION
BSB PROPERTY
KENT, WASHINGTON

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By:

Michael Stewart
Construction Manager

Brian O'Neal, P.E.
Project Manager

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1.0 SUMMARY

1.1 Introduction and Purpose

PES Environmental, Inc. (PES) has prepared this Construction Report (CR) to describe how the BSB Diversified (BSB) Phase I and II Final Cleanup Action was constructed. The BSB property is located at 8202 South 200th Street, Kent, Washington (referred to as the Property; see Figure 1). This CR has been prepared under Consent Decree No. 11-2-27288-5 (CD) between BSB and the State of Washington, Department of Ecology (Ecology) and is consistent with the requirements of the Model Toxics Control Act (MTCA), Chapter 173-340-400 of the Washington Administrative Code (WAC). The CR describes a cleanup action implemented for the shallow aquifer at the Property. Any cleanup actions required for the deep aquifer beneath the property will be covered through a future Ecology cleanup action plan (CAP).

In addition to describing the shallow aquifer construction activities, the CR also describes the construction quality control (CQC) and construction quality assurance (CQA) procedures implemented during the project, which together document the project was completed consistent with the design intent.

1.2 Project Background

1.2.1 Property Description

The BSB Property is located in Township 22 North, Range 4 East, Section 1H at a latitude of 47 degrees 25' 22" North and a longitude of 122 degrees 13' 51" West. The 4.2-acre Property was formally a fenced, vacant lot that sloped gently to the north. The area surrounding the Property is topographically flat and is zoned "Limited Industrial." The Property is bounded on the north by South 200th Street and the Hexcel Corporation (Hexcel) industrial facility. Commercial and industrial park properties are located to the west and south of the Property, and the JH Carr industrial facility is immediately to the east of the Property.

1.2.2 Historical Waste Management Operations

A variety of industrial and hazardous wastes that were generated by the metal finishing and electroplating plant located on the north side of South 200th Street (now part of the Hexcel Facility) were formerly managed in a area located on the Property south of S. 200th Street and referred to as Parcel G (See Figure 2). The waste management area was located in the northeast and southern portions of the Property, and a parking lot was located in the northwest portion of the parcel. Waste handling and generation reportedly occurred on Parcel G between the mid 1950s, when electroplating operations were begun on the property north of South 200th Street, and 1985, when treatment, storage, and disposal activities ceased. The waste treatment operations included an equalizing lagoon, four aboveground treatment tanks, a sludge settling lagoon, sludge drying beds, a connection to the sanitary sewer for the disposal of treated water, and a drum storage area.

1.2.3 Previous Investigations

In the early 1980s, the United States Environmental Protection Agency (USEPA) initiated investigations at the Property. BSB conducted a series of investigations in subsequent years both on and off the BSB Property. The investigations on and off the Property included drilling soil borings; installing monitoring wells and piezometers; analyzing soil gas samples, sludge samples, soil samples, and groundwater samples; measuring groundwater levels; and conducting hydraulic conductivity tests. These investigations are summarized in a Final Focused Remedial Investigation Summary/Feasibility Study (FRI/FS) report (PES, 2008) and a Remedial Investigation Report Addendum (PES, 2011).

1.2.4 Previous Property Remediation

Previous soil and groundwater cleanup actions have been conducted at the Property as part of Resource Conservation and Recovery Act (RCRA) closure activities in the late 1980s and early 1990s. These cleanup actions have included:

- Removal and closure of solid and hazardous waste management units;
- Removal of contaminated solids from the former sludge settling lagoon and the former equalizing lagoon;
- Removal of approximately 2,000 cubic yards of contaminated soil from the primary source area on the Property;
- Consolidation, stabilization, and isolation of dangerous waste solids in the former sludge drying beds;
- Capping of potentially impacted portions of the Property; and
- Installation and operation of a groundwater extraction and treatment corrective measures system (CMS).

Between August 1992 and August 2011, the CMS removed groundwater contaminated with halogenated VOCs (HVOCs) beneath the BSB and Hexcel properties. The CMS consisted of two recovery wells (HYR-1 and HYR-2) which were located on the BSB property and four recovery wells (CG-1 through CG-4) located on the Hexcel property. Responsibility for system operation was separated with BSB taking responsibility for HYR-1 and HYR-2, and Hexcel taking responsibility for CG-1 through CG-4. Groundwater recovered by the PES system was discharged to the King County sewer system, following pretreatment to remove VOCs using an air stripper.

As a result of these cleanup actions, conditions at the Property have stabilized, contaminated soil and waste have been stabilized in situ and/or removed from the Property, over 10,000 pounds of HVOCs have been removed and treated by operation of the CMS, and the potential risks to human health and the environment have been reduced and controlled.

1.3 Purpose of Final Clean Up Action

The purpose of the Phase I and Phase II Final Cleanup Action described in this report is to implement a cleanup of the shallow aquifer at the Property. The final cleanup action was described in the Cleanup Action Plan (CAP) included as Appendix A to the CD, and consists of a zero valent iron (ZVI) reactor vault (Phase I work), a 35- to 45-foot deep low permeability soil-bentonite cutoff wall (SCBW) constructed around the property, and an asphalt final cover constructed over the property that extends horizontally beyond the horizontal limits of the slurry wall (Phase II work). The Engineering Design Report (PES 2011) provides a detailed design for the shallow aquifer cleanup action.

The ZVI reactor vault is intended to treat contaminated groundwater removed from the shallow aquifer before it is pumped into the City of Kent (King County) sanitary sewer system. The slurry wall mitigates lateral movement of contaminates in the shallow aquifer. The asphalt final cover minimizes infiltration of surface water into soil and upper aquifer groundwater contained inside the slurry wall.

1.4 2009 Suspension of Phase I Work

The construction of the shallow aquifer cleanup action was initiated in 2009. At that time a contractor was retained by BSB to construct the Phase I portion of the project, with the Phase II portion scheduled for 2010. However, higher than anticipated levels of contamination were discovered in the lower aquifer during Phase I dewatering activities. This led to suspension of work and design modifications for the project.

In July of 2011 the project was re-started. At that time Phase I and Phase II portions of the project were started under a change order to the original 2009 construction contract. That change order incorporated revised construction drawings and technical specifications into the construction contract that defined the design changes.

1.5 Relevant Reference Documents

The following documents provide information relevant to the selection of a cleanup action for the BSB Diversified property, and to the design and construction of the Final Cleanup Action Phases I and II:

- *Final Cleanup Action Plan, BSB Property*. Washington Department of Ecology. August 5, 2011.
- *Engineering Design Report Shallow Aquifer Cleanup Action*. PES Environmental. December 15, 2011.
- Construction Drawings Final Cleanup Action Phase I, dated August 2009, revised July 2011.
- Technical Specifications Final Cleanup Action Phase 1, dated July 2009.
- Construction Drawings Final Cleanup Action Phase II, dated August 2011.

- *Technical Specifications Final Cleanup Action,* dated July 2009, Revised June 11 with Change Order 8, Revised September 20111 for Phase II Work.
- *Construction Quality Assurance (CQA) Manual Final Cleanup Action*, dated July 2009, Revised June 11 with Change Order 8, Revised September 20111 for Phase II Work.

1.6 Report Organization

Contents of the CR include the following:

Section 1 describes the purpose of the report, briefly describes the scope of the project, and references relevant supporting documents such as the construction drawings, technical specifications and construction quality assurance manual.

Section 2 describes organizations involved in the project and their responsibilities.

Section 3 briefly describes how each major component of the project was constructed and its general function.

Section 4 describes CQA work performed by PES to document work completed with the design intent, and CQC work performed by the contractors to assure elements of the project were properly constructed.

Section 5 describes documentation prepared during construction such as daily reports, photographic records and as-constructed drawings.

Section 6 describes design and CQA modifications made during construction and the justification for each modification.

Section 7 provides a statement by PES that the Final Cleanup Action was constructed in substantial compliance with the design intent.

Appendices include record drawings, summaries of various CQA and CQC test data, raw laboratory test reports, selected product submittals, warranties, and a compact disc containing daily construction progress reports and selected photos.

This report does not describe operation and maintenance of the system.

2.0 PROJECT ORGANIZATIONS AND RESPONSIBILITIES

This section of the report describes the primary organizations involved in the project and their responsibilities.

2.1 BSB Diversified

BSB Diversified is the property owner. It was responsible for managing all aspects of the Phase I and II cleanup action and complying with the requirements of Consent Decree No. 11-2-27288-5. BSB Diversified realized these responsibilities through it environmental consultant, Burt Geology & Environmental Applications, PLLC, which was designated owner's Project Manager for oversight of the work.

2.2 PES Environmental

PES Environmental was retained by BSB Diversified to perform various site investigations, and remedial actions associated with remediation of the BSB property. PES's specific involvement associated with the Phase I and II Final cleanup action included preparation of the Engineering Design Report, construction drawings, technical specifications, and construction quality assurance manual for the Phase I and II Cleanup Action. PES was also retained to provide construction contract administration and CQA services during the construction phase.

2.2.1 Vista Consultants (Vista)

Vista was retained by PES to assist in the design of the Phase I and II Cleanup Action. Their role focused on geotechnical aspects of the slurry wall, final cover and reactor vault. Vista also prepared construction drawings, technical specifications, and CQA Manual for the Phase I and II cleanup action.

2.2.2 Livermore Architects and Engineers (Livermore)

Livermore was retained by PES to assist in the Phase I and II Cleanup Action. Livermore focused their work on structural design of the reinforced concrete ZVI Reactor Vault and prepared structural construction drawings and technical specifications.

2.2.3 Mayes Testing Engineers (Mayes)

Mayes was retained by PES to perform special testing and inspection services defined in the CQA Manual and other construction documents. Their services included inspection and testing associated with the ZVI vault steel reinforcement and concrete, and field density testing of the aggregate and asphalt final cover.

2.2.4 HWA Geosciences (HWA)

HWA was retained by PES to perform special testing defined in the CQA manual. Their services included classification and permeability testing of the soil/bentonite slurry that comprises the constructed SBCW, and the drainage gravel associated with the reactor vault.

2.3 MidMountain Contractors Inc. (MidMountain)

MidMountain was the prime construction contractor retained by BSB Diversified. They were responsible for constructing the entire Phase I and II project. Work completed by MidMountain included all site preparation and demolition, stormwater management, ZVI reactor vault construction, site grading and drainage improvements, and placement of crushed aggregate for the asphalt final cover. MidMountain relied upon specialty contractors to construct other components of the project.

2.3.1 DeWind One Pass Trenching (DeWind)

DeWind was retained by MidMountain as a specialty subcontractor to prepare a work plan for, and to construct, the SBCW. They were selected to do the work by BSB Diversified based on a recommendation from PES because of their unique one-pass slurry wall trenching technique.

2.3.2 Tetra Tech/INCA

Tetra Tech/INCA was retained by MidMountain to perform various surveys to layout the work, measure installed quantities, and obtain as-built documentation.

2.3.3 Lakeside Industries

Lakeside Industries was retained by MidMountain to furnish and install asphalt paving associated with the Type 1 and Type 2 final covers.

2.3.4 Northwest Linings

Northwest Linings was retained by MidMountain to furnish and install geosynthetics to encapsulate un-stabilized and cement stabilized sludge that was discovered during excavation of exploratory trenches in the SBCW key trench.

2.3.5 Ground Up Road Construction, Inc.

Ground Up Road Construction Inc. was retained by MidMountain to perform cement treating and compaction of soft soils removed from the ZVI reactor vault excavation.

2.3.6 Service Electric Co., Inc.

Service Electric Co., Inc. was retained by MidMountain to perform all electrical wiring and connections between the vault, treatment system Conex, control panel, and disconnect. Final connection to the main service was performed by Puget Sound Energy.

2.3.7 Clear Water Services

Clear Water Services was retained by MidMountain to perform stormwater management and sediment and erosion control during the Phase II construction activities.

2.4 Washington State Department of Ecology (Ecology)

The Washington State Department of Ecology is the lead government agency having jurisdiction over this project. Their responsibilities included review of various design and construction documents prepared by PES and project oversight.

3.0 CLEANUP ACTION SYSTEM CONSTRUCTION

This section generally describes how major components of the Phase I and Phase II Cleanup Action were constructed.

3.1 Phase I Components

Phase 1 construction was initiated in 2009, suspended for nearly two years, and then re-started in August of 2011. Major components of the Phase 1 Cleanup Action include:

2009 Work

- Installing sheet piles;
- Dewatering the lower aquifer;
- Initiating excavation of contaminated soil inside the sheet piles to create a space for the proposed below-ground concrete ZVI reactor vault; and
- Stockpiling and securing the excavated contaminated soil.

Work During Suspension of Project (late 2009 through mid-2011)

- Constructing and operating a CMS groundwater treatment system housed in a Conex shipping container to treat contaminated groundwater before discharging it to the sanitary sewer during the construction process.

2011 Work

- Removing stormwater that entered the excavation during the project shut down;
- Completing excavation of contaminated soil inside the sheet piles to create a space for the proposed below-ground concrete ZVI reactor vault;
- Dewatering of the excavation by pumping and treating groundwater that developed in the vault excavation;
- Setting forms for the six-chamber cast-in-place concrete reactor vault;
- Installing structural steel reinforcement for the concrete vault;
- Water proofing the outer walls and base of the concrete vault;
- Pouring concrete for the reactor vault base and walls;
- Installing vault piping;
- Installing gravel and a geotextile separator outside the vertical walls of the vault;
- Fabricating and installing six concrete lids, one each for each of the six-chamber vault;
- Trenching and backfilling for installation of a buried conduit containing an electrical service into chamber 6 that provides power to temporary and permanent pumping systems;

- Trenching and backfilling for installation of buried electrical conduits that house pressure transducer signal wires serving four piezometers located inside and outside of the slurry wall (two inside, two outside), and one pressure transducer to chamber 6 of the vault. A sixth empty conduit was installed that serves chamber 6;
- Trenching and backfilling for installation of a buried 1 ½-inch diameter Schedule 80 PVC force main that runs from chamber 6 of the vault to a point just outside the Conex box. The electrical conduits, signal wire conduits and force main are installed in a common trench located along the east site perimeter that terminates just outside the Conex at the northeast corner of the site;
- Installing a temporary foundation system for the Conex box; and
- Connecting the electrical service and pressure transducers to a control panel in the Conex.

3.2 Phase I Work Completed in 2009

3.2.1 2009 Sheet Piles, Dewatering, Excavation, and Soil Stockpiling

In 2009, sheet piles were driven to elevation -5 feet[1] around the perimeter of the planned ZVI reactor vault excavation. Their purpose was to isolate groundwater in the upper aquifer allowing excavation of contaminated soil inside the sheet piles. This was followed by the installation of four dewatering wells constructed in the lower aquifer whose purpose was to minimize groundwater uplift from the lower aquifer acting on an aquitard, which separates the lower and upper aquifers. This would prevent hydraulic uplift and a hydraulic connection between the two aquifers through the aquitard.

As dewatering began, excavation of the reactor vault area was initiated as the first step towards installing the cast-in-place concrete ZVI reactor vault. Groundwater dewatered from the lower aquifer was pumped to an on-site Baker tank and analyzed to determine VOC levels. This analysis indicated much higher levels of VOC's than previously measured in the lower aquifer, and levels that would not allow discharge to the sanitary per the *"Industrial Waste Program Construction Dewatering Request Form,"* issued by the King County Industrial Waste Program. This led to suspending work on the project. At that time, soil had been excavated to approximately elevation 14 ft, leaving sufficient soil in place to prevent uplift from the lower aquifer without maintaining the dewatering system. Contaminated soil removed from the excavation was stockpiled in an on-site containment area and covered with plastic.

A copy of the *"Industrial Waste Program Construction Dewatering Request Form,"* issued by the King County Industrial Waste (KCIW) Program is provided in Appendix B-1.

[1] All elevations based on North American Vertical Datum of 1988 (NAVD 1988).

3.3 Phase I Work Completed During Suspension of Construction

3.3.1 Temporary Groundwater Treatment System

Prior to re-starting work in 2011 and as a result of finding contamination in the lower aquifer, PES in conjunction with H2Oil Recovery Equipment, Inc. constructed a system for treating VOCs found in groundwater. This system was housed in a Conex shipping container and positioned in the northeast corner of the site. During suspended work groundwater was removed at a controlled rate from existing groundwater wells HYR-1, and HYR-2 and treated to a quality that allowed disposal in the sanitary sewer. This treatment system continued to be utilized for the project after work was re-started in 2011.

3.4 Phase I Work Completed in 2011

3.4.1 Stormwater Removal, Excavation and Groundwater Treatment

In 2011 when the project was re-started, stormwater had filled the vault excavation to about elevation 23. This stormwater was tested and then pumped down to about elevation 14 with the water discharged directly to the sanitary sewer system after verifying that it met discharge standards of a *Waste Discharge Permit Number 7575-04* issued by KCIW; Waste Discharge Permit number 7575-04 (WDP 7575-04) is provided in Appendix B-2.

Following removal of the accumulated stormwater, groundwater began to seep into the excavation. This groundwater was pumped into a 20,000-gallon Baker tank to allow settlement of settleable solids, and to perform sampling and analysis. This analysis indicated VOC contaminant levels in groundwater at levels requiring treatment before disposal, per WDP 7575-04. From that point on, all water removed from the excavation was transferred from the excavation to a Baker tank for settling, transferred from the Baker tank at a controlled rate through the water treatment system, and then discharged to the sanitary sewer.

Groundwater removed from the excavation was periodically sampled from the discharge house entering the Baker tank, and from the discharge point of the treatment system to verify that the volume of settleable solids did not exceed the permitted discharge limits of 5 ml/liter. This testing was accomplished using an Imhoff Cone by Standard Method 2540A. At no time did this testing indicate that water being stored in the Baker tank or that was discharged from the Baker tank to the sanitary sewer exceeded the discharge limit of 5 ml/liter.

Continued removal of groundwater allowed soil excavation to continue to elevation 10.25 ft, which was the revised design's bottom elevation of the excavation for the concrete vault. It became evident that soft soil and seeping groundwater conditions at elevation 10.25 were not suitable for constructing the concrete base slab, or the associated water proofing that had to be installed in contact with the base of the slab. Therefore, a plan was implemented to dewater the excavation to a degree that would permit concrete and water proofing construction.

3.4.2 Excavation Dewatering and Subgrade Preparation

Dewatering of the excavation was accomplished by pushing a 3-foot diameter steel casing into the subgrade soils from elevation 10 to elevation 6 at all four corners of the excavation. Soil inside each casing was removed by a vacuum truck to approximately elevation 6, and placed in the on-site soil stockpile. A 12-inch diameter slotted PVC casing was installed vertically in the center of the steel casing with the bottom of the casing set at approximately elevation 6, the top at elevation 14, and positioned outside of the proposed vertical concrete vault walls. The annulus between the steel and PVC casing was then backfilled with ¾-inch to 1.5– inch rounded gravel. The steel casing was then pulled leaving the slotted PVC casing surrounded by the gravel. Two-inch diameter sump pumps were then installed in each of the four PVC casings over an approximate 6-inch thick gravel layer at the base of the casing.

Groundwater pumped from the four sumps was conveyed to a 20,000-gallon Baker tank for settling, and then treated prior to discharge. Monitoring of settleable solids and VOC treatment efficiency were as described above.

Dewatering allowed excavation to continue to elevation 9.75 ft, six inches below the base slab elevation. The base of the excavation was covered with a geocomposite drainage layer consisting of two layers of geotextile heat bonded to a core of polyethylene grid. (See Appendix C-1 for product cut sheet). The geocomposite was covered with a 6-inch thick layer of ¾-inch to 1.5– inch rounded gravel. A grid of 4-inch diameter perforated PVC pipes were installed over the geocomposite, buried in the gravel, and configured to drain to the four dewatering corner sumps. The combination of the geocomposite, 6-inch gravel layer, perforated pipes and continuous pumping from the four sumps provided a relatively dry and stable gravel subgrade surface to install the designed water proofing materials and base concrete slab.

3.4.3 Water Proofing

Water proofing designed for the vault exterior consisted of *"Paraseal LG Multiple Component Sheet Membrane Waterproofing System,*" manufactured by Tremco. Paraseal LG is a multi layer sheet membrane waterproofing system that consists of a self-sealing, expandable layer of granular bentonite laminated to high density polyethylene geomembrane. A thin layer of spun polypropylene geotextile covers and stabilizes the bentonite layer. The water proofing provides a barrier preventing groundwater seepage through the concrete vault. Product information is provided in Appendix C-2.

Water proofing was installed over the gravel subgrade and up the excavation walls to approximately elevation 14 ft, and placed vertically against the face of the sheet piles. The vertical portion of waterproofing was installed against the sheet pile walls to provide sufficient materials that would eventually connect the base slab water proofing material to the vertical wall material once the base and walls of the vault were poured. The base slab was then formed and poured independently from the vertical walls.

Once the base slab was poured and cured, the vertical walls were formed, poured, and stripped followed by the installation of a layer of water proofing on the face of the vertical walls, overlapping the water proofing installed under the slab. This provided a continuous barrier from

under the slab, around the slab facing, and up the exterior face of the walls, terminating at the top of the walls. A special nailing system was used to attach water proofing to the walls, and then it was covered with geosynthetic drainage net.

Portions of the base area water proofing were damaged by excessive moisture between the time it was installed and the vertical vault walls completed. This damage consisted of the bentonite being removed from portions of the polyethylene geomembrane sheet. Where this occurred, a new sheet of water proofing was installed over the damaged materials and dry bentonite spread over the overlap area, providing a continuous composite layer of bentonite and polyethylene connecting water proofing installed under the slab to waterproofing installed on the exterior walls.

3.4.4 Steel Reinforcement and Water Stops

Steel reinforcement bars for the concrete vault were pre-fabricated and delivered to the project site in 2009. When the project was suspended, the bars were stored on pallets and covered with plastic to prevent damage caused by rust. When the project re-started, PES retained Mayes to inspect the condition of this stored steel. Based on their inspection, it was determined that the steel was in a condition suitable for installation. The Mayes report is provided in Appendix D.

Steel reinforcement was installed over the base area water proofing to the configurations, spacings, and overlaps defined on the construction drawings. It was also placed on small concrete blocks to provide the minimum required clearance between the bottom of the concrete slab and the steel bars.

Prior to pouring the base slab, 6-inch high PVC water stops were installed vertically along the alignment of the exterior and interior walls with three inches of the water stop positioned into the base slab and three inches extending above the slab. Water stop product information is provided in Appendix C-4.

Vertical wall steel was also placed to the configurations, spacings, and overlaps defined on the construction drawings. The wall reinforcement was prefabricated into mats outside of the vault and then lifted into place with a crane. The steel was secured in place with tie wire, and spacers were installed between the steel bars and the form work to provide the designed clearance between the steel and the face of concrete.

3.4.5 Form Work

In 2009, MidMountain mobilized pre-fabricated forms for constructing vertical walls of the vault. When work was suspended they were stacked and covered with plastic protection. These forms were used to construct the vault walls in 2011, but some modification to their dimensions was required.

Other forms were set to define the exterior face of the 24-inch thick base slab. Forms on the north and east end of the slab were installed against the sheet piles, with the water proofing placed between the sheet pile and the form. This positioning of the forms resulted in the north and south portions of the slab being approximately six inches longer than designed.

Forms on the east and west ends of the slab were positioned approximately 3 feet inside the face of the sheet piles in order to construct the slab to its designed width. The water proofing remained outside of the forms and against the sheet piles.

After the slab was poured, the prefabricated wall forms were set vertically to form the 14-inch thick interior walls and 12-inch thick exterior walls. One face of each wall was formed, reinforcing steel installed, and then the second face was installed. All wall forms were positioned to the dimensions shown on the drawings and checked to assure they were vertical and in the correct dimensional position. Bracing was installed on the inside and outside of the forms to hold them securely in place during the concrete pour.

3.4.6 Cast-in-Place Concrete

The base slab was poured first. Concrete was placed with a crane-mounted pumping system. Two twelve-inch thick lifts were poured, and the concrete was continuously vibrated for proper consolidation throughout its placement. The surface of the slab was finished with a float finish. During the pour, the water stops were checked for correct positions in the middle of the vertical wall with three inches extending above the finished slab surface.

The vertical walls were poured continuously using the same crane-mounted pumping system. Concrete was placed in about 2- to 3-foot deep lifts and continuously vibrated for proper consolidation. The concrete pour was terminated 12-inches below the top of the exterior walls and at the top of the interior walls to allow installation of the steel "Nelson studs" at the top of the poured wall. All but five of the Nelson studs were installed in the wet concrete before the concrete became too hard for continued installation. These five Nelson studs, which were located on interior walls, were installed later and the procedure for their installation is described in Section 6.

A third pour was made after setting additional forms that defined the 4.5-inch wide by 12-inch high exterior stem wall. The interior face of this stem wall forms the exterior face and position of the pre-cast concrete lids. (See Record Drawing S.1.2.)

3.4.7 Pre-Cast Concrete Lids

The ZVI vault is configured with six chambers, and each requires a concrete lid. The concrete lids were pre-cast off-site. Each lid is reinforced with steel that was configured to meet the design requirements shown on the drawings. Access hatches and small manholes were precast into each lid. The small manholes provide access to vertical riser pipes in chambers 1 through 5, a valve in chamber 1, and a riser housing the pump in Chamber 6. Access hatches provide personnel access into all of the chambers, with the hatch in chamber 6 also providing access to the pumping system. (See Drawings in Appendix A-1 that show the position of these manholes and hatches.). Ladder rungs are positioned in the vault walls directly below each hatch. Nelson studs were also installed into the lids such that the Nelson studs on the lids set adjacent to the Nelson studs positioned on the top of walls. Each lid is equipped with lift points.

The pre-cast lids were transported to the site on March 5, 2012. They were lifted and set into place using a crane.

3.4.8 Exterior Groundwater Collection Piping and Inlet Valve

A series of 4-inch diameter perforated and solid wall HDPE pipes were installed outside of the vault walls. One continuous horizontal run of perforated pipe is installed around the entire vault at an invert elevation of 12.25 feet. A second similar run was installed around the entire vault at an invert elevation of 16.75 feet. A solid wall vertical riser connects the two horizontal pipe runs and extends to an elevation just below the asphalt cover surface just outside the northwest corner of the vault. Access to the riser is provided through a small manhole lid set in the asphalt cover. The exterior riser is used to measure groundwater elevations in gravel outside of the vault.

The perforated pipes collect and convey groundwater from outside the vault through a penetration in the north wall of chamber 1 and into the vault. A butterfly valve installed on the inlet pipe inside of chamber 1 provides a means for controlling groundwater flow into the vault. Valve product information is provided in Appendix C-5.

All HDPE pipe was fabricated outside of the excavation and welded using the thermal butt fusion method. Weld beads on the inside of the pipe were removed with a reamer.

3.4.9 Drainage Gravel Around The Vault

Free-draining rounded gravel was placed between the reactor vault walls and the sheet pile. Prior to installation of the gravel, a non-woven geotextile separator was draped vertically from a cable in a position approximately half way between the concrete walls and sheet piles. The separator was designed and installed to keep soil particles outside the separator from seeping into the gravel placed directly next to the wall and into perforated collection pipes. The gravel was placed in sequential three-foot thick lifts on each side of the geotextile. The gravel was placed to an elevation about 3 to 3.5 feet below the top of the reactor vault walls, and covered with another layer of geotextile separator.

3.4.10 Interior Conveyance Piping and Gravel Cover

A series of 4-inch diameter perforated and solid-wall piping is installed inside each of the six chambers. They are secured horizontally to the base of each chamber. In chambers one through five a solid-wall riser extends from the perforated pipes to an elevation just below the lid and is positioned under a small manhole access. A tee and horizontal pipe is installed on the solid wall risers in chambers 1 through 5. Each horizontal pipe penetrates the wall at an invert elevation of 16.75 feet. A link seal set in the concrete wall prevents leakage around the penetrating pipe. As groundwater fills chamber one it flows through the perforated pipes, up the solid-wall riser and into chamber two through the wall penetration. The same flow occurs from chamber two to three, three to four, four to five, and five to six. Perforated pipes secured to the bottom of each chamber are covered with an 8-inch thick layer of rounded gravel and a layer of non-woven geotextile.

3.4.11 Conex Foundation

A temporary foundation system was installed for the Conex box that houses the groundwater treatment system. The foundation consists of four poured-in-place concrete foundations. All four are 18 inches thick, at least 3 feet square, and positioned under the four corners of the Conex box. Threaded anchor bolts inserted into the concrete foundations secure the Conex box to the foundations.

3.4.12 Temporary Pumping and Treatment System

In January of 2012, groundwater was allowed to flow into all six chambers before the ZVI reactor media was installed. A temporary pump was installed in the vault and connected to the 1 ½-inch force main. Untreated groundwater was then pumped from the vault to the Conex treatment system, where it is treated to acceptable discharge limits and discharged to the sanitary sewer.

3.4.13 Pumping System

Following temporary pumping and treating of groundwater, a dedicated electrically-powered submersible pump was installed inside the 8-inch diameter solid wall riser in chamber six. The pump is a Grundfos Redi-Flo4 with ½ HP motor. The pump discharge is connected to the 1 ½-inch force main penetration in Cell 6. Subsurface piping is temporarily routed to the treatment Conex for additional treatment of the groundwater.

A 1 ½-inch diameter solid wall riser pipe is attached to the 8-inch riser in chamber six. A dedicated pressure transducer is installed in the 1 ½-inch pipe and provides for continuous water level monitoring in chamber six. Access to the 8-inch riser and other components of the pumping system are through a 12-inch diameter manhole and an access hatch.

3.4.14 ZVI Installation

On March 2, 2012, 45 tons of ZVI and 14 tons of 10/20 Colorado Silica Sand were delivered to the site and installed in Cells 1, 2, and 3. The media installed in Cell 1 consisted of 6 tons of ZVI and 14 tons of sand (30/70 by weight mixture). The ZVI and sand were combined in batches within a pre-cleaned cement truck mixer and deposited into Cell 1 using the truck's chute. The final media thickness is approximately 4.45 feet with a top elevation of 16.70 within Cell 1.

Cells 2 and 3 each received 19.5 tons of 100 percent ZVI corresponding to approximately 2.6-foot thickness and top elevation of 14.85. The media in all three cells was graded to be uniformly flat. Upon media installation, the Cell 1 inlet valve was immediately opened to allow groundwater to cover the media in each cell and prevent potential oxidation of the ZVI.

3.5 Phase II Components

Major components of the Phase II Cleanup Action include:

- Excavation of a key trench for the SBCW;
- Excavation of an exploratory trench along the proposed SBCW alignment;
- Installation of the SBCW;
- Installation of a geosynthetic encasement of un-solidified and cement stabilized sludge discovered in the key trench;
- Site grading;
- Placement of crushed aggregate as part of the Type 1 and 2 final cover systems;
- Placement of asphalt pavement to construct the Type 1 and 2 final cover systems;
- New fencing; and
- Final cover stormwater management.

3.5.1 Key Trench Excavation

An approximate 17-foot wide trench was excavated over the intended centerline of the SBCW prior to installing the SBCW. Prior to excavating the trench asphalt was saw-cut and removed along the key trench alignment. This asphalt was stockpiled, crushed and used for general fill during final grading of the site.

The trench was excavated to a depth of about 1.0 to 3.5 feet below existing asphalt. The trench depth and horizontal position are indicated by station number (0+00 to 15+86) on the Phase II record drawings in Appendix A-1. This trench was excavated to provide a containment area for soil/bentonite slurry mix (slurry) that did not settle back into the slurry trench.

3.5.2 Exploratory Trench and Test Pits

An exploratory trench and series of test pits were excavated along the center of the key trench from station 12+00 through station 0+00 and to station 3+75. They were excavated to investigate the presence of buried un-stabilized sludge and cement stabilized sludge (CSS) buried below the existing asphalt pavement. This exploratory work indicated that light blue to grey un-stabilized sludge was present in the exploratory trench from station 14+25 to 15+85. In some areas a layer of geotextile covered the un-stabilized sludge. CSS was present from station 0+00 to 2+50. The CSS found from station 0+00 to 2+40 had been placed over a PVC geomembrane liner, and covered with a PVC geomembrane liner. The un-stabilized sludge was not contained in a liner system. Un-stabilized sludge and CSS excavated from the exploratory trench, test pits, and the key trench itself was placed inside a plastic-lined containment area on the existing asphalt and then covered with plastic. The CSS and un-stabilized sludge were stockpiled separately.

3.5.3 Soil/Bentonite Cutoff Wall

The SBCW was installed using a one-pass trenching system that constructs the low permeability vertical slurry wall with a single pass. The diesel powered, track-mounted trenching machine includes a bar and a 2-ft wide cutting chain similar to a "ditch-witch" or chain saw, only at a much larger scale. The boom is constructed in 5-foot segments, allowing it to be adjusted to lengths specific to the job. For the BSB project, the boom was adjusted to lengths between 35 and 45 feet. The boom and chain are lowered and raised by hydraulic controls that allow the operator to position the cutting chain in a vertical position, with the bottom of the cutting chain positioned at a selected elevation of the base of the SBCW. A laser system directs the operator to move the boom up or down to the designed SBCW depth.

As the cutting chain is rotated, the machine moves along the key trench at a speed of up to one foot per minute cutting the 2-ft wide trench as it goes. As it moves, dry bentonite is loaded into a hopper mounted on the machine, and an auger type delivery system delivers the dry bentonite from the hopper through 4-inch diameter tubes and into a system that injects the bentonite below the trench surface and directly into the trench. Water is added to the trench on an as needed basis through a 4-inch diameter hose mounted on the boom and also positioned below the trench surface. The action of rotating the cutting chain in the in-situ soils and adding dry bentonite and water creates well-mixed slurry in the trench.

The trencher was moved into position in the key trench and trenching began at station 14+75 working west. Bentonite was injected into the trench through the injection tube mounted on the boom at predetermined rates based on the calculated volume of soil being treated. Appendix F includes a summary spreadsheet indicating the volume of bentonite addition by station along the entire wall. The summary also includes calculations that estimate the percent of dry bentonite added to the soil. The estimate is based on the ratio of dry bentonite added to dry soil. The dry unit weight of soil was estimated based on undisturbed samples of soil obtained along the wall during a geotechnical site investigation.

3.5.4 Containment of Cement Stabilized and Un-stabilized Sludge

As discussed earlier in this report, CSS and un-stabilized sludge was encountered in the key trench and exploratory trench between stations 14+25 and 2+50. The sludges were stockpiled, placed back in the key trench, and then encapsulated inside a PVC liner and cover system, much like the liner and cover system found during the exploratory trench work. A typical detail of what was proposed is shown on a Figure in Appendix A-3. Ecology approved the proposal and it was constructed as follows from station 15+30 through station 0+00 and terminating at station 3+73.

The existing slurry and surrounding soils in the bottom of the key trench were very soft after slurry wall installation. These soft soil and slurry conditions were stabilized by admixing cement. The cement stabilized soil and slurry were then graded to a relatively flat surface and allowed to cure and harden. After the cement stabilized material had cured to a hard surface a thin layer of sandy soil was spread over the stabilized soil to create a uniformly graded surface. A layer of woven geotextile was installed over the graded surface and covered with a layer of 16-oz/sy geotextile (geotextile cushion). Then an approximate 45-foot wide panel of 40-mil

PVC geomembrane was deployed over the geotextile, with portions of the 45-wide panel draped out of each side of the 17-foot wide key trench. A second layer of geotextile cushion was deployed over the portion of PVC geomembrane deployed in the trench. Cement stabilized sludge and un-stabilized sludge was placed over the geotextile cushion covering the geomembrane liner and graded to a surface elevation approximately eight inches below the adjacent asphalt surface. The CSS was generally placed from 3+75 to 0+00. The un-stabilized sludge was generally placed between station 15+30 and 15+85. The 8-inch layer was left open to install the Type 1 final cover system at a grade uniform with the surrounding asphalt surface.

The cement stabilized and un-stabilized sludge filled the entire lined key trench to this 8-inch depth below the asphalt, but some of the un-stabilized sludge remained in the stockpile area. This remaining un-stabilized sludge was placed from station 15+35 through 0+00 and to 0+40, resulting in a portion of the backfill constructed approximately twelve inches higher than other portions of the backfill.

The completed trench backfill was covered with a layer of geotextile cushion and then the PVC liner was wrapped over the geotextile cushion. Ends of the PVC geomembrane were welded together, effectively wrapping the sludges in a continuous layer of PVC geomembrane liner. A final layer of geotextile cushion was placed over the welded geomembrane.

3.5.5 Site Grading and Cement Treated Subgrade

Prior to constructing the asphalt final cover systems, soil from the contaminated soil stockpile and other small soil and crushed asphalt stockpiles generated at the site were graded to form subgrade for the asphalt final cover. When this grading was completed, two issues arose. First, it was clear that additional soil would have to be imported from off-site to raise grades to the designed subgrade contours and elevations. Second, the existing on-site soils, including the soil and slurry in the key trench, were soft and not suitable for constructing a stable subgrade surface upon which the asphalt covers could be constructed.

The soft subgrade soils were treated with cement and re-graded to a rough surface at or below the designed subgrade contours. Soil from the contaminated soil stockpile was treated by a subcontractor retained by MidMountain and resulted in an area of approximately 30,000 square feet positioned generally where the stockpile existed. Soil and slurry in the key trench and other soft soil areas, particularly around the vault, were treated and graded by MidMountain. As the cement treated soil cured, it became firm to hard and suitable for final cover construction.

Crushed concrete aggregate was imported to raise remaining areas of the site to the designed subgrade contours. This aggregate was the same product used to construct the gravel surface under all of the final cover asphalt. It was placed and compacted simultaneously with aggregate imported to construct the final cover.

3.5.6 Placement of Crushed Aggregate

Crushed aggregate for final cover systems consisted of two products. One was the crushed concrete aggregate described above. This was placed directly under asphalt in the Type 1 and Type 2 final cover areas. The second product was crushed rock aggregate and it was placed

under the crushed concrete aggregate in the Type 2 final cover areas. The Record Drawings indicate the constructed thicknesses and gradations of these aggregate layers (see Appendix A-1).

All aggregate was furnished to the site in dump trucks, spread into lifts not exceeding six inches in depth, and compacted with a vibratory steel drum roller. The surface was graded to designed elevations and contours with a motor grader and compacted again with the steel drum roller.

A combination of grade stakes and laser controls were used to control construction of the aggregate to design grades and contours.

3.5.7 Placement of Asphalt Paving

Hot mix asphalt (HMA) was furnished to the site in dump trucks, dumped into a paving machine, and then spread and compacted with steel drum rollers in a single lift to the designed thickness. In areas too small for access by the paving machine, asphalt was spread by hand and compacted with steel drum rollers or hand-operated vibratory plate compactors.

The placement of aggregate and asphalt final cover systems took place in two phases. The first phase included most of the Type 1 cover area, excluding a portion of the Type 1 area along the north perimeter of the site. None of the Type 2 areas were paved during the first sequence. The second sequence included the remaining Type 1 areas, and all of the Type 2 areas, including a new paved site entrance from South 200th Street.

During the second sequence, rain began to fall as the work was completed. Runoff from the existing paved areas sheet-flowed into areas being paved along the north perimeter of the site. The rain impacted the compacted density of paving on the north perimeter. The areas of low density asphalt were generally identified by testing and observation, and were repaired at a later date when weather conditions improved. The repair consisted of grinding an approximate 5-foot wide and 1-inch deep area along the south edge of the area requiring repair and then placing an approximate 1-inch thick lift of HMA over the entire area requiring repair. The area of repair is shown on the Phase II Record Drawings in Appendix A-1.

3.5.8 Piezometer Installation and Existing Monitoring Well Monument Retrofits

Sixteen piezometers and one monitoring well were installed in December 2011 to monitor water levels inside and outside of the SBCW. PES subcontracted Cascade Drilling, Inc. (Cascade), of Woodinville, Washington, to install piezometers P-1 through P-16 and monitoring well HY-7s. The piezometers were installed in shallow-aquifer zone/intermediate-aquifer zone pairs to provide monitoring locations across the SBCW, with use of existing monitoring wells where available. The odd-numbered piezometers were installed in the shallow aquifer zone, and the even-numbered piezometers were installed in the intermediate aquifer zone. Shallow-aquifer-zone monitoring well HY-7s was installed to provide water level and water quality monitoring adjacent to existing deeper monitoring wells outside of the northern part of the SBCW.

Cascade installed the piezometers and well between December 6 and December 14, 2011, using a direct-push drill rig. Piezometers P-9 and P-10 could not be installed with the direct-push rig

due to refusal, and Cascade used a hollow-stem auger drill rig to install them. All piezometer and well completions consisted of 1.5-inch inside-diameter polyvinyl chloride (PVC) pipe, with machine-slotted, pre-packed screens. The screen slot size was 0.010 inches, and 20 x 40 Colorado Silica Sand® was used in the pre-packed screen. The annular space around the pre-packed screen was filled with 10 x 20 Colorado Silica Sand®, and the annular space above the filter pack was filled with bentonite chips, which were hydrated above the water table. The installations were completed at the surface with flush-with-grade, traffic-rated, steel monuments. Each installation was developed by surging and pumping until the pumped water cleared up.

After site grading and paving, some pre-existing wells were covered with aggregate and the new pavement. To retrofit the well completions, PES subcontracted a pavement corer to remove the new pavement above the buried wells and Cascade to unearth the wells, raise the PVC riser pipes, and install new flush-with-grade, traffic-rated, steel monuments. After the wells were retrofitted, PES subcontracted a surveyor to provide horizontal and vertical coordinates of the top of PVC, the top of the steel surface monument, and the adjacent ground surface for each well.

Appendix G provides a map with the piezometer and well locations, an updated well completion table, and boring logs for the new installations.

3.5.9 Fencing

The entire fence along the north property line was removed and replaced with a new 6-foot high chain-link fence with three strands of barbed-wire installed across the top of the fence. A 16-foot wide swing gate (two eight-foot sections) was installed at the new site entrance.

3.5.10 Final Cover Stormwater Management

Small raised asphalt berms were formed on the surface of the asphalt cover system to direct stormwater run-off to selected areas. Two of these raised berms run generally in a north-south direction and direct stormwater off the pavement and into rock-lined ditches constructed north of the new fence. These rock-lined ditches convey stormwater to existing stormwater catch basins. Other raised berms were constructed along portions of the east perimeter, and also direct run-off to rock-lined ditches and existing catch basins located north of the fence.

3.6 Work Common to Both Phases

Elements of work common to both Phases of the project include:

- Improvements to frontage along S. 200th Street;
- Demolition; and
- Stormwater and Sediment Management.

3.6.1 South 200th Street Frontage Maintenance

The area between the new fence line and the paved portion of South 200th Street was improved. This improvement included removal of asphalt that formed abandoned site entrances, placement of crushed aggregate, and grading to improve drainage along the entire frontage.

3.6.2 Demolition

A variety of demolition work was completed on-site to allow Phase I and Phase II construction. Appendix A-1 includes a drawing that provides details of the demolition work, which generally included decommissioning of electrical services, removal of concrete structures, and removal of vegetation, bushes, and trees.

3.6.3 Stormwater and Sediment Management

MidMountain performed a variety of stormwater, sediment, and erosion control work throughout the project. This included containment systems placed around and over soil removed from the ZVI reactor vault excavation, plastic lined and covered stockpiles of sludges removed from the key trench, plastic covering of non-contaminated soil stockpiles, erecting silt fencing, and constructing small detention/sedimentation basins on-site.

As winter weather approached, it became apparent that the on-site sedimentation basins would not be large enough to contain all site runoff, and that it would require treatment before it was discharged off-site. MidMountain applied for and received coverage under the Washington Department of Ecology's *Construction Stormwater General Permit* and received Permit Number WAR-125362 for the project. MidMountain mobilized a subcontractor (Clear Water Services) to manage, treat, and discharge site stormwater stored in sedimentation basin located at the northeast corner of the projects. That work was successfully completed by Clear Water Services, and their water treatment plan and field reports are provided in Appendix B-3.

4.0 CONSTRUCTION QUALITY CONTROL AND QUALITY ASSURANCE

This section of the report describes construction quality assurance (CQA) and construction quality control (CQC) implemented during the Phase I and II Cleanup Action.

4.1 Definition of Construction Quality Assurance and Construction Quality Control

4.1.1 CQA

CQA is a planned and systematic pattern of procedures and documentation designed to provide confidence that items of work or services meet the requirements of the contract documents. It includes observation and testing of work performed by the contractor or their subcontractors and is performed by a third-party consultant independent of the owner and contractor. CQA activities are performed by the CQA Consultant (CQAC), which in this case was PES and their selected sub-consultants.

4.1.2 CQC

CQC is comprised of actions which provide a means to measure and regulate the characteristics of an item or service to comply with the requirements of the contract documents. CQC was performed by the prime contractor or their subcontractors.

4.2 Construction Quality Assurance

CQA services provided by PES were guided by a CQA Manual prepared initially for the Phase I work and then updated to include the Phase II work. These CQA services included observation of the contractor's work, and materials testing. PES provided on-site personnel that were responsible for observing the contractor's work and managing the construction contract. Because multiple activities took place throughout the project, full time observation of each element of work was not intended or possible. Contract management activities also limited time for full time observation of the work. In some cases, PES subcontracted specific materials installation and testing to specialty subconsultant laboratories.

Specific CQA activities assigned to PES were provided in a table format in the CQA Manual. These tables are provided in this report (see Tables 1 though 8) but modified to indicate the actual CQA activities performed. In some cases CQC activities performed by the contractor are also discussed in these tables.

4.3 CQA and CQC Summary

The following sections briefly summarize the results of the CQA and CQC work.

4.3.1 Site Clearing and Preparation

Site clearing and preparation activities were observed by the CQAC as they occurred. These activities were completed as the project progressed and generally completed in compliance with the design intent.

4.3.2 Shoring

Shoring was installed in 2009 and at that time complied with the intended design. In 2011, the shoring as installed in 2009 was deemed adequate for continued construction and was left in place until the vault was constructed and backfilled. When the vault was completed, the shoring (sheet piles) were pulled, cleaned, and removed from the site.

4.3.3 Waste Management and Excavation

Water management and excavation activities took place in 2009 and in 2011. Based on observation, testing, and documentation associated with stormwater permit number WAR-125362, stormwater was managed in accordance with the permit conditions. Water removed from the excavation was tested frequently prior to discharge into the sanitary sewer. This testing verified that discharge standards of the permit were met.

Appendix B-3 includes records associated with stormwater permit number WAR-125362.

4.3.4 Cast-In-Place ZVI Reactor Vault

The ZVI reactor vault was constructed in 2011 to comply with the modified design. Based on observations performed by the CQAC and special testing and inspection performed by Mayes testing, the ZVI reactor vault was constructed as designed. Test reports prepared by Mayes testing are provided in Appendices D and E.

4.3.5 ZVI Reactor Vault Waterproofing and Backfill

Based on observations performed by the CQAC, and its performance after the sheet piles were removed, the ZVI vault water proofing was installed and is performing as designed. A warranty for the product and installation was also provided by the contractor and is provided in Appendix K.

Based on observations by the CQAC and testing performed by HWA, gravel backfill around and in the ZVI reactor vault met product requirements defined in the technical specifications and was installed as designed. Laboratory testing of the gravel is provided in Appendix J.

4.3.6 ZVI Reactor Vault Piping

Based on observations performed by the CQAC, HDPE piping supplied to the project met product requirements defined in the technical specifications and was installed as designed.

4.3.7 SBCW

Based on observations performed by the CQAC, testing performed by HWA, and testing performed by DeWind, the SBCW was installed along the intended alignment, to the designed depth, and met the specified hydraulic conductivity (See Appendices F, G, and H).

4.3.8 Grading and Final Cover

Based on observations performed by the CQAC, testing performed by the contractor, and special inspection and testing performed by Mayes Testing, final grading, installation of crushed aggregates, and placement of asphalt final cover met the intended design. Section 6 includes a discussion regarding modifications made to the compacted density of aggregates and asphalt (See Appendices J and K).

5.0 RECORD KEEPING

The CQAC and contractors documented that quality control and quality assurance requirements were satisfied by observation, testing, and record keeping. Records consisted of daily reports, test reports, installation reports, photographic records, documentation of design and CQA revisions, and this report. Appendix N includes a compact disk containing copies of the field reports.

5.1 Daily Recordkeeping

A daily progress report was prepared that included:

- a date, project name, project number and location;
- a unique number for cross-referencing and document control;
- weather information;
- a description of all ongoing construction for the day in the area of the monitor's responsibility;
- an inventory of equipment utilized by the contractor;
- items of discussion and names of parties involved in discussions;
- a summary of materials received and quality documentation;
- follow-up information on previously reported problems or deficiencies; and
- a record of any site visitors.

Daily reports are kept on file at the office of the Engineer.

5.2 Test Reports

Test reports were prepared by the CQA laboratories, CQC laboratories, and CQC field personnel. Test reports were completed on a variety of forms, which included the information as appropriate for the form being used. These various CQC and CQA forms are provided in appendices to this report.

Records associated with installation of the SBCW were kept by the CQA Monitor. They indicate the progression of work by time and date records, depth of the slurry trench by station number, addition of bentonite in tons by station, and estimates of percentage of bentonite added for selected segments of the constructed wall.

5.3 As-Built Records

The Contractor, project surveyor, and CQA Monitor were responsible for collecting and documenting as-constructed conditions of the Phase I and II projects. This was done by working in a coordinated effort, and included collection of as-built data by survey method, by hand

measurement, by observation, and by red-lining the drawings issued for construction. As-built Record Drawings are provided in Appendix A.

5.4 Photographs

Construction activities were photographed. Photographs included any significant problems encountered and actions taken to correct these problems, and general progress of the project. Copies of representative construction photos are on file in the office of the Engineer. The daily reports in Appendix N include some selected photographs taken on the day the report was prepared.

6.0 DESIGN AND CQA MODIFICATIONS MADE DURING CONSTRUCTION

This section describes significant design modifications made during construction. The significant design changes are reflected on the record drawings. Less significant changes, such as those to typical details, are not described in this report but are reflected on the record drawings.

Some limited changes were also made to the CQA plan during construction such as changes to observation and test methods. These changes are also described in this section.

6.1 Design Modifications

6.1.1 ZVI Reactor Vault

As discussed in Section 3.2.1, higher than anticipated contaminant levels discovered in the lower aquifer led to suspension of work in 2009. During that suspension, several modifications were made to the ZVI Reactor vault, and additional modifications were made during construction. These changes are summarized below.

- The top and bottom elevations of the vault were modified, which also resulted in modifications to the structural concrete and steel reinforcement drawings;
- Invert elevations for horizontal collector pipes positioned outside the vault were modified in 2011. The lower pipe from elevation 10.0 to 12.25 and the upper pipe from 17.0 to 16.75;
- Gravel windows and collectors designed under and through the base slab were deleted;
- An outlet pipe and associated infiltration well for treated groundwater was deleted;
- A tremie placed concrete pad that was planned for 2011 construction under the vault was deleted;
- As discussed in Section 3.4.2, dewatering occurred in the vault excavation resulting in a 6-inch thick gravel drainage layer constructed directly under the vault; and
- A plan to gravity discharge treated groundwater directly from the vault to the sanitary sewer through a dedicated side sewer connection was replaced with a system that pumps treated groundwater from chamber six of the vault to the treatment Conex and to sanitary sewer system through a dedicated force main.

6.1.2 Final Grading Plan

A slight modification was made to the final grading plan. The modification involved changes to the contours that resulted in a more uniform grade across the site. This change was consistent with the original design intent, but less complicated to construct.

6.1.3 Areas of Type I and II Cover Systems

The plan area of the Type I and II final covers was modified. The western limits of Type 1 final cover was modified slightly to minimize potential of ponding on the asphalt where it transitioned from existing to the new pavement. The Type II area was increased.

6.1.4 Nelson Studs

Nelson studs were installed in the reactor vault walls during pouring of the wall concrete. However, the concrete became too hard at one point and prevented the installation of five of the Nelson studs. After reviewing the issue with the structural engineer, these five studs were installed by drilling vertical holes in the concrete that matched the anchor pattern on the studs, inserting the anchors in the holes and securing the Nelson studs with an epoxy grout.

In addition to the corrective work described above, the structural engineer required that angle iron supports be added to the interior corner of the vault walls where the Nelson studs were installed as described above. Details of their installation are provided on a Figure in Appendix A-2.

6.1.5 Geotextile in Key Trench

A woven geotextile was installed along the entire length of key trench to stabilize compacted soil in the key trench and to bridge potential soft areas of slurry along the trench center line.

6.1.6 Geogrid Over Key Trench in Type 2 Final Cover

A reinforcing geogrid was installed in the key trench in Type 2 final cover areas. It was placed over a 2- to 4-inch thick layer of crushed aggregate, which was placed over the woven geotextile. It provides an additional bridging effect over the slurry wall alignment in areas where heavy traffic loads are anticipated.

6.1.7 Additional Woven Geotextile and Geogrid Under Type 2 Final Cover

Woven geotextile and geogrid remained after completing the key trench backfill. It was used as additional subgrade reinforcement in the Type 2 final cover area where observations indicated soft or yielding subgrade conditions. It was placed under the crushed aggregate that forms the Type 2 final cover.

6.2 CQA Modifications

6.2.1 General Fill Compaction Testing

As discussed in Section 3.5.2, soil from the contaminated soil stockpile and other small soil and crushed asphalt stockpiles generated at the site were graded to form subgrade for the asphalt final cover. These on-site soils, including the soil and slurry in the key trench, were extremely soft

and not suitable for constructing a stable subgrade surface upon which the asphalt covers could be constructed, and weather conditions were not suitable for drying these soils prior to compaction. Therefore, these soft soils were treated with cement and re-graded to a rough surface at or below the designed subgrade contours. As the cement treated soil cured, it became firm to hard and suitable for final cover construction. Compaction testing to document these soils were properly compacted was deleted, and instead the CQA Monitor verified by observation that the cement treating resulted in a stable, non-yielding fill that was suitable for placing imported aggregate.

Crushed concrete aggregate was imported to raise remaining areas of the site to the designed subgrade contours. This aggregate was the same product used to construct the gravel surface under all of the final cover asphalt. It was placed and compacted simultaneously with aggregate imported to construct the final cover. Compaction testing was performed on this material, and the results are provided in Appendix K.

6.2.2 Aggregate Fill Compaction Testing

The technical specifications and CQA manual required compaction testing of crushed aggregate placed to construct the final cover systems. This testing included pre-construction testing *ASTM D 698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 [600 kN-m/m^3])*, which is a laboratory test used to determine the maximum compacted density of a soil or aggregate based on a given compactive effort. Field testing was also required using *ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)*, which is a field test that is performed to determine the relative compacted density of soil and aggregate related to the maximum density determined by ASTM D 698. The specifications required that the aggregates placed as part of the final cover system be compacted to 98 percent of the relative compaction based on ASTM D 698.

However, the laboratory test used to determine the maximum compacted density of aggregates imported to the site was *ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 [2,700 kN-m/m3])*. This laboratory test uses a higher compactive effort than D 698 and results in a higher maximum compacted density. Test Method D 1557 indicated a maximum compacted density for the crushed concrete aggregate of 124.1 pounds per cubic foot (pcf), which based on historical test data was probably 2-5 pcf greater than what test method D698 would have indicated. Therefore, for the purpose of determining the relative field compacted density of the crushed aggregate, an estimated maximum density for Test method D 698 was set at 121.6.

Randon field density testing was then performed by Mayes Testing using *ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods* on the compacted crushed concrete aggregate before asphalt placement. Tests performed by Mayes Testing indicated a compacted dry density ranging from 119.3 to 124.6 pcf, which would indicate a minimum relative compaction of 98.1 percent based on the assumed maximum density of 121.6. Based on this data, PES concluded that the crushed aggregate placed and compacted under the Type 1 and 2 asphalt met the designed-in-place density.

6.2.3 Asphalt Density Testing

The technical specifications required that asphalt be compacted to 95 percent of the maximum density as determined by AASHTO A-230 (Rice Density). However, this relative compaction was changed to 92 percent of the Rice density, which was more in line with typical WSDOT specifications for pavement construction.

Fifteen randomly located field density tests performed by Lakeside Industries, which were based on an assumed maximum Rice density of 157.9 pcf indicated relative compaction ranging from 91.1 to 95.1, with an average of 92.6. Twenty-eight randomly located field density tests performed by Mayes Testing, which were based on a Rice density of 158.1 pcf (based on historical data) indicated relative compaction ranging from 91.0 to 95.0, with an average of 92.6. Based on these test results, PES concluded that the asphalt pavement was compacted to industry standards and in general compliance with the design intent.

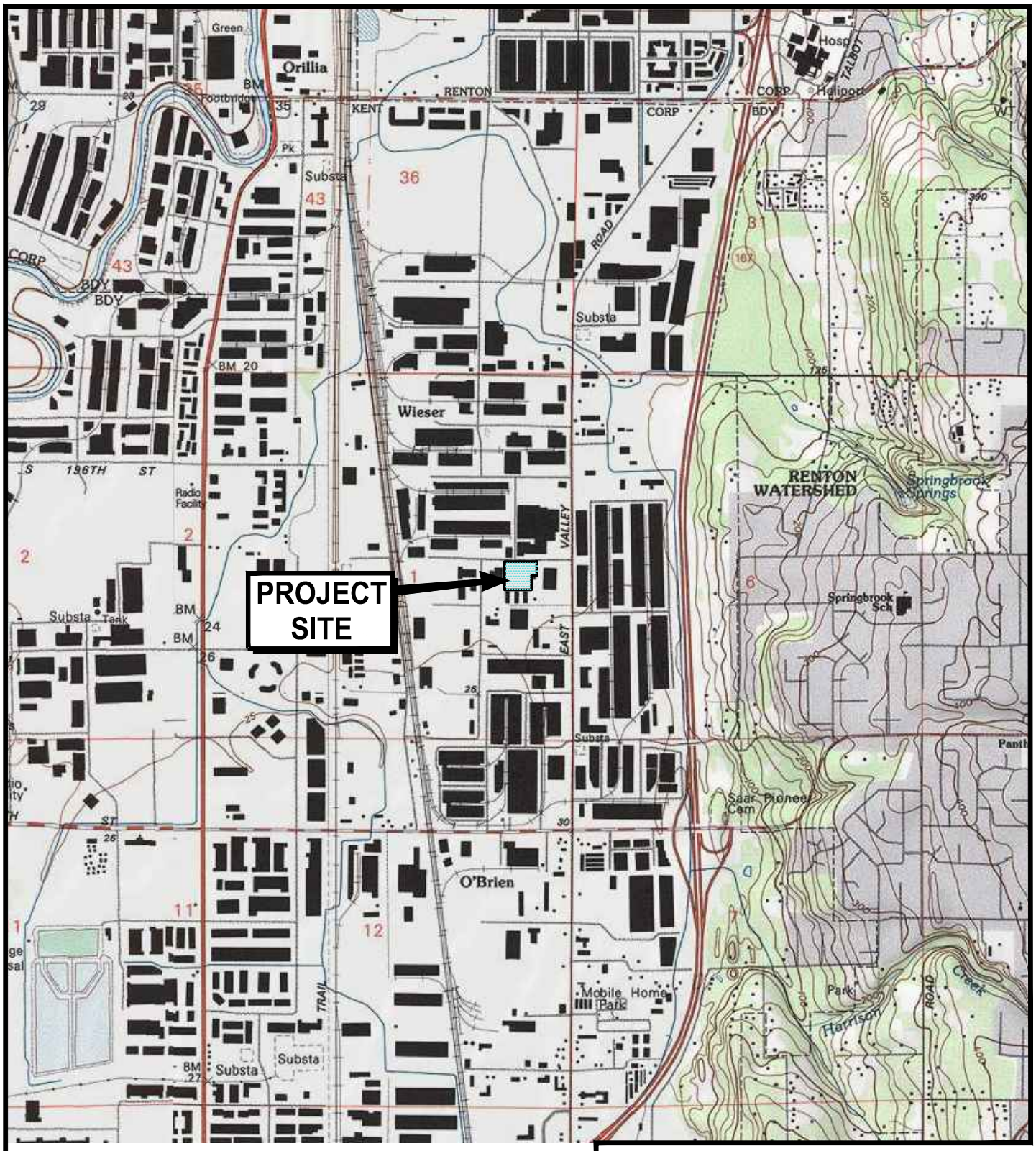
Five other tests performed by Mayes Testing (tests 29 through 33) indicated relative compaction ranging from 87.2 to 90.0. The areas of asphalt represented by this testing were those impacted by rain, and they were repaired as discussed in Section 3.

Test results described above are provided in Appendix L.

7.0 STATEMENT OF COMPLIANCE

Representatives of PES, specialty testing and inspection consultants, and off-site laboratories observed and tested the construction activities described in this Construction Report, reviewed documentation produced during the CQA work, and reviewed CQC data provided by the manufacturers and contractors, all under supervision of the Engineer of Record. On the basis of direct observations by PES and special inspections and testing completed by their sub-consultants, PES concludes that construction of the BSB Final Cleanup Action Phases I and II was constructed consistent with the construction drawings and technical specifications issued for construction and met the design intent.

FIGURES



0 2000 4000

Scale in Feet

N

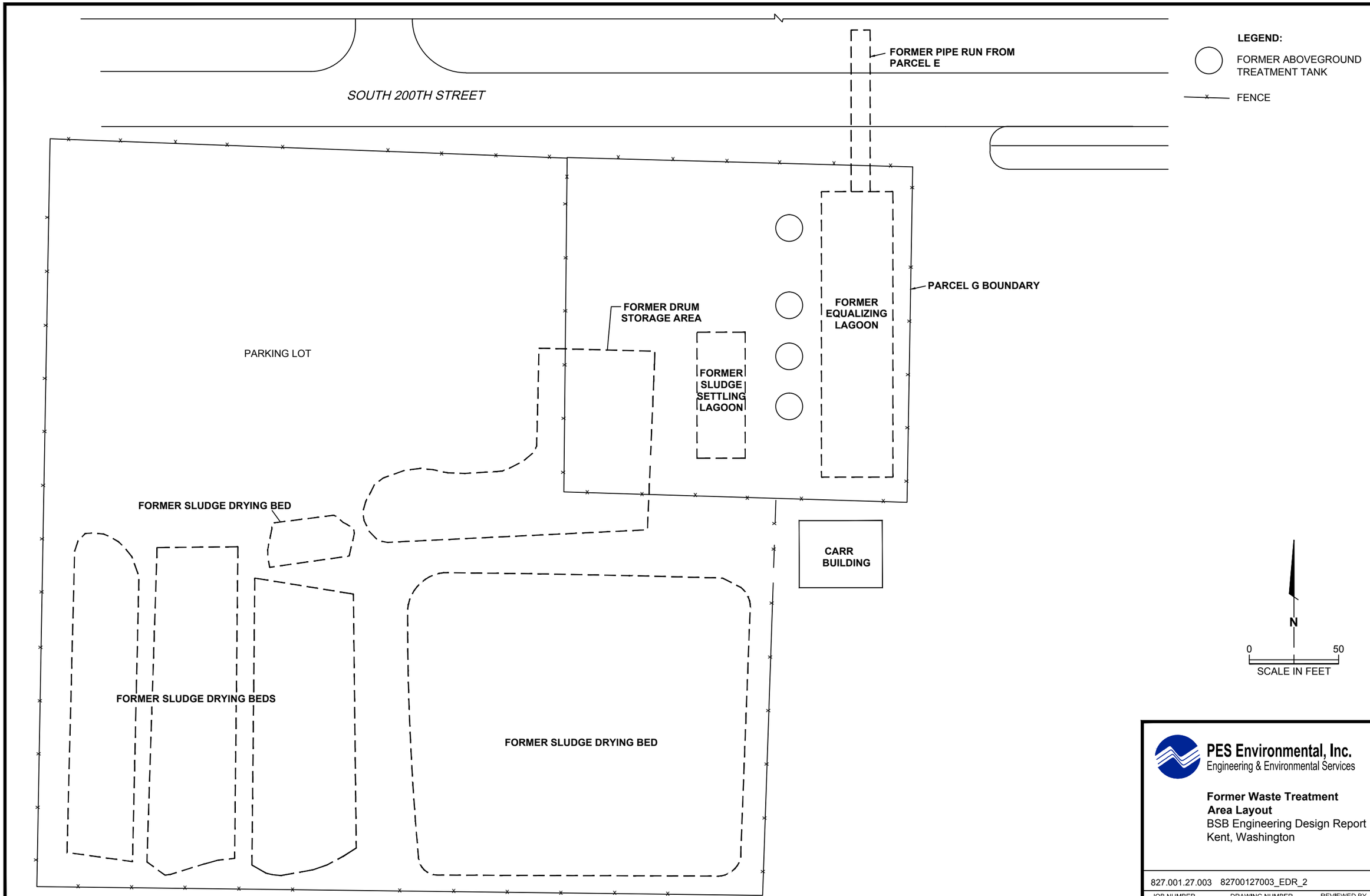
U.S.G.S. Topo Map - Renton, WA, 7.5-minute quadrangle.1949 revised 1994.

PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
BSB RI Report Addendum
Kent, Washington

FIGURE
1

827.001.23.002	82700123002_RI-ADD_1		4/11
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



PES Environmental, Inc.
Engineering & Environmental Services

Former Waste Treatment Area Layout
BSB Engineering Design Report
Kent, Washington

FIGURE
2

827.001.27.003	82700127003_EDR_2		12/11
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

TABLES

Table 1
CQA Activities - Site Clearing and Preparation
BSB Property, Kent, Washington

Task or Item	Specification or Drawing	Required Observation, Testing or Documentation	Inspection or Testing Frequency	CQA Performed
Utility Location	Specification 01510. Contractor to locate utilities in project area.	Review results of utility locating service's work. If necessary work with parties to mitigate utilities that conflict with project area.	Prior to beginning field work.	Observation and documentation completed as work progressed. Verified that utilities were removed from construction area. Employed assistance from Puget Sound Energy (PSE) regarding high voltage lines.
Erosion and Sediment Control Measures – Performance Checks	Drawing 4.	Visually inspect to ensure erosion and sediment control (ESC) measures are installed as shown on Drawing 4 – including features at soil stockpile area, and ditches.	Prior to breaking ground.	Observed installation of systems prior to contractor initiating site work.
		Visually inspect to document performance of ESC measures. Document any maintenance, repair or cleaning to maintain proper function.	Daily.	Observed systems daily to assure they were properly maintained and repaired throughout project. Contractor employed specialty contractor to treat stormwater, and their records are provided in Appendix B-3.
Establish Site Survey Control	Specifications 01052 and 01700.	Confirm benchmark and datum used.	Before start of work.	Verified that Contractor's surveyor established a benchmark off site on South 200th Street. Also had Surveyor establish an on-site benchmark at the completion of work inside the fence line near the northeast corner of the site.
Protect Existing Groundwater Treatment Facilities and Equipment	Drawings 2 and 3. Specification 01510	Visually inspect to document protection.	Daily.	Observed daily to assure systems were properly protected. Discussed system protection at progress meetings. In some cases installed traffic cones and other devises to indicate the location of monitoring wells.
Clear and grub	Drawing 2.	Visually inspect and document to assure all clearing and grubbing from work area is performed and materials are removed from site.	Prior to starting construction activities.	Clearing and grubbing activities were observed for compliance with the design intent, and actually occurred on an as needed basis as the work progressed.
Prepare soil stockpile area	Drawings 2 and 4	Visually inspect to assure that asphalt has been removed, and that stockpiled soils will be in contact with exposed soil. Assure that asphalt is removed from site and properly disposed.	Prior to starting soil excavation.	Visually verified during 2009 that asphalt was removed, and that stockpiled soils were in contact with exposed soil. Visually verified that asphalt was removed from site.
ZVI Reactor Vault Layout	Drawings 5, 6, and 7.	Visually inspect to document layout per Drawings.	Prior to excavating or shoring.	The vault location was actually moved approximately 2 feet to the west to avoid removal of a concrete slab. This location is documented on the Record Drawings in Appendix A-1.

Table 2
CQA Activities - Shoring
BSB Property, Kent, Washington

Task or Item	Specification or Drawing	Required Observation, Testing or Documentation	Inspection or Testing Frequency	CQA Performed
Steel Sheet Piles – Materials	Specification 02221. Approved Work Plan prepared by the Contractor.	For material specified in work plan, visually inspect or confirm that the following properties meet design intent, per Contractors Work Plan: Mass; Length; Thickness; Width; and Straightness.	Upon delivery to site.	Visually inspected and verified.
Steel Sheet Piles - Driven Position	At or outside the design limits of ZVI reactor vault location.	Visually inspect relative to layout location.	Daily observation while driving in progress	Visually inspected and verified. Installed dimensions documented in field notes and as red-lines on 2009 Phase 1 construction drawings. Piles driven to elevation -5.0 feet.
Steel Sheet Piles - Driving Record with Driven Length	Approved Work Plan prepared by the Contractor.	Prepare pile log documenting length of each pile, blows per foot to drive each pile, and final top and tip elevations for each pile.	For each pile; submit within 24 hours of driving.	Final tip elevation documented as redlines on the 2009 Phase I construction drawings.
Steel Sheet Piles – Waler Materials	Approved Work Plan prepared by the Contractor.	For material specified in work plan, visually inspect to assure that the following properties meet design intent, per Contractors Work Plan: Section; Length; and Straightness.	Upon delivery to site.	Visually inspected and verified.
Steel Sheet Piles – Waler Installation	Approved Work Plan prepared by the Contractor.	Visually inspect to ensure walers are installed at design elevations, with connections between walers and bracing per Contractors Work Plan.	Upon installation.	Visually inspected and documented as red-lines on 2009 Phase 1 construction drawings.
Sheet pile removal	Approved Work Plan prepared by the Contractor.	Visually inspect removal to assure installed components are not damaged.	During sheet pile removal.	Visually inspected and documented. Sheet piles were thoroughly cleaned by pressure washer before leaving site and wash water was contained on site.

Table 3
CQA Activities - Water Management and Excavation
BSB Property, Kent, Washington

Task or Item	Specification or Drawing	Required Observation, Testing or Documentation	Inspection or Testing Frequency	CQA Performed
Prior to starting work.	Specification 01025. and approved Excavation, Shoring, and Water Management Plan prepared by the Contractor.	Submittal and approval of excavation, shoring, and water management plan prepared by the Contractor	N/A	Reviewed and approved submittal for excavation, shoring, and water management plan prepared by the Contractor
Discharge of groundwater to Sanitary Sewer	Specification 01025, Technical Memorandum dated 7/27/09, and King County discharge requirements.	Record discharge volume and document discharge rate does not exceed 100 gpm. Measure Turbidity at discharge location.	Daily	Pumping rate monitored by measuring draw down in excavation. Solids monitored by Imholf method. Records submitted to King County by Project Hydrogeologist.
Excavation to Elevation -2 ft. Design modified to elevation 10 feet in 2011.	Specification 02221.	Observe and document excavation to design lines and grades. Document base of excavation is stable and not subject to base heave	Periodically during excavation and prior to constructing concrete slab.	Visually inspected and measured with measuring tape from known elevations on the walers. See discussion regarding excavation in Section 3.
Management of excavated soils	Specification 02221, Drawing 4, and City of Kent erosion and sediment control requirements.	Observe to assure compliance.	Daily during earthwork activities.	Visually inspected and verified compliance with drawings, specifications, and plans.
Manage water emanating from stockpile.	Specification 02221, Drawing 4, and Contractor's approved excavation, shoring, and water management plans.	Observe to assure water from stockpile soils is being managed and is not discharging directly from site.	Daily during earthwork activities.	Visually inspected and verified compliance with drawings, specifications, and plans.

Table 4
CQA Activities - Cast In Place ZVI Reactor Vault
BSB Property, Kent, Washington

Task or Item	Specification or Drawing	Required Observation, Testing or Documentation	Inspection or Testing Frequency	CQA Performed
Reinforcement	Drawings S0.1, S1.1, and S1.2.	Visually inspect to assure deformed bars are Grade 60, ASTM A615. Visually inspect bar size.	Upon Delivery.	See section 3 of this report regarding Mayes inspection of stored steel. Steel size and grade verified by PES and by special inspection performed by Mayes Testing (See Appendix D).
		Visually inspect to assure bar sizes and to assure lap splice lengths.	After fixing and before placing concrete.	Visually inspected and approved by special inspection performed by Mayes Testing. Mayes Testing reports are provided in Appendix D.
		Visually inspect to assure correct cover to wall forms or top and bottom of base slab.		
		Visually inspect to assure bars are tied in place correctly.		
Embedded Items	Specification 051200 and Drawings S0.1, S1.1 and S1.2.	Visually inspect to assure embedded items are fixed securely in correct positions.	Before placing concrete.	Embedded items were limited to Nelson studs. See sections 3 and 6 for discussion of Nelson studs, which were embedded in wet concrete.
Waterstops	Specification 031513 and Drawing S1.1.	Review Contractor's approved submittal, and verify delivered product matches submittal.	Upon delivery and before installation.	Reviewed approved shop drawings, inspected for conformance with submittals. Water stop installation and butt splices inspected and approved by Mayes Testing and PES.
		Visually inspect to assure waterstop centered and secured in correct positions.	Prior to pouring concrete.	
		Visually inspect to assure waterstop butt splices are welded correctly.	Prior to pouring concrete.	
Formwork	Specification 033000.	Visually inspect to assure formwork erected, secured and braced to support concrete loads.	Prior to installing steel and/or pouring concrete.	Visually inspected and approved.
Concrete	Specification 033000 and Drawing S0.1.	Review Contractor approved submittal, and request certification from supplier for each load delivered.	One submittal for each mix design and certification for each load delivered.	Reviewed approved submittal. Mayes testing verified mix design by reviewing truck tickets for each batch. Mayes concrete inspection and testing reports are provided in Appendix E.
		Slump	At least 1 test every 50 cy. and 1 test per shift.	ASTM C143 performed by Mayes Testing at required frequency.
		Air Content		ASTM C231 performed by Mayes Testing at required frequency.
		Temperature		ASTM C10 performed by Mayes Testing at required frequency.
		Strength		ASTM C31 performed by Mayes Testing at required frequency.
		Visually inspect to assure that concrete is placed continuously in such a way that no concrete placed on previously placed concrete that has hardened enough to create a seam or plane of weakness.	Continuous during concrete placement.	Full time special inspection performed by Mayes Testing.
		Visually inspect to assure that mechanical vibrating equipment is used during concrete placement.	Continuous during concrete placement.	Full time special inspection performed by Mayes Testing

Table 5
CQA Activities - Waterproffing and Backfilling Around ZVI REactor Vault
BSB Property, Kent, Washington

<table>
<tr><th>Task or Item</th><th>Specification or Drawing</th><th>Required Observation, Testing or Documentation</th><th>Inspection or Testing Frequency</th><th>CQA Performed</th></tr>
<tr><td>Tremco Waterproofing</td><td>Specification 071416.</td><td>Review Contractor approved product data and verify delivered material matches submittal.</td><td>Upon delivery and before installation</td><td rowspan="2">Reviewed and approved submittal, which was a proposed alternative product, verified supplied product complied with approved submittal, verified that entire exterior of concrete vault was covered with water proofing. Product and Installation warranty provided in Appendix C-2 .</td></tr>
<tr><td></td><td>Review Contractor approved shop drawing showing location and extent of coverage and visually inspect application to assure correct coverage.</td><td>During application and before material is covered.</td></tr>
<tr><td rowspan="8">Non- Woven Geotextile Separator Around ZVI Reactor Vault.</td><td>Specification 02771.
Property | ASTM Test Method | MARV Requirement
Mass/Area | D5261 | 8.0 oz/yd^2
Grab Tensile Strength | D4632 | 220 lbs
Puncture Strength | D4833 | 120 lbs
Trapezoidal Tear Strength | D4533 | 95 lbs
Permittivity | D4491 | 1.5 sec^{-1}</td><td rowspan="2">Review Contractor’s approved submittal and manufacturer’s quality control test data. Compare roll numbers of delivered material with roll numbers on MQC data. Document MQC test results indicate the materials meet specified requirements prior to installation</td><td rowspan="2">See Table in Section 02771.2.2 for MQC testing frequencies. There are no CQA testing requirements.</td><td rowspan="2">Reviewed approved submittal. Reviewed manufacturer’s quality control certification for compliance with specifications prior to installation</td></tr>
<tr></tr>
<tr><td>Apparent Opening Size | D4751 | <0.180 mm</td><td>Visually inspect to assure that geotextile is placed as shown on Drawings, or in accordance with Contractor approved Work Plan.</td><td rowspan="2">As material is being installed.</td><td rowspan="2">Visually inspected to assure that geotextile was installed centered in the gravel and backfilled as described in Section 3.</td></tr>
<tr><td>UV Resistance (500 hours) | D4355 | 70% of strength</td><td>Visually inspect to assure that geotextile is overlapped.</td></tr>
<tr><td rowspan="4">Drainage Gravel for Drainage Gravel Around ZVI Reactor Vault.</td><td>Specification 02225. Material greater than ½ inch in largest dimension must be rounded to sub-rounded.</td><td rowspan="2">Review Contractor’s approved submittals. Compare submitted sample to delivered material.</td><td rowspan="2">Complete one test per source prior to start of backfilling.</td><td>Reviewed Contractor’s approved submittals and compared to delivered material.</td></tr>
<tr><td>Specification 02225. Having a hydraulic conductivity of greater than or equal to 0.5 cm/sec when placed in accordance with this Section</td><td>HWA performed test per WSDOT Test Method 605. Results indicated compliance with specifications. (See Appendix I).</td></tr>
<tr><td>Specification 02225.
U.S. Sieve Size | Percent Passing
2-inch | 100
1½-inch | 85-100
1-inch | 50-85
¾-inch | 0-10
3/8-inch | 0-5
#4 | 0-3
#40 | 0-3
#200 | 0-2
Gradation requirements are an index test. Gradation of materials below the 2-inch dimension and above the ½-inch sieve can be modified if the hydraulic conductivity requirements are met. Material must be of a gradation such that the D_{85} size is greater than ½-inch.</td><td></td><td></td><td>HWA performed test per ASTM Test Method C 136. Results indicated compliance with specifications.

HWA test reports are provided in Appendix I.</td></tr>
<tr><td>Drawings 6 and 7</td><td>Visually inspect to assure gravel is placed as shown on Construction Drawings, or Contractor’s approved Work Plan.</td><td>During installation and before gravel is covered.</td><td>Visually inspected and verified as described in Section 3.</td></tr>
<tr><td rowspan="2">Piping Around ZVI Reactor Vault.</td><td rowspan="2">Specification 02711 and Drawings 6 and 7.</td><td>Review Contractor’s approved submittal to verify delivered products matches submittal.</td><td>Upon delivery to the site and before installation.</td><td rowspan="2">Reviewed Contractor’s approved submittal to verify delivered products matched submittal. Documented pipes placed at elevations 12.25 and 16.75 ft and vertical riser was installed per design.</td></tr>
<tr><td>Document pipes placed at elevations 12.25 and 16.75 ft and vertical connection between pipes and riser to ground surface.</td><td>As piping placed and before covering with gravel.</td></tr>
</table>

Table 6
CQA Activities - Piping Inside ZVI Reactor Vault
BSB Property, Kent, Washington

Task or Item	Specification or Drawing	Required Observation, Testing or Documentation	Inspection or Testing Frequency	CQA Performed
Piping Inside ZVI Reactor Vault	Specification 02711 and Drawings 6 and 7.	Review Contractor's approved submittal to verify delivered products matches submittal.	Upon delivery to the site and before installation	Reviewed Contractor's approved submittal. Verified delivered products matched submittal. Inspected pipes penetrating concrete were placed at designed elevations. Inspected pipe layout and pipe clamps on base of vault. Inspected welding of pipe joints and bead reaming. Inspected location of riser pipes relative to access lids. Inspected pipe perforations for compliance with design. All inspected items complied with design.
		Visually inspect pipes that penetrate concrete are placed at elevations 16.25 and 17.0.	As piping placed and before concrete pour.	
		Visually inspect pipe layout on base of vault.	Following installation and before gravel installation.	
		Visually inspect all pipe joints.	During welding.	
		Visually inspect location of riser pipes relative to access lid design.	Following riser installation and before fabrication of lids.	
		Visually inspect pipe perforations.	Prior to installing pipes.	
Drainage Gravel for Drainage Gravel Around and Over Pipes on Base of ZVI Reactor Vault	Specification 02225. Material greater than ½ inch in largest dimension must be rounded to sub-rounded.	Review Contractor's approved submittals. Compare submitted sample to delivered material.	Complete one test per source prior to start of backfilling	Reviewed Contractor's approved submittals and compared to delivered material.
	Specification 02225. Having a hydraulic conductivity of greater than or equal to 0.5 cm/sec when placed in accordance with this Section			HWA performed test per WSDOT Test Method 605. Results indicated compliance with specifications.
	Specification 02225. U.S. Sieve Size: Percent Passing 2-inch: 100 1½-inch: 85-100 1-inch: 50-85 ¾-inch: 0-10 3/8-inch: 0-5 #4: 0-3 #40: 0-3 #200: 0-2			HWA performed test per ASTM C136. . Results indicated compliance with specifications. HWA test reports are provided in Appendix I.
	Gradation requirements are an index test. Gradation of materials below the 2-inch dimension and above the ½-inch sieve can be modified if the hydraulic conductivity requirements are met. Material must be of a gradation such that the D_{85} size is greater than ½-inch.			
	Drawings 6 and 7	Visually inspect to assure gravel is placed as shown on Construction Drawings, or Contractor's approved Work Plan.	During installation.	Visually inspected and verified.
Linkseal Fittings	Drawing S0.1.	Review Contractor's approved submittal to verify delivered products matches submittal.	Upon delivery.	Reviewed approved submittal. Verified delivered products matched submittal.
		Visually inspect elevation of penetrations for fittings.	After each penetration through ZVI reactor vault walls is completed.	Inspected elevation and installation of penetrations, which complied with the design.
		Visually inspect installation of fittings.		
Valves	Drawing 2.	Review Contractor's approved submittal to verify delivered products matches submittal.	Upon delivery and prior to installation.	Reviewed Contractor's approved submittal to verify delivered products matches submittal. Reviewed Contractor's approved shop Construction Drawings to verify installed valve supports comply with shop drawing.
		Review Contractor's approved shop Construction Drawings to verify installed valve supports comply with shop drawing.	Upon delivery and prior to installation.	Visually inspected installation of valves and fittings for compliance with required elevation and approved shop drawings.
		Visually inspect installation of valves and fittings for compliance with required elevation and approved shop drawings.	Following installation of each valve.	

Table 7
CQA Activities - SBCW Construction
BSB Property, Kent, Washington

Task or Item	Specification or Drawing	Required Observation, Testing or Documentation	Inspection or Testing Frequency	CQA Performed
Utility Location	Specification 01510. Contractor to locate utilities in project area.	Review results of utility locating service's work. If necessary work with parties to mitigate utilities that conflict with project area.	Prior to beginning field work.	Verified by observation that utility locate was completed and that located abandoned electrical utilities were removed.
Utility Abandonment	Specification 01510. Utilities intersecting the trench alignment shall be identified and Owner notified. Do not abandon without Owner's permission.	Document locations.	Once per occurence.	Verified by observation that utility locate was completed and that located abandoned electrical utilities were removed. Coordinated with Puget Sound Enrgy (PSE) to verify high voltage lines were abandoned.
Explore for Waste Sludge	Specification 02613 and Drawing 5 of Phase II Construction Drawings.	Excavate a continuous exploratory trench 3 feet deeper than the working trench between stations 12+25 and 1+75 and potholing 3 feet deeper than the working trench at 50-ft intervals between stations 1+75 and 3+75.	Once	Verified by observation. See Section 3 for details of exploratory work and results.
Mixing Water Lab Testing	N/A	Document water source. Test for pH, hardness, total suspended solids and total dissolved solids.	1 per source	Verified by observation.
Soil-Bentonite Backfill	Minimum bentonite content of 6% by dry weight of soil.	Number of bentonite sacks added to trench/equipment. Volume of slurry added to trench.	Every 25 ft.	Verified by observation, measurement and calculations at intervals of about 7 feet average. See Table in Appendix F.
Soil-Bentonite Backfill Field Testing	Slump 3 to 6 inches.	Observe QC testing and perform independent QA tests at QA Monitor's discretion. Distribute documentation daily.	Every 75 ft	ASTM C143. Verified by observing CQC testing by Contractor. Performed independent CQA testing. See CQC report in Appendix H.
	Density/Unit Weight.			ASTM C138. Verified by observing CQC testing by Contractor. Performed independent CQA testing. See CQC report in Appendix H.
Soil-Bentonite Backfill Laboratory Testing	Permeability	Observe QC sampling at 150 ft intervals.	Obtain QC/QA split sample every 150 ft.	ASTM D5084. Observed QC sampling. Reviewed QC tests results. Obtained independent CQA samples and performed tests at the required frequency. See HWA report in Appendix G and CQC report Appendix H.
	Atterberg Limits			ASTM D4318. Obtained independent CQA samples and performed tests at the required frequency. See HWA report in Appendix G.
	Gradation/Sand Content			ASTM C136/ASTM D4381. Obtained independent CQA samples and performed tests at the required frequency. See HWA report in Appendix G.
	Density/Unit Weight			ASTM C138. Obtained independent CQA samples and performed tests at the required frequency. See HWA report in Appendix G.
Trench Width	2 feet minimum.	Document with record survey and drawings.	Monitor continuously.	Verified by observation that trench was minimum of 27 inches wide.
Horizontal Alignment	Per Specification 02613 Section 3.6.F, within 2 feet of design alignment from Station 12+00 to Station 9+00, and within 1 foot of design alignment from Station 9+00 to Station 12+00.	Document with record survey and drawings.	Check at 25 ft intervals.	Verified by observation. Field measured relative to perimeter fence line. No survey performed.
Cutting boom orientation	Per Specification 02613 Section 3.6.A.	Cutting boom rotated to vertical position to full required depth at start of trenching	Monitor continuously.	Verified by observation and by hand leveling from known elevation to known position on boom.
		Cutting boom maintained in vertical position for remainder of trenching		
Bottom of trench elevation.	Per Construction Drawings	Record based on measurement of boom depth.	Record at 25 ft intervals.	Verified by observation and by hand leveling from known elevation to known position on boom. Documented on red-line record drawings in Appendix A-1.
Settlement of soil-bentonite backfill following completion of SBCW	Specification 02613.	Confirmation that settlement of top of SBCW has stopped.	Several days to week after construction.	Verified by observation. Slurry was eventually treated with cement to provide hard surface for backfilling trench and placing key trench backfill.

Table 8
CQA Activities - Grading and Final Cover
BSB Property, Kent, Washington

Task or Item	Specification or Drawing	Required Observation, Testing or Documentation	Inspection or Testing Frequency	CQA Performed
Utility Location	Specification 01510. Contractor to locate utilities in project area.	Review results of utility locating service's work. If necessary work with parties to mitigate utilities that conflict with project area.	Prior to beginning field work.	Reviewed results of utility locating service's work. Removed utilities as required. Coordinated with PSE for assistance with high voltage utilities to assure they were abandoned.
Utility Abandonment	Specification 01510. Utilities intersecting the trench alignment shall be identified and Owner notified. Do not abandon without Owner's permission.	Document locations.	Once per occurrence.	
Saw Cut Alignment of SBCW	Construction Drawings.	Document asphalt saw cut in locations where existing asphalt will be maintained.	Prior to SBCW construction and prior to paving.	Verified by observation.
Working trench.	Construction Drawings and Specification 02613.	Excavation to required depth and alignment	Prior to SBCW construction.	Verified by observation.
Remove excess soil-bentonite from working trench or mix with OPC in place to solidify.	Specification 02613 and/or develop OPC mix criteria to solidify and leave in place.	For removal, sufficiently clean to allow working trench to be backfilled.	Prior to backfilling.	Verified by observation, slurry remained in trench and was solidified with cement admix. See Section 3.
		If left in place, mix with design quantity of OPC and allow to cure. Strength.	Prior to constructing final cover. Every 300 ft.	
Working trench backfill.	Construction Drawings and Specifications 02222 and 02613.	Determine compaction characteristics of soil (Proctor)	1 per material type	Relative compaction testing replaced with method specification and CQA observation. See Section Sections 3 and 6 for description.
		Backfill each lift to minimum of 90 % of maximum dry density determined by ASTM D1557.	250 cy minimum.	
General backfill	Construction Drawings and Specifications 02222.	Determine compaction characteristics of soil (Proctor)	1 per material type	CQA Monitor and Design Engineer chose option of using observational procedures, including proof-rolling with dump trucks. Most soil was also treated with a cement admix and allowed to cure to a hard surface.
		Backfill each lift to minimum of 90 % of maximum dry density determined by ASTM D1557.	250 cy minimum.	
		Final surface is completed to correct minimum grades for Type 1 and Type 2 final covers.	Check entire paving area.	Survey of completed asphalt cover surface completed and provided in Appendix A-1.
Final cover crushed rock	Construction Drawings	Gradation.	1 per material type.	ASTM C136. Verified by submittal from supplier.
		Thickness.	Spot check thickness throughout cover areas or provide method to monitor placement thickness.	Verified by observation of grading relative to construction staking provided by surveyor. Most areas exceeded design depth.
		Density greater than 98% standard Proctor, ASTM D698, maximum dry density.	1 per 250 cy	ASTM D698. Proctor testing per ASTM D1557 performed by supplier. CQA nuclear density tests performed by Mayes Testing. See results in Appendix J. See discussions of placement and testing in Sections 3 and 6.
Existing asphalt	Construction Drawings	Grind along tie-in to allow minimum 1-inch overlay.	Check entire overlay area.	Verified by observation.
Final cover asphalt	Construction Drawings and Specification 02415	Transport covered	Each load.	Verified by observation.
		Temperature above 250 deg F	Each load.	Verified by Mayes Testing (See test reports).
		Thickness	Provide method to monitor placement thickness. If suspect inadequate thickness core after placing.	Coring completed by PES that verified minimum thickness requirements were met.
		Compaction greater than 95%	1 per 300 cy.	CQA nuclear density tests performed by Mayes Testing and CQC nuclear density tests performed by subcontractor. See results in Appendix K, and discussion of results in Section 6.
		Finished surface texture	Entire paved area.	Verified by observation.
		Finished surface grade minimum 0.5%		Verified by survey. See Record Drawings in Appendix A-1.

APPENDIX A

Phase I and II Record Drawings

A-1 – Original Construction Drawings and Red-Lined Drawings to Reflect As-Constructed Conditions

A-2 – Instructions From Structural Engineer Regarding Nelson Stud Repair Work

A-3 – Sketch Indicating PVC Geomembrane Encasement of Un-solidified and Cement Stabilized Sludge

A-4 – Site Demolition Plan

Appendix A-1

Original Construction Drawings and Red-Lined Drawings to Reflect As-Constructed Conditions

Includes:

- Phase I Original Final Stamped Design Drawings

- Phase II Original Final Stamped Design Drawings

- Red-Lined Drawings:
  - Phase I As-Constructed Drawings
  - Phase II As-Constructed Drawings
  - Final Site Topographic Survey (TetraTech/INCA)
  - Fence and Vault Survey (DR Strong)
  - Final Conduit and Pipe Configuration

CONSTRUCTION DRAWINGS

FINAL CLEANUP ACTION PHASE I

FOR

BSB DIVERSIFIED, INC. PROPERTY

8202 S. 200TH STREET, KENT, WASHINGTON

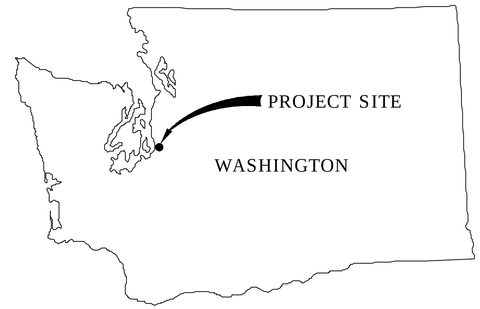
AUGUST 2009

(REVISED JULY 2011)

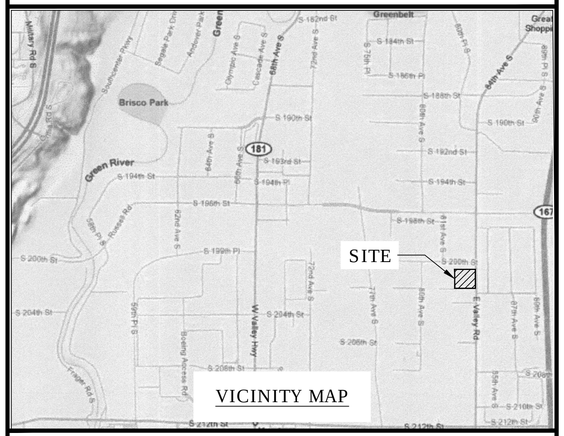
PREPARED FOR:

BSB DIVERSIFIED, INC.

C/O BURT GEOLOGY AND ENVIRONMENTAL APPLICATIONS PLLC
902 GRAPEVINE LANE
NASHVILLE, TENNESSEE 37221
PH. (615) 828-6126
RON BURT (OWNER'S REPRESENTATIVE)



REGIONAL MAP



VICINITY MAP

Sheet List Table

Sheet Number	Sheet Title
1	TITLE PAGE
2	NOTES
3	EXISTING SITE PLAN
4	EROSION CONTROL PLAN
5	ZVI REACTOR VAULT PLAN VIEW
6	REACTOR VAULT PLAN & DETAIL 1
7	REACTOR VAULT SECTIONS A-C
8	REACTOR VAULT SECTIONS D-E

APPROVED:

ROGER B. NORTH STATE OF WASHINGTON 15370 REGISTERED PROFESSIONAL ENGINEER

7/15/11
ENGINEER OF RECORD - ROGER B. NORTH, P.E. DATE

ENVIRONMENTAL ENGINEER:

PES Environmental, Inc.
Engineering & Environmental Services

1215 4TH AVENUE - SUITE 1350
SEATTLE, WASHINGTON 98161
PH. 206-529-3980
FX. 206-529-3985
BRIAN O'NEAL P.E. (PROJECT MANAGER)

CIVIL ENGINEER:

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
PH. (503) 922-2522
ROGER NORTH P.E. (PROJECT MANAGER)

STRUCTURAL ENGINEER:

LIVERMORE ASSOCIATES, INC.
140 SW ARTHUR STREET, SUITE 200
PORTLAND, OREGON 97201
PH. 503-892-3002
FX. 503-892-3003
GARY LIVERMORE P.E. (PROJECT MANAGER)

DETAIL INDICATOR:

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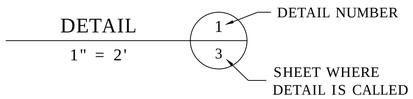

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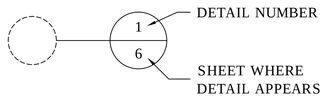

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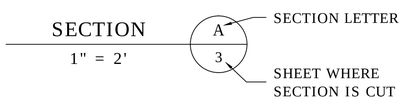

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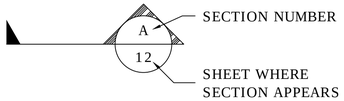


ABBREVIATIONS:

AC	ACRES	FT	FEET
BLDG	BUILDING	G.B.	GRADE BREAK
℄	CENTERLINE	GALV	GALVANIZED
CO	CLEANOUT	HORIZ	HORIZONTAL
DIA or Ø	DIAMETER	HP	HIGH POINT
DWG	DRAWING	ID	INSIDE DIAMETER
E	EAST	I.E.	INVERT ELEVATION
EL or ELEV	ELEVATION	L	LENGTH
FT	FEET	L.F.	LINEAR FEET
H or h	HEIGHT	N	NORTH
HDPE	HIGH DENSITY POLYETHYLENE	N.I.C.	NOT IN CONTRACT
E	EAST	OD	OUTSIDE DIAMETER
EL OR ELEV	ELEVATION	℄	PROPERTY LINE
EXIST OR EX	EXISTING	S	SLOPE IN FEET/FOOT
		TYP	TYPICAL

GENERAL NOTES:

1. CONTRACTOR SHALL PROCURE AND CONFORM TO ALL CONSTRUCTION PERMITS REQUIRED BY THE CITY. OWNER TO PAY ALL PROJECT PERMIT COSTS. CONTRACTOR SHALL PROVIDE OWNER 48 HOURS NOTICE PRIOR TO REQUIRING PAYMENT FOR PERMITS.
2. THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO COMPLETE THE PROJECT IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DRAWINGS INCLUDING SUCH INCIDENTALS AS MAY BE NECESSARY TO MEET APPLICABLE AGENCY REQUIREMENTS AND PROVIDE A COMPLETED PROJECT.
3. ANY INSPECTION BY THE CITY OR OTHER AGENCIES SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM THE WORK IN STRICT COMPLIANCE WITH THE CONTRACT DOCUMENTS, APPLICABLE CODES AND AGENCY REQUIREMENTS.
4. CONTRACTOR SHALL ERECT AND MAINTAIN BARRICADES, WARNING SINGS, TRAFFIC CONES PER CITY REQUIREMENTS IN ACCORDANCE WITH THE MUTCD (INCLUDING WASHINGTON AMENDMENTS). ACCESS TO DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES. ALL TRAFFIC CONTROL MEASURES SHALL BE APPROVED AND IN PLACE PRIOR TO ANY CONSTRUCTION ACTIVITY.
5. CONTRACTOR SHALL BE LICENSED WITH THE CONSTRUCTION CONTRACTOR BOARD.
6. ELEVATIONS ARE BASED ON NAVD 1988 DATUM.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MANAGING CONSTRUCTION ACTIVITIES TO ENSURE THAT PUBLIC STREETS AND RIGHT-OF-WAYS ARE KEPT CLEAN OF MUD, DUST OR DEBRIS. DUST ABATEMENT SHALL BE MAINTAINED BY ADEQUATE WATERING OF THE SITE BY THE CONTRACTOR.

EXISTING UTILITIES & FACILITIES:

1. CONTRACTOR SHALL PROTECT EXISTING GROUNDWATER TREATMENT FACILITIES AND EQUIPMENT. ANY DAMAGE TO SAME WILL BE REPAIRED BY CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
2. THE CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF APPROVED DRAWINGS ON THE CONSTRUCTION SITE AT ALL TIMES WHEREON HE WILL RECORD ANY APPROVED DEVIATIONS IN CONSTRUCTION FROM THE APPROVED DRAWINGS, AS WELL AS THE STATION LOCATIONS AND DEPTHS OF ALL EXISITNG UTILITIES ENCOUNTERED. THESE FIELD RECORD DRAWINGS SHALL BE KEPT UP TO DATE AT ALL TIMES AND SHALL BE AVAILABLE FOR INSPECTION BY THE OWNER UPON REQUEST. FAILURE TO CONFORM TO THIS REQUIREMENT MAY RESULT IN DELAY OF PAYMENT AND/OR FINAL ACCEPTANCE OF THE PROJECT.
3. UPON COMPLETION OF CONSTRUCTION OF ALL NEW FACILITIES, CONTRACTOR SHALL SUBMIT A CLEAN SET OF FIELD RECORD DRAWINGS CONTAINING ALL AS-BUILT DRAWINGS TO THE OWNER FOR USE IN THE PREPARATION OF AS-BUILT DRAWINGS. ALL INFORMATION SHOWN ON THE CONTRACTORS FIELD RECORD DRAWINGS SHALL BE SUBJECT TO VERIFICATION BY THE ENGINEER. IF SIGNIFICANT ERRORS OR DEVIATIONS ARE NOTED BY THE ENGINEER, AN AS-BUILT SURVEY PREPARED AND STAMPED BY A REGISTERED PROFESSIONAL LAND SURVEYOR AND/OR QUALIFIED ENGINEER SHALL BE COMPETED AT THE CONTRACTOR'S EXPENSE.
4. THE LOCATION AND DESCRIPTIONS OF EXISTING UTILITIES SHOWN ON THE DRAWING, ARE COMPILED FROM AVAILABLE RECORDS AND/OR FIELD SURVEYS. THE ENGINEER OR UTILITY COMPANIES DO NOT GUARANTEE THE ACCURACY OR THE COMPLETENESS OF SUCH RECORDS. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND SIZES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
5. THE CONTRACTOR SHALL LOCATE AND MARK ALL EXISTING PROPERTY AND STREET MONUMENTS PRIOR TO CONSTRUCTION. ANY MONUMENTS DISTURBED DURING CONSTRUCTION OF THE PROJECT SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR AT THE CONTRACTORS EXPENSE.
6. CONTRACTOR SHALL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING POTENTIAL UTILITY CONFLICTS FAR ENOUGH AHEAD OF CONSTRUCTION TO MAKE NECESSARY CONSTRUCTION MODIFICATIONS WITHOUT DELAYING THE WORK.
7. ALL FACILITIES SHALL BE MAINTAINED IN-PLACE BY THE CONTRACTOR UNLESS OTHERWISE SHOWN OR DIRECTED. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO SUPPORT, MAINTAIN, OR OTHERWISE PROTECT EXISTING UTILITIES AND OTHER FACILITIES AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR TO LEAVE EXISTING MONITORING WELLS, AND OTHER FACILITIES IN AN EQUAL OR BETTER-THAN-ORIGINAL CONDITION AND TO THE SATISFACTION OF THE OWNER.
8. UTILITIES OR INTERFERING PORTIONS OF UTILITIES THAT ARE ABANDONED IN PLACE SHALL BE REMOVED BY THE CONTRACTOR TO THE EXTENT NECESSARY TO ACCOMPLISH THE WORK. THE CONTRACTOR SHALL PLUG THE REMAINING EXPOSED ENDS OF ABANDONED UTILITIES.
9. ALL PIPED UTILITIES ABANDONED IN PLACE SHALL HAVE ALL OPENINGS CLOSED WITH CONCRETE PLUGS WITH A MINIMUM LENGTH EQUAL TO 2 TIMES THE DIAMETER OF THE ABANDONED PIPE.
10. ANY WELLS TO BE DECOMISSIONED SHALL BE ABANDONED PER STATE REQUIREMENTS.

TESTING AND INSPECTION

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THAT ALL REQUIRED OR NECESSARY INSPECTIONS ARE COMPLETED BY THE OWNER'S AUTHORIZED INSPECTORS PRIOR TO PROCEEDING WITH SUBSEQUENT WORK WHICH COVERS OR THAT IS DEPENDENT ON THE WORK TO BE INSPECTED. FAILURE TO OBTAIN NECESSARY INSPECTION(S) AND APPROVAL(S) SHALL RESULT IN THE CONTRACTOR BEING FULLY RESPONSIBLE FOR ALL PROBLEMS ARISING FROM UNINSPECTED WORK.

GRADING, & DRAINAGE:

1. CLEAR AND GRUB WITHIN WORK LIMITS ALL SURFACE VEGETATION, TREES, STUMPS, BRUSH, ETC.
2. ALL TREES, BRUSH AND DEBRIS ASSOCIATED WITH CLEARING, STRIPPING OR GRADING SHALL BE REMOVED AND DISPOSED OF OFF-SITE.
3. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, STRAIGHT GRADES SHALL BE RUN BETWEEN ALL FINISH GRADE ELEVATIONS AND/OR FINISH CONTOUR LINES SHOWN.
4. FINISH PAVEMENT GRADES AT TRANSITION IN EXISTING PAVEMENT SHALL MATCH EXISTING PAVEMENT GRADES OR BE FEATHERED PAST JOINTS WITH EXISTING PAVEMENT AS REQUIRED TO PROVIDE A SMOOTH, FREE DRAINING SURFACE.
5. ALL EXISTING OR CONSTRUCTED MANHOLES, CLEANOUTS, MONUMENTS, GAS VALVES, WATER VALVES AND SIMILAR STRUCTURES SHALL BE ADJUSTED TO MATCH FINISH GRADES OF THE PAVEMENT, SIDEWALK, LANDSCAPED AREA OR MEDIAN STRIP WHEREIN THEY LIE.
6. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, NO CUT OR FILL SLOPES SHALL BE CONSTRUCTED STEEPER THAN 2H:1V.

UTILITIES:

1. THE END OF ALL UTILITY STUBS SHALL BE MARKED WITH A 2X4 COLOR CODED TAG WIRED TO THE PIPE STUB.
2. ALL NON-METALLIC WATER, SANITARY AND STORM SEWER PIPING SHALL HAVE 14 GAUGE COLOR CODED TRACER WIRE INSTALLED AS PER CITY OF KENT DETAILS.
3. SANITARY SEWER LATERALS TO BE RUN TO EDGE OF R.O.W. AT 1/4" PER 12" SLOPE. LATERALS TO BE INSTALLED DOWNSTREAM OF MAINLINE CLEAN OUTS AND/OR MANHOLES. ALL CATCH BASINS TO HAVE 8" PVC. SDR-35 LATERALS. CATCH BASIN LOCATION MAY BE MODIFIED TO ACCOMMODATE LOW SPOTS CREATED DURING CONSTRUCTION. ENGINEER AND/OR CITY PROJECT MANAGER MAY REQUIRE ADDITIONAL CATCH BASINS TO BE PLACED AT LOW SPOTS CREATED DURING CONSTRUCTION.
4. CONTRACTOR TO MAKE MINOR ADJUSTMENT TO SERVICE LOCATIONS, WHERE NECESSARY, TO AVOID CONFLICT. MAINTAIN 5' MINIMUM SEPARATION BETWEEN STORM AND SANITARY AND 10' MIN. SEPARATION BETWEEN SANITARY AND WATER, 1' TO MANHOLES OR CATCH BASINS AND 5' BETWEEN MANHOLES AND CATCH BASINS. MAINTAIN 1' VERTICAL AND 2' HORIZONTAL SEPARATION BETWEEN CITY AND PRIVATE FRANCHISE UTILITY SERVICES AND 2' HORIZONTAL SEPARATION BETWEEN CITY UTILITIES IN A COMMON TRENCH.

WATER SYSTEM:

1. CITY FORCES TO OPERATE ALL VALVES INCLUDING FIRE HYDRANTS ON EXISTING PUBLIC MAINS.
2. ALL WATER SUPPLY PIPE SHALL BE PVC C-900 COLORED BLUE THROUGHOUT THE ENTIRE COMPOSITION OF THE PIPE. ALL FITTINGS SHALL BE DUCTILE IRON FITTINGS IN CONFORMANCE WITH AWWA C-153 AND NSF 61. THE MINIMUM WORKING PRESSURE FOR ALL MJ CAST IRON OR DUCTILE IRON FITTINGS 4-INCHES THROUGH 24-INCH IN DIAMETER SHALL BE 350 PSI FOR MJ FITTING AND 250 PSI FOR FLANGED FITTINGS.
3. MATERIALS THAT COME INTO CONTACT WITH POTABLE WATER SHALL MEET NATIONAL SANITATION FOUNDATION STANDARD 61, SECTION 9 REQUIREMENTS.
4. ALL WATER MAINS TO BE INSTALLED WITH A MINIMUM 36 INCH COVER TO FINISH GRADE UNLESS OTHERWISE NOTED OR DIRECTED. SERVICE LINE TO BE INSTALLED WITH A MINIMUM 24 INCH COVER.

VALVES IN ZVI REACTOR VESSEL:

1. FURNISH AND INSTALL COMPLETE VALVE ASSEMBLIES FOR INLET AND OUTLET PIPES.
2. VALVES SHALL BE TYPE 57 BUTTERFLY VALVES MANUFACTURED BY ASAHI-AMERICA.
3. VALVES SHALL BE 4-INCH NOMINAL DIAMETER.
4. VALVES SHALL BE LEVER-OPERATED BUTTERFLY VALVES WITH TWO-PIECE STEM AND HOUSING EXTENSIONS.
5. STEM AND HOUSING EXTENSIONS SHALL BE SUPPORTED TO WALL OF ZVI REACTOR VESSEL.
6. VALVE LEVER HANDLES SHALL HAVE PROVISION FOR A PADLOCK.
7. VALVE LEVERS TO BE POSITIONED AT LOCATIONS OPERABLE FROM THE ACCESS DOOR THROUGH THE TOP OF THE REACTOR VESSEL.
8. VALVES SHALL BE SUPPLIED WITH FLANGES AT EACH END FOR CONNECTION TO FLANGES ON ENDS OF ADJACENT 4-INCH DIAMETER SDR 17 HDPE PIPE.
9. MANUFACTURERS OTHER THAN ASAHI-AMERICA SHALL BE ISO-9001 CERTIFIED AND SHALL PROVIDE DOCUMENTATION THAT PROPOSED PRODUCT IS AT LEAST EQUIVALENT TO SPECIFIED PRODUCT.

ROGER B NORTH
STATE OF WASHINGTON
43593
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-13

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	05/28/09	PHASE I REVIEW	RN	STM	RN
1	06-10-11	CHANGE ORDER #8	RN	STM	RN
2	07-11-11	C/O #8 UPDATE	RN	STM	RN
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

SCALE: AS SHOWN

DATE: 7/16/2011

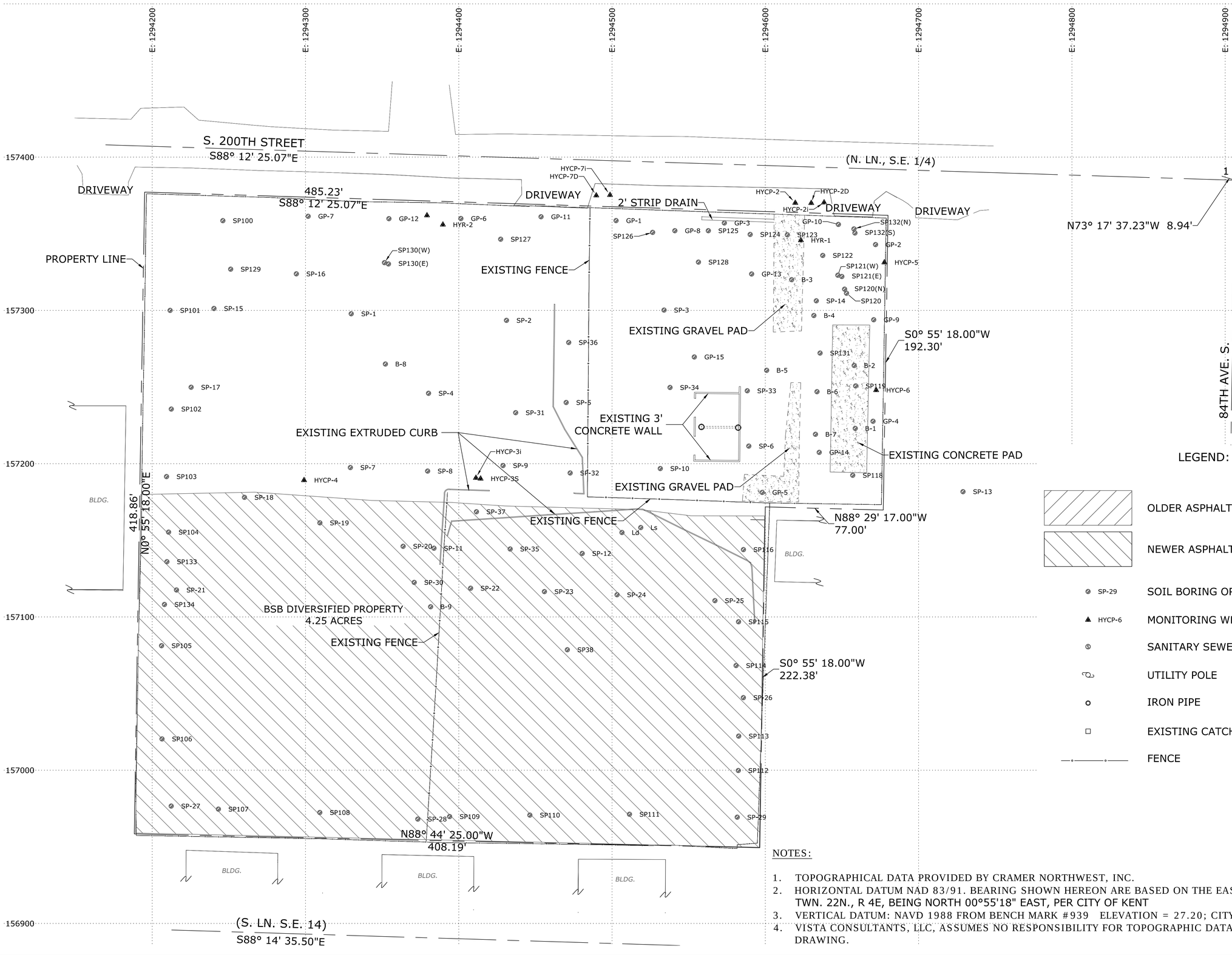
FINAL CLEANUP ACTION
FINAL CLEANUP DRAWINGS
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

NOTES

DRAWING NO. 2 OF 8

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 1 CLEANUP DRAWINGS\LEGEND AND NOTES.DWG PLOTTED: 7/16/2011 10:15 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 1 CLEANUP DRAWINGS\EXISTING SITE PLAN.DWG PLOTTED: 7/16/2011 10:15 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)



REDUCTION SCALE CHECK

1"

0 30' 60'

GRAPHICAL SCALE

LEGEND:

- OLDER ASPHALT PAVING
- NEWER ASPHALT PAVING
- SP-29 SOIL BORING OR SOIL PROBE
- HYCP-6 MONITORING WELL
- SANITARY SEWER MANHOLE
- UTILITY POLE
- IRON PIPE
- EXISTING CATCH BASIN
- FENCE

NOTES:

1. TOPOGRAPHICAL DATA PROVIDED BY CRAMER NORTHWEST, INC.
2. HORIZONTAL DATUM NAD 83/91. BEARING SHOWN HEREON ARE BASED ON THE EAST LINE OF S.E. 1/4 SEC. 1, TWN. 22N., R 4E, BEING NORTH 00°55'18" EAST, PER CITY OF KENT
3. VERTICAL DATUM: NAVD 1988 FROM BENCH MARK #939 ELEVATION = 27.20; CITY OF KENT, WASHINGTON.
4. VISTA CONSULTANTS, LLC, ASSUMES NO RESPONSIBILITY FOR TOPOGRAPHIC DATA PRESENTED IN THIS DRAWING.

ROGER B NORTH
STATE OF WASHINGTON
43591
REGISTERED
PROFESSIONAL ENGINEER

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-13

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	05/28/09	PHASE I REVIEW	RN	STM	RN
1	06-10-11	CHANGE ORDER #8	RN	STM	RN
2	07-11-11	C/O #8 UPDATE	RN	STM	RN

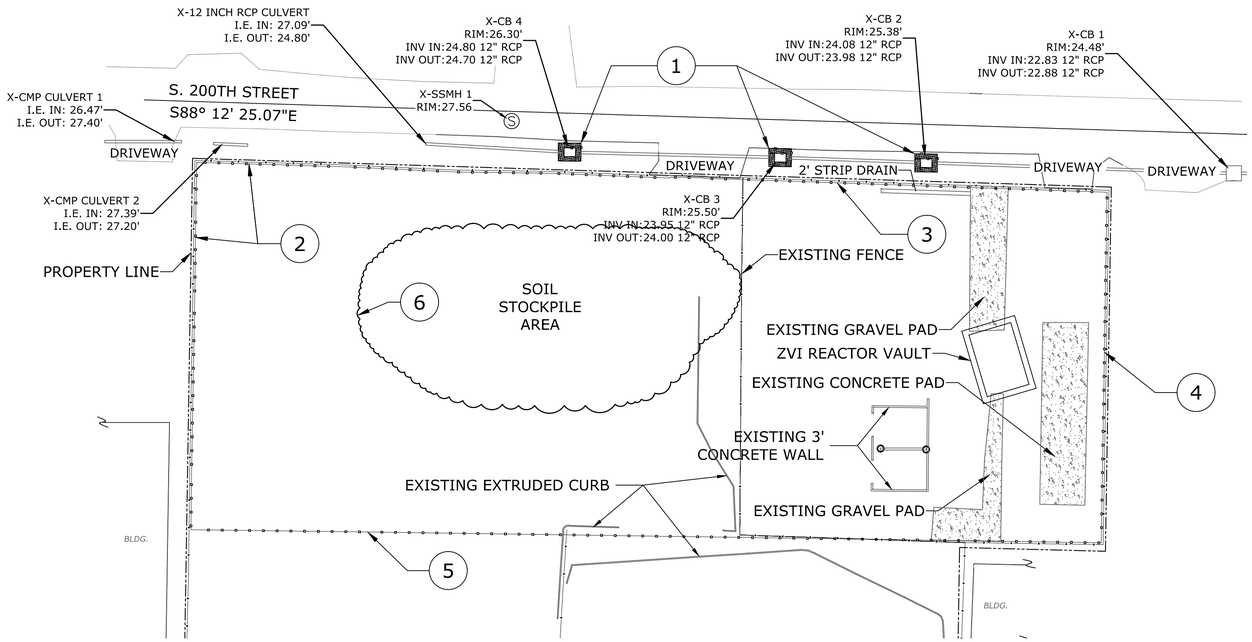
SCALE: AS SHOWN

DATE: 7/16/2011

FINAL CLEANUP ACTION
FINAL CLEANUP DRAWINGS
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

EXISTING SITE PLAN

DRAWING NO. 3 OF 8

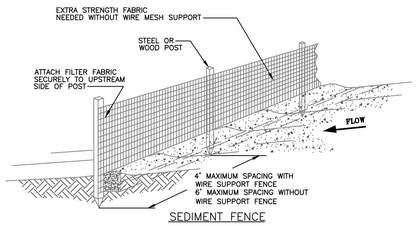


EROSION CONTROL NOTES:

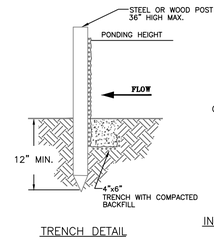
1. SILT FABRIC SHALL BE PLACED OVER THE CATCH BASIN INLETS SO THAT NO SEDIMENT WILL ACCUMULATE IN THE CATCH BASINS.
2. THE CONTRACTOR SHALL INSPECT SITE AND ENTRANCE DRIVEWAY DAILY AND WASH AS NEEDED SO THAT NO SEDIMENT IS WASHED OR CARRIED OFF-SITE.
3. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED.
4. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
5. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
6. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY.
7. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

NOTES FOR SEDIMENT FENCES:

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND SHALL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST, OR OVERLAP 2"X 2" POSTS AND ATTACHED AS SHOWN ON DETAIL.
2. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS WHERE FEASIBLE. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 18 INCHES.
3. THE FILTER FABRIC SHALL HAVE A MINIMUM VERTICAL BURIAL OF 6 INCHES. ALL EXCAVATED MATERIAL FROM FILTER FABRIC FENCE INSTALLATION SHALL BE BACKFILLED AND COMPACTED ALONG THE ENTIRE DISTURBED AREA.
4. STANDARD OR HEAVY DUTY FILTER FABRIC FENCE SHALL HAVE MANUFACTURED STITCHED LOOPS FOR 2"X 2" POST INSTALLATION. STITCHED LOOPS SHALL BE INSTALLED ON THE UPHILL SIDE OF THE SLOPED AREA.
5. FILTER FABRIC FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED.
6. FILTER FABRIC FENCES SHALL BE INSPECTED BY APPLICANT/CONTRACTOR IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.



SEDIMENT FENCE



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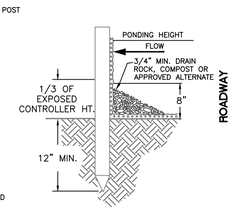
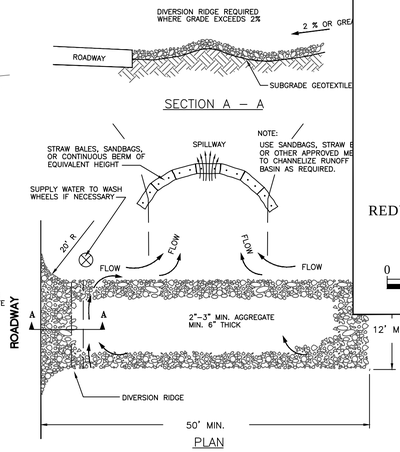


INSTALLATION WITHOUT TRENCHING

NOTES:

1. SEDIMENT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
2. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN IT EXCEEDS 1/3 THE EXPOSED HEIGHT OF CONTROLLER STORAGE DEPTH.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

SILT FENCE STANDARD DETAILS



NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT–OF–WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

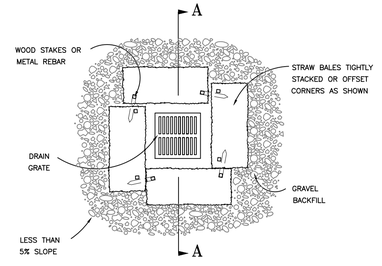
GRAVEL CONSTRUCTION ENTRANCE DETAIL

CONSTRUCTION NOTES:

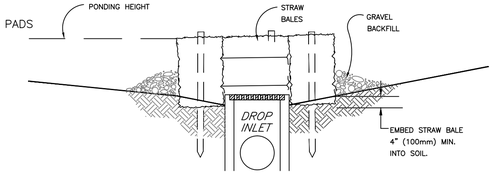
1. INSTALL STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER
2. INSTALL 430 LF SILT FENCE
3. INSTALL 190 LF SILT FENCE
4. INSTALL 190 LF SILT FENCE
5. INSTALL 480 LF SILT FENCE
6. INSTALL STRAW BALES AROUND SOIL STOCKPILE AREA. ALL STOCKPILED SOILS SHALL BE COVERED DAILY.

OTHERS NOTES:

1. CLEAR AND GRUB ALL VEGETATION
2. REMOVE FENCES, CURBS, WALLS AND CONCRETE PADS



PLAN VIEW



SECTION A–A

NOTES:

1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%).
2. EMBED THE BALES 4" (100mm) INTO THE SOIL AND OFFSET CORNERS OR PLACE BALES WITH ENDS TIGHTLY ABUTTING. GRAVEL BACKFILL WILL PREVENT EROSION OR FLOW AROUND THE BALES. STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION. DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. EXCAVATION OF A BASIN ADJACENT TO THE DROP INLET OR A TEMPORARY DIKE ON THE DOWNSLOPE OF THE STRUCTURE MAY BE NECESSARY.

ROGER B. NORTH
STATE OF WASHINGTON
13597
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 40' 80'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-13

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	05/28/09	PHASE I REVIEW	RN	STM	RN
1	06-10-11	CHANGE ORDER #8	RN	STM	RN
2	07-11-11	C/O #8 UPDATE	RN	STM	RN

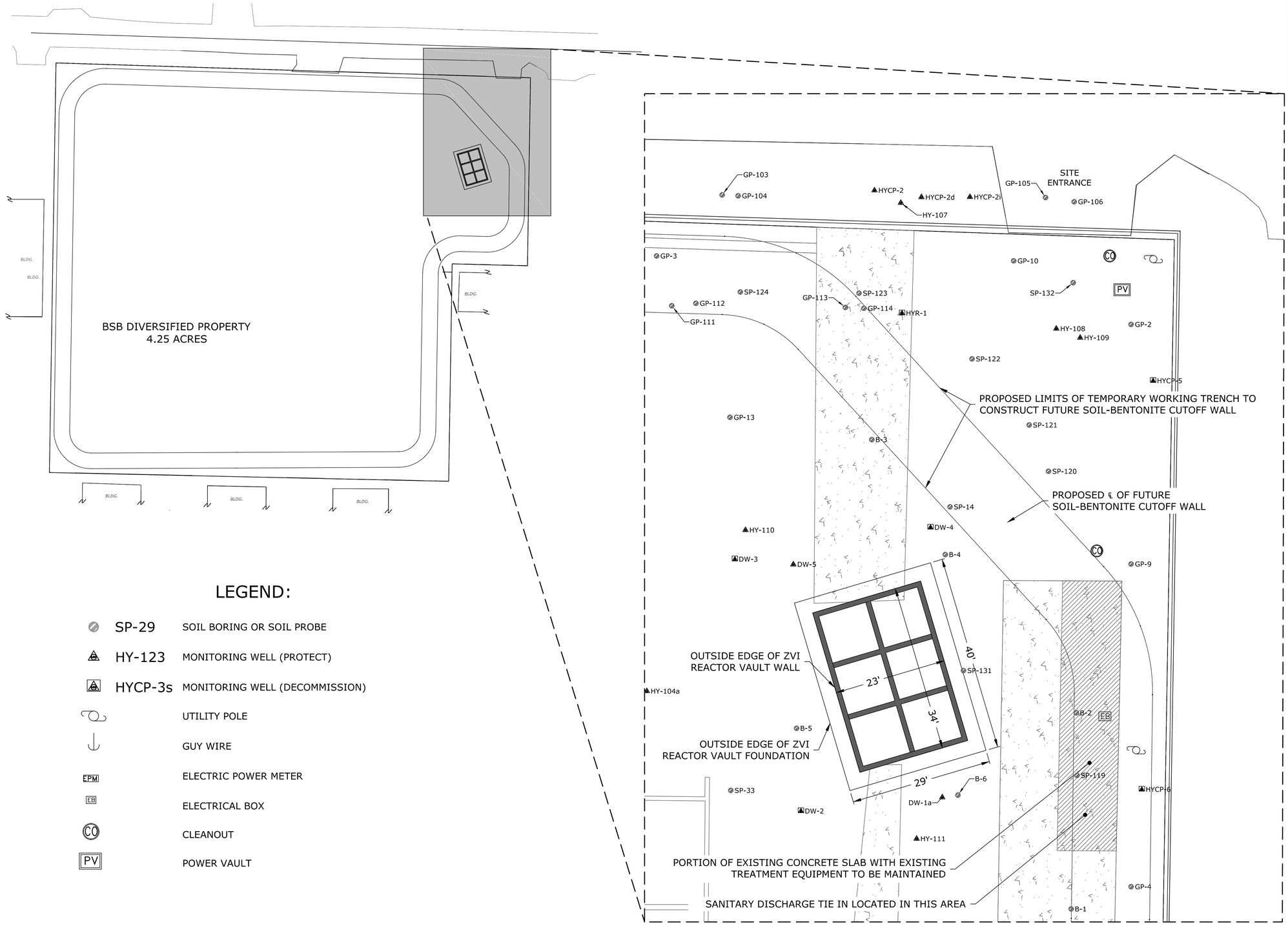
SCALE: AS SHOWN

DATE: 7/16/2011

FINAL CLEANUP ACTION
FINAL CLEANUP DRAWINGS
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

EROSION CONTROL PLAN

DRAWING NO. 4 OF 8



LEGEND:

⊘	SP-29	SOIL BORING OR SOIL PROBE
▲	HY-123	MONITORING WELL (PROTECT)
▲	HYCP-3s	MONITORING WELL (DECOMMISSION)
		UTILITY POLE
		GUY WIRE
EPM		ELECTRIC POWER METER
EB		ELECTRICAL BOX
CO		CLEANOUT
PV		POWER VAULT

N

REDUCTION SCALE CHECK
1"
0 10' 20'
GRAPHICAL SCALE

ROGER B NORTH
STATE OF WASHINGTON
43597
REGISTERED
PROFESSIONAL ENGINEER

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-13

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-	-	-	-	-	-

SCALE:
AS SHOWN

DATE: 7/16/2011

FINAL CLEANUP DRAWINGS
FINAL CLEANUP DRAWINGS
BSB DIVERSIFIED, INC. PROPERTY
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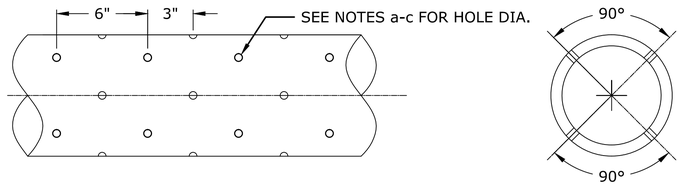
ZVI REACTOR VAULT PLAN VIEW

DRAWING NO.
5
OF 8

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 1 CLEANUP DRAWINGS\ZVI REACTOR VAULT AREA PLAN VIEW.DWG PLOTTED: 7/16/2011 10:15 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)



DETAIL NOTES:

a. HOLES SHALL BE DRILLED AT 90° CIRCUMFERENCE AROUND PIPE. SUCCESSIVE ROWS SHALL BE SEPARATED BY 3" AND STAGGERED.
b. HOLE DIAMETER SHALL BE 3/8" FOR ALL PERFORATED HDPE PIPE.
c. REMOVE INTERIOR WELD BEADS AND ALL CUTTINGS INSIDE AND OUT BEFORE PIPE IS INSTALLED.

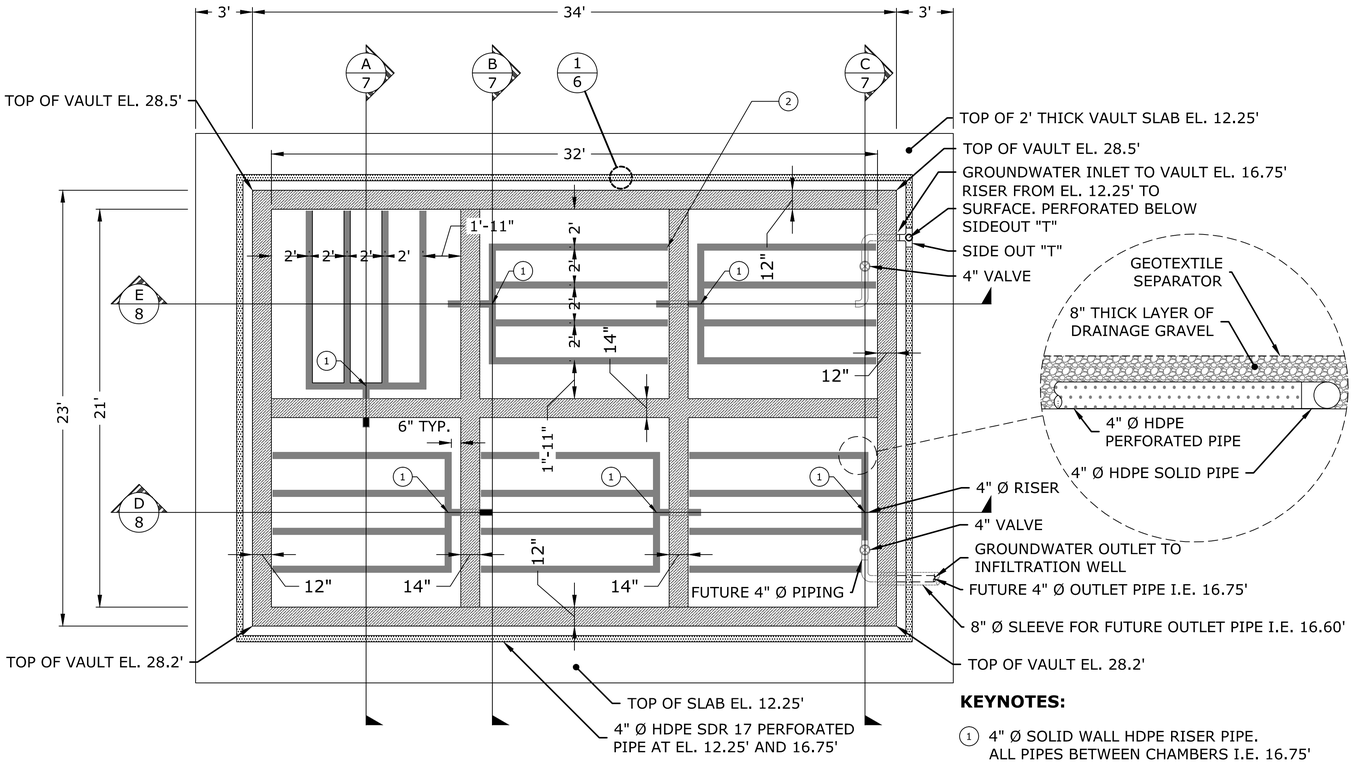
CONSTRUCTION NOTES:

1. PROVIDE PIPE SADDLE CLAMP SUPPORTS (STANDON MODEL C92 [www.standon.net], OR APPROVED ALTERNATE) ON ALL PIPES NOT LOCATED ON THE BASE OF THE VAULT. SET SUPPORTS AT 5 FEET MAXIMUM SPACING AND WITHIN 9 INCHES OF PIPE ENDS AND WALL PENETRATIONS. SET PIPES A MINIMUM OF 6 INCHES FROM VAULT WALLS. CENTER REMOVABLE COVERS OVER RISER PIPES.

2. PROVIDE PIPE CLAMPS TO SECURE ALL PIPES LOCATED ON BASE OF VAULT TO CONCRETE. SECURE AT MAXIMUM SPACING OF 5 FEET AND WITHIN 9 INCHES OF PIPE ELBOWS AND JUNCTIONS. SECURE PIPE TO VAULT BASE.

3. PERFORATE ALL HORIZONTAL PIPE AROUND OUTSIDE OF VAULT AND ALL 9.5-FT LONG SECTIONS OF PIPE ON INSIDE BASE OF VAULT. ALL OTHER HORIZONTAL SECTIONS OF PIPE AND ALL VERTICAL SECTIONS OF PIPE SHALL BE SOLID WALL.

DETAIL 1/6 *PIPE DETAIL*
N.T.S.



KEYNOTES:

(1) 4" Ø SOLID WALL HDPE RISER PIPE. ALL PIPES BETWEEN CHAMBERS I.E. 16.75'
(2) PROVIDE END CAPS ON OPEN ENDS OF PERFORATED PIPES

VAULT AND PIPING PLAN
SCALE: 1" = 4'

REDUCTION SCALE CHECK
1"
0 4' 8'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-13

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FINAL CLEANUP ACTION
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BSB DIVERSIFED, INC. PROPERTY
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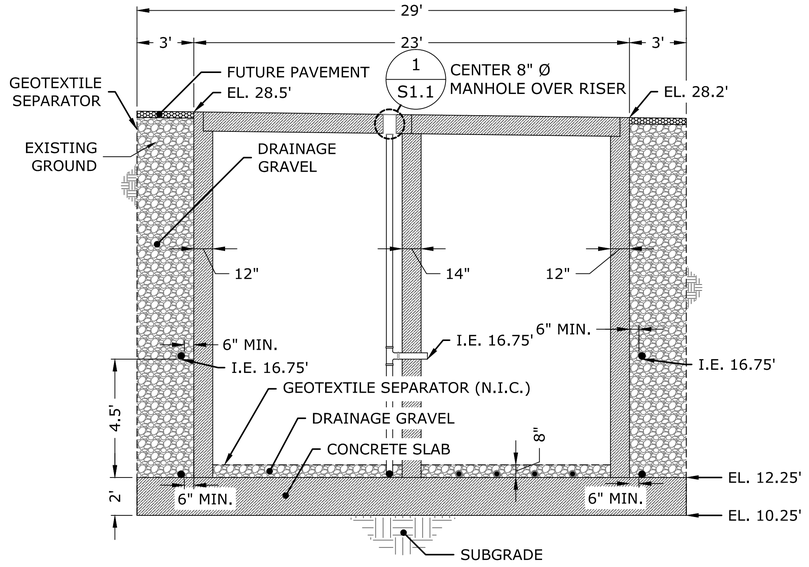
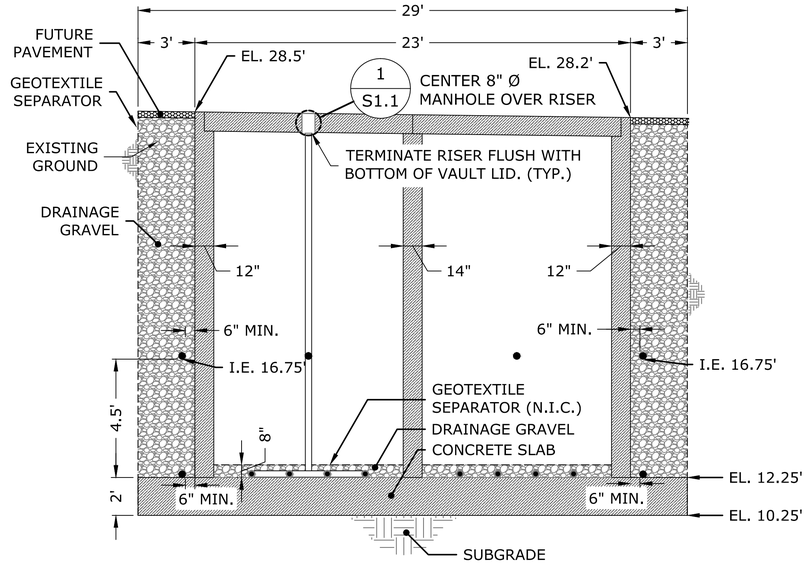
REACTOR VAULT PLAN & DETAIL 1

DRAWING NO. 6 OF 8

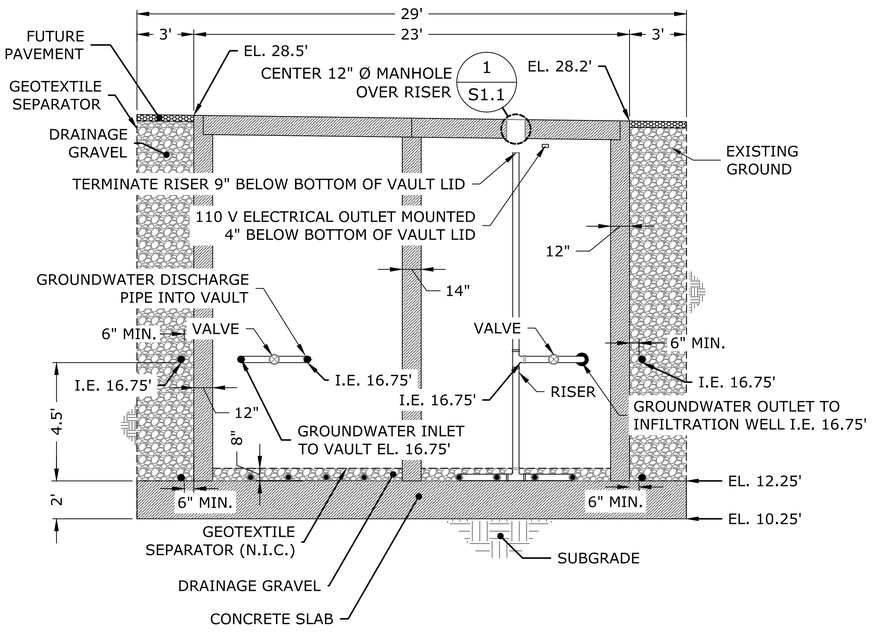
SECTION A 1" = 4' — TRANSVERSE SECTION



SECTION B 1" = 4' — TRANSVERSE SECTION



SECTION C 1" = 4' — TRANSVERSE SECTION



REDUCTION SCALE CHECK

1"

0 4' 8'

GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

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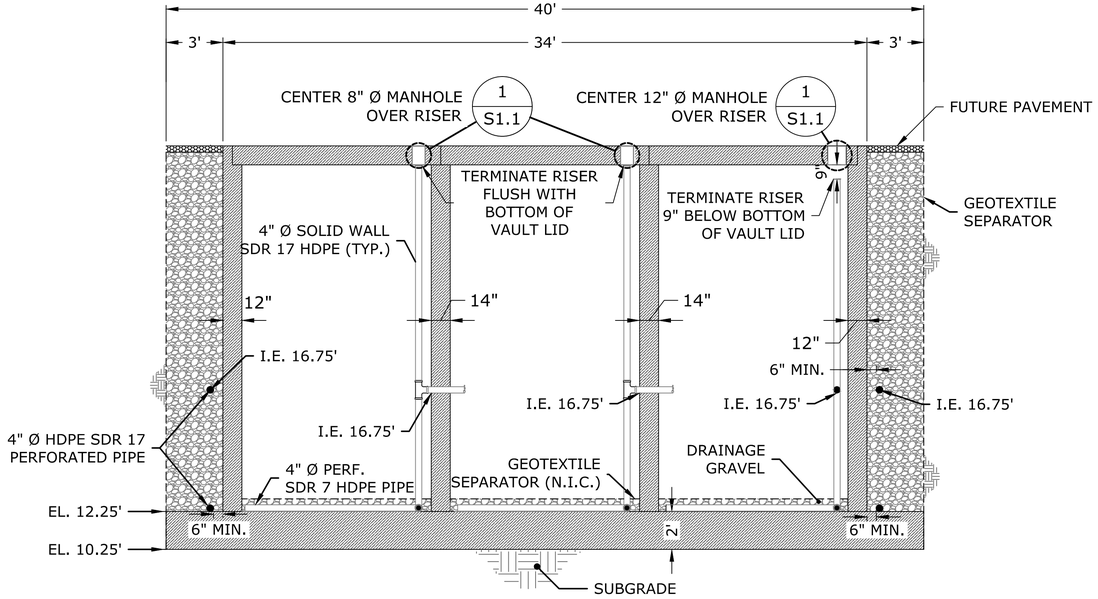
FINAL CLEANUP DRAWINGS
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

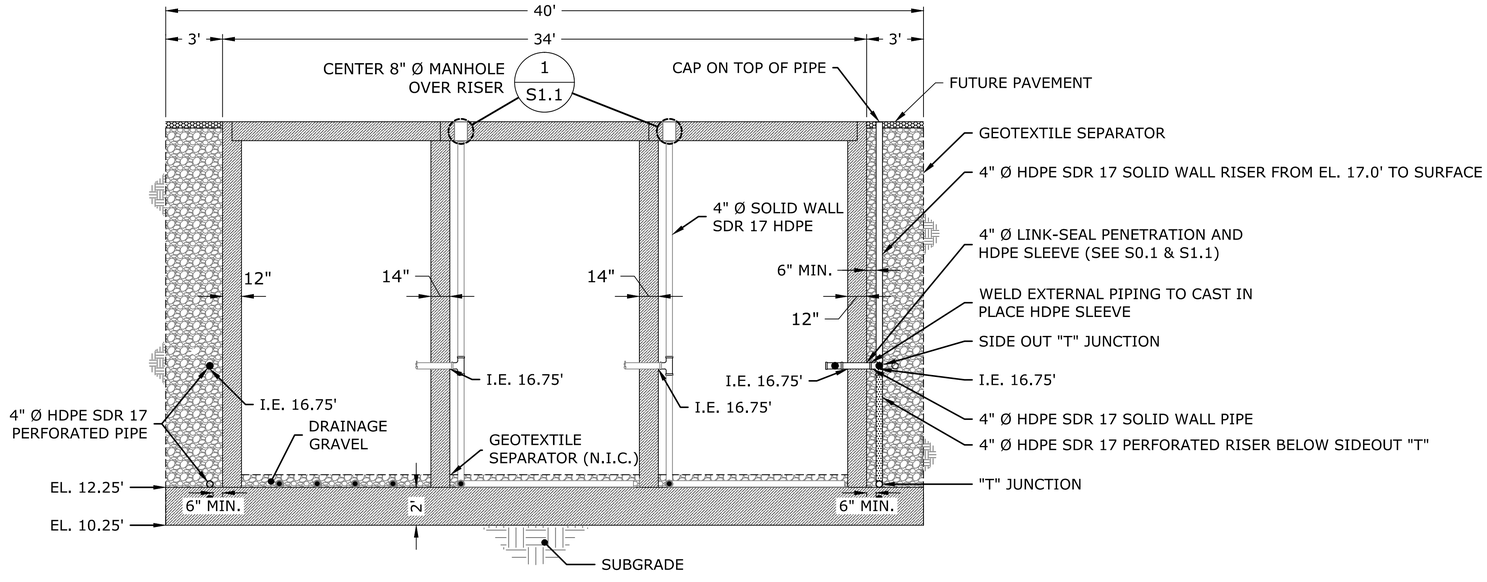
REACTOR VAULT SECTIONS A-C

DRAWING NO. 7 OF 8



SECTION D/6 *VAULT LOGITUDIANAL SECTION*

1" = 4'



SECTION E/6 *VAULT LOGITUDIANAL SECTION*

1" = 4'

REDUCTION SCALE CHECK

1"

0 4' 8'

GRAPHICAL SCALE

ROGER B NORTH STATE OF WASHINGTON 43593 REGISTERED PROFESSIONAL ENGINEER

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-13

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
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-	-	-	-	-	-
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-	-	-	-	-	-

SCALE: AS SHOWN

DATE: 7/16/2011

FINAL CLEANUP ACTION
FINAL CLEANUP DRAWINGS
BSB DIVERSIFIED, INC. PROPERTY
KENT, WASHINGTON

REACTOR VAULT SECTIONS D-E

DRAWING NO. 8 OF 8

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CODE

STATE OF WASHINGTON STRUCTURAL SPECIALTY CODE, 2010 EDITION

CONCRETE

1. MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS
   - FOUNDATIONS 4000 PSI
   - SLABS 4000 PSI
   - WALLS 4000 PSI
2. CONCRETE TO HAVE MAXIMUM WATER/CEMENT RATIOS PER ACI 318 TABLE 4.2.2 (PROPORTIONING ON THE BASIS OF FIELD EXPERIENCE AND/OR TRIAL MIXTURES). THESE MAXIMUMS MAY BE EXCEEDED IF TEST RECORDS PER SECTION 5.3 OF ACI 318 ARE SUBMITTED TO AND APPROVED BY THE ENGINEER.
3. MAXIMUM SLUMP 3" PLUS OR MINUS 1".
4. CONCRETE AND REINFORCING TO HAVE SPECIAL INSPECTION IN ACCORDANCE WITH IBC CHAPTER 17.
5. MECHANICALLY VIBRATE ALL CONCRETE WHEN PLACED.

REINFORCING

1. DEFORMED BARS ASTM A615, GRADE 60. WELDED BARS ASTM A706, GRADE 60.
2. UNLESS NOTED OTHERWISE, LAP SPLICES SHALL BE CLASS 'B' TENSION LAP SPLICES IN ACCORDANCE WITH ACI 318, CHAPTER 12.
3. PROVIDE BENT CORNER BARS TO MATCH AND LAP WITH HORIZONTAL BARS AT CORNERS AND INTERSECTIONS OF FOOTING AND WALLS. REINFORCING BAR SPACING GIVEN ARE MAXIMUM ON CENTERS. ALL BARS PER CRSI SPECIFICATIONS AND HANDBOOK. DOWEL ALL VERTICAL REINFORCING TO FOUNDATION. SECURELY TIE ALL BARS IN LOCATION BEFORE PLACING CONCRETE.
4. CLEAR CONCRETE COVERAGE AS FOLLOWS FOR CAST-IN-PLACE
   - CAST AGAINST & PERMANENTLY EXPOSED TO EARTH: 3"
   - EXPOSED TO EARTH OR WEATHER & #6 OR LARGER: 2"
   - EXPOSED TO EARTH OR WEATHER & #5 OR SMALLER: 1 1/2

   ALL OTHERS PER LATEST EDITION OF ACI 318.

METALS

1. MISCELLANEOUS STRUCTURAL STEEL TO BE ASTM A36, FY = 36 KSI, UNLESS NOTED OTHERWISE.
2. WELDING TO BE BY CERTIFIED WELDERS USING E70XX ELECTRODES IN ACCORDANCE WITH AWS STANDARDS.
3. ALL STEEL TO GALVANIZED.
4. STEEL FABRICATOR TO SUBMIT SHOP DRAWINGS TO A/E FOR REVIEW PRIOR TO FABRICATION.
5. LATEST AISC, SJI AND AWS CODES APPLY. ALL CONSTRUCTION PER LATEST AISC HANDBOOK.
6. ALL EXPANSION ANCHORS SHALL BE SIMPSON WEDGE-ALL ANCHORS OR APPROVED EQUAL WITH CURRENT I.C.B.O. RATING FOR MATERIAL INTO WHICH INSTALLATION TAKES PLACE.
7. ALL ADHESIVE ANCHORS TO BE SIMPSON SET ADHESIVE ANCHORS.
8. ALL REFERENCE TO HEADED STUDS (HWS) SHALL BE INDICATE AUTOMATIC WELDED HEADED STUDS (NELSON OR EQUIVALENT).

LINK-SEAL

1. FURNISH AND INSTALL COMPLETE LINK-SEAL MODULAR SEAL ASSEMBLY.
2. WALL OPENINGS-THE WALL OPENING SIZE AND/OR TYPE SHALL BE SELECTED ACCORDING TO RECOMMENDATIONS FOUND IN THE MOST RECENT LINK-SEAL MODULAR SEAL CATALOG.
3. PROVIDE SUFFICIENT QUANTITY AND TYPE OF LINK-SEAL MODULAR SEALS REQUIRED TO EFFECTIVELY PROVIDE A HYDROSTATIC AND/OR FIRE-RATED SEAL.
4. EACH INDIVIDUAL LINK SHALL CONSPICUOUSLY AND PERMANENTLY IDENTIFIED WITH THE NAME OF THE MANUFACTURER AND MODEL NUMBER. MANUFACTURERS OTHER THAN THE ABOVE-NAMED COMPANY WISHING TO QUOTE EQUIPMENT IN THIS SECTION SHALL SUBMIT DETAIL DRAWINGS OF THEIR PROPOSED EQUIPMENT AND SUITABLE EVIDENCE OF A MINIMUM 25 YEARS EXPERIENCE AND RESULTS TO THE ENGINEER TO OBTAIN WRITTEN APPROVAL TO QUOTE AT LEAST (10) DAYS PRIOR TO BID OPENING.

VAULT LID ACCESS HATCHES

1. THE FLOOR ACCESS DOOR SHALL BE MODEL W-AHS AS MANUFACTURED BY ACUDOR PRODUCTS, INC., WITH THE SIZE SPECIFIED ON THE PLANS.
2. DOOR LEAF SHALL BE 1/4" THICK STEEL DIAMOND PLATE REINFORCED FOR AN AASHTO H-20-44 WHEEL LOAD.
3. UPON REQUEST, MANUFACTURER SHALL PROVIDE STRUCTURAL CALCULATIONS SHOWING THE DOOR DESIGN MEET THE LOADING REQUIREMENTS OF AASHTO H-20-44.
4. THE FRAME SHALL BE 1/4" THICK STEEL ANGLE WITH ANCHORS WELDED TO THE FRAME FOR CASTING INTO CONCRETE.
5. THE COVER SHALL BE ATTACHED TO THE FRAME WITH 316 STAINLESS STEEL BOLTS (THE BOLTS MUST BE SECURELY FASTENED WHENEVER THE COVER IS CLOSED TO INSURE SAFE AND PROPER PERFORMANCE OF THE DOOR).
6. THE FLOOR ACCESS DOOR SHALL BE EQUIPPED WITH A FLUSH STEEL LIFTING HANDLE THAT DOES NOT PROTRUDE OVER THE COVER, AND A 316 STAINLESS STEEL HOLD OPEN ARM WITH RED VINYL GRIP THAT AUTOMATICALLY LOCKS THE COVER IN ITS UPRIGHT POSITION. A STEEL SKIRT SHALL BE WELDED TO THE FRAME TO PROVIDE A COMBINED HEIGHT EQUAL TO THE DEPTH OF THE CONCRETE. THE DOOR SHALL HAVE TAMPER RESISTANT HINGES WITH RECESSED STAINLESS STEEL PINS AND LUGS. THE DOOR SHALL HAVE OPEN, STAINLESS STEEL, HORIZONTAL, COMPRESSION SPRINGS TO ASSIST IN OPENING THE COVER AND REDUCING THE FORCE DURING CLOSING. THE FLOOR ACCESS DOOR SHALL HAVE A HOT DIPPED GALVANIZED FINISH.
7. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS ATTACHED INSTRUCTIONS.
8. THE ENTIRE FRAME, INCLUDING THE SEAT ON WHICH THE REINFORCING RESTS, SHALL BE SUPPORTED BY CONCRETE OR OTHER MATERIAL DESIGNED TO SUPPORT THE SPECIFIED LOAD.
9. THE DOOR SHALL BE MANUFACTURED IN THE UNITED STATES.
10. MANUFACTURER SHALL GUARANTEE THE DOOR AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR FIVE YEARS.

BEARING PADS

1. ALL BEARING PADS ARE TO BE APS SUPPLY CO. BRAND NEOPRENE COMMERCIAL GRADE PADS OR EQUIVALENT.
2. PADS USED ARE TO BE COMPOSED OF DENSE NEOPRENE/NITRILE BLEND POLYMERS AVAILABLE IN DUROMETERS OF 40-70.
3. PADS USED ARE INTENDED FOR ISOLATION FOR CONCRETE TO CONCRETE INTERFACES ONLY.

MANHOLE STEPS

1. MANHOLE LADDER RUNGS ARE TO BE BOWCO PRESS FIT TYPE-R STEPS.
2. LADDER RUNGS ARE TO HAVE COPOLYMER POLYPROPYLENE COATING.

WATER-TIGHT MANHOLES

1. ALL WATER-TIGHT MANHOLES TO BE EAST JORDAN IRONWORKS WATERTIGHT MANHOLES (CATALOGUE #V2610-1) OR APPROVED EQNVALENT.
2. ALL MANUFACTURERS SHALL BE APPROVED SUPPLIERS AND BE ABLE TO DEMONSTRATE THAT THERE IS AN ACCEPTABLE QUALITY CONTROL PROGRAM AT THE PRODUCING FOUNDRY, PRIOR TO SUPPLYING CASTINGS.
3. DUCTILE IRON CASTINGS SHALL CONFORM TO ASTM A536. THE IRON MATERIAL USED IN PRODUCTS PROVIDED SHALL HAVE A MINIMUM RECYCLED MATERIAL CONTENT OF 75%. THE RECYCLED MATERIALS SHALL CONSIST OF POST-CONSUMER MATERIAL.
4. CASTINGS SHALL BE OF UNIFORM QUALITY, FREE FROM SAND HOLES, GAS HOLES, SHRINKAGE, CRACKS AND OTHER SURFACE DEFECTS. CASTINGS SHALL BE GROUND SMOOTH AND WELL CLEANED BY SHOT BLASTING. FOR TRAFFIC SERVICE CASTINGS, BEARING SURFACES BETWEEN MANHOLE RINGS AND COVERS OR GRATES AND FRAMES SHALL BE CAST OR MACHINED WITH SUCH PRECISION TO PREVENT ROCKING.
5. TRAFFIC SERVICE CASTINGS SHALL HAVE A FIRST ARTICLE PROOF LOAD TEST CONDUCTED AND THE RESULTS OF THAT PROOF LOAD SHALL BE MADE AVAILABLE TO THE PURCHASER UPON REQUEST. THE PROOF LOAD SHALL BE CONDUCTED IN ACCORDANCE AASHTO M306, SECTION 7.0, PROOF LOAD TESTING. THE CASTING SHALL BE TESTED ON A SUITABLE AND CALIBRATED LOAD TESTING MACHINE AND THE CASTING SHALL HOLD A 40 KIP POUND PROOF LOAD FOR ONE MINUTE WITHOUT EXPERIENCING AND CRACKS OR DETRIMENTAL PERMANENT DEFORMATION.
6. INSPECTION'S SHALL BE IN ACCORDANCE WITH 9.1.1 OR 9.1.2 OF AASHTO M306. RESULTS SHALL BE FURNISHED TO THE PURCHASER UPON REQUEST. THE HEAT OR PRODUCTION DATE AND PRODUCT NUMBERS, AS CAST ON THE CASTING SHALL BE THE BASIS OF TRACIBILTY AND RECORDING OF THE TESTS.
7. EACH CASTING SHALL BE IDENTIFIED AND SHOW A MINIMUM, THE FOLLOWING:
   A) NAME OF THE PRODUCING FOUNDRY
   B) COUNTRY OF MANUFACTURER (SUCH AS MADE IN THE U.S.A.)
   C) ASTM MATERIAL DESIGNATION
   D) RECYCLE SYMBOL
   E) INDIVIDUAL PART NUMBER
   F) CAST OR HEAT DATE

GENERAL

1. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE BUT NOT BE LIMITED TO BRACING, SHORING OR LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC. OBSERVATIONS VISITS TO THE SITE BY THE ENGINEER OF RECORD SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS WITH DRAWINGS PRIOR TO START OF CONSTRUCTION AND RESOLVE ANY DISCREPANCY WITH THE ENGINEER OF RECORD.
3. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDUM.
4. WHERE ANY DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL STRUCTURAL NOTES OR SPECIFICATIONS, THE GREATER REQUIREMENTS SHALL GOVERN.
5. OPTIONS ARE FOR CONTRACTOR'S CONVENIENCE. HE/SHE SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY. IF HE/SHE CHOOSES AN OPTION, THAN HE/SHE SHALL COORDINATE ALL DETAILS.
6. ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL OF A CIVIL OR STRUCTURAL ENGINEER REGISTERED IN THE STATE OF WASHINGTON.

DEFERRED SUBMITTAL/SHOP DRAWINGS

PURSUANT TO THE IBC, SUBMITTAL DOCUMENTS FOR DEFERRED ITEMS SHALL BE PROVIDED TO THE ARCHITECT/ENGINEER OF RECORD FOR REVIEW AND APPROVAL.

ITEM	SUBMIT ITEM TO: A/E OF RECORD	BUILDING OFFICIAL	NOTE
STRUCTURAL STEEL SHOP DRAWINGS	REQUIRED		1
CONCRETE MIX DESIGN	REQUIRED		
STRUCTURAL STEEL MILL CERTS	REQUIRED		
REINF. STEEL SHOP DRAWINGS	REQUIRED		1
WELDING PROCED. SPECS (AWS D1.1)	REQUIRED		

NOTE:
1. CONSTRUCTION DOCUMENTS BY LIVERMORE ASSOCIATES ARE THE SOLE PROPERTY OF LIVERMORE ASSOCIATES AND SHALL NOT BE DUPLICATED FOR THE USE IN SHOP DRAWING SUBMITTALS.

STRUCTURAL OBSERVATIONS

CONTRACTOR TO NOTIFY STRUCTURAL ENGINEER TO ARRANGE FOR A STRUCTURAL OBSERVATION 48 HOURS PRIOR TO COVERING UP THE FOLLOWING:
- WALL REINFORCING

(NOTE, STRUCTURAL OBSERVATIONS ARE NOT IN LIEU OF SPECIAL INSPECTION BY AN INDEPENDENT AGENCY)

MIN. REINF. BAR SPLICE LENGTHS IN CONCRETE

ESTABLISHED PER ACI 318 SECTION 12.2 & 12.3.

BAR SIZE	GR	TENSION BARS f'c = 4,000 PSI REGULAR CLASS	TOP CLASS
#3	60	19"	24"
#4	60	25"	33"
#5	60	31"	40"
#6	60	37"	48"
#7	60	54"	71"
#8	60	62"	81"
#9	60	70"	91"

NOTES:
1. TOP BARS ARE ANY HORIZONTAL BARS PLACED SO THAT MORE THAN 12" OF FRESH CONCRETE IS CAST ON THE MEMBER BELOW THE REINFORCEMENT.
2. UNLESS NOTED OTHERWISE, LAP SPLICES IN CONCRETE BEAMS, SLABS AND WALLS SHALL BE CLASS 'B' TENSION LAP SPLICES AND LAP SPLICES IN CONCRETE COLUMNS SHALL BE COMPRESSION LAP SPLICES.
3. ALL REINFORCING SHALL BE UNCOATED.
4. VALUES SHOWN ABOVE ARE FOR CLEAR COVER OF 1 BAR DIAMETER MINIMUM AND CLEAR BAR SPACING OF 2 BAR DIAMETERS MINIMUM. WHERE COVER OF BAR SPACING IS LESS THAT THIS INCREASE LAP LENGHT BY 50%.
5. NO BUNDLE BARS.
6. ALL CONCRETE SHALL BE NORMAL WEIGHT AGGREGATE.

SPECIAL INSPECTION & TESTING PROGRAM

(ESTABLISHED PER 2006 IBC SECTION 109 & CHAPTER 17)
- THE ITEM CHECKED WITH AND 'X' SHALL BE INSPECTED IN ACCORDANCE WITH THE IBC CHAPTER 17 BY A CERTIFIED SPECIAL INSPECTOR FROM AN ESTABLISHED TESTING AGENCY. FOR MATERIAL SAMPLING AND TESTING REQUIREMENTS, REFER TO THE MATERIAL SAMPLING AND TESTING SECTION, THE PROJECT SPECIFICATIONS AND THE SPECIFIC GENERAL NOTES SECTIONS. THE TESTING AGENCY SHALL SEND COPIES OF ALL STRUCTURAL TESTING AND INSPECTION REPORTS DIRECTLY TO THE ENGINEER, CONTRACTORS AND BUILDING OFFICIAL ANY MATERIALS WHICH FAIL TO MEET THE PROJECT SPECIFICATIONS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER. SPECIAL TESTING REQUIREMENTS APPLY EQUALLY TO ALL BIDDER DESIGNED COMPONENTS.
- CONTINUOUS SPECIAL INSPECTION MEANS THAT THE SPECIAL INSPECTOR IS ON THE SITE AT ALL TIMES OBSERVING THE WORK REQUIRING SPECIAL INSPECTION (IBC 1702). PERIODIC SPECIAL INSPECTION MEANS THAT THE SPECIAL INSPECTOR IS ON SITE AT TIME INTERVALS NECESSARY TO CONFIRM THAT ALL WORK REQUIRING SPECIAL INSPECTION IS IN COMPLIANCE (IBC 1702).
- SPECIAL INSPECTION IS NOT REQUIRED FOR WORK PERFORMED BY AN APPROVED FABRICATOR PER IBC SECTION 1704.2.2.

LEGEND

EOR ENGINEER OF RECORD
MT MAGNETIC PARTICLE TESTING
NDT NON-DESTRUCTIVE TESTING
UT ULTRASONIC TESTING
WPS WELDING PROCEDURE QUALIFICTIONS

CONCRETE CONSTRUCTION (TABLE 1704.4)

VERIFICATION AND INSPECTION	INSPECTION CONTINUOUS	PERIODIC	COMMENTS	TESTING TYPE	FREQUENCY
REINFORCING STEEL					
INSPECTION		X			
PLACEMENT		X			
MATERIAL VERIFICATION		X	C1		
BOLTS					
INSPECTION	X	X	C2		
PLACEMENT	X	X	C2		
MIX					
VERIFICATION OF APPROVED MIX DESIGN		X			
CONCRETE PLACEMENT					
VERIFICATION OF STRENGTH	X			STRENGTH	C3
VERIFICATION OF SLUMP	X			SLUMP	C3
VERIFICATION OF AIR CONTENT	X			AIR CONTENT	C3
VERIFICATION OF TEMPERATURE	X			TEMPERATURE	C3
CONCRETE CURING					
MAINTENANCE INSPECTION OF TEMPERATURE		X			
MAINTENANCE INSPECTION OF TECHNIQUE		X			
VERIFICATION OF CONCRETE STRENGTH PRIOR TO REMOVAL OF FORMS		X			

COMMENTS:
C1. APPLIES TO REINFORCING STEEL OTHER THAN ASTM A 706.
C2. CONTINUOUS INSPECTION AT EPOXY ANCHORS AND PERIODIC AT ALL OTHERS.
C3. ONCE EACH SHIFT BUT NOT LESS THEN ONE SAMPLE FOR EACH 50 CUBIC YARDS

WELDING

TYPE OF WORK	INSPECTION CONTINUOUS	PERIODIC	COMMENTS	TESTING TYPE	FREQUENCY
WELDING					
MATERIAL VERIFICATION		X			
MANUFACTURERS CERTIFIED MILL TEST REPORTS		X			
VERIFY USE OF PROPER WPS'S		X			
VERIFY WELDER QUALIFICATIONS		X			
MANUFACTURERS CERTIFIED MILL TEST REPORTS		X			
PARTIAL PENETRATION GROOVE WELDS	X				
SINGLE-PASS FILLET WELDS < 5/16		X			
WELDING STUDS	X	X	WD1	PRE-PROD. TESTING	WD2

COMMENTS:
WD1. CONTINUOUS INSPECTION REQUIRED AT STRUCTURAL DIAPHRAGM.
WD2. EACH SIZE AND TYPE OF STUD, EACH DAY PER SHIFT.

#	DATE	DESC.
5	07.15.11	C.O. #8 UPDATE
4	06.10.11	C.O. #8
3	06.03.11	PERMIT ISSUE
2	08.14.09	ISSUED FOR CONST.
1	07.20.09	ISSUE FOR BID

DEAN MICHAEL LIVERMORE — STATE OF WASHINGTON — 19765 — REGISTERED PROFESSIONAL ENGINEER

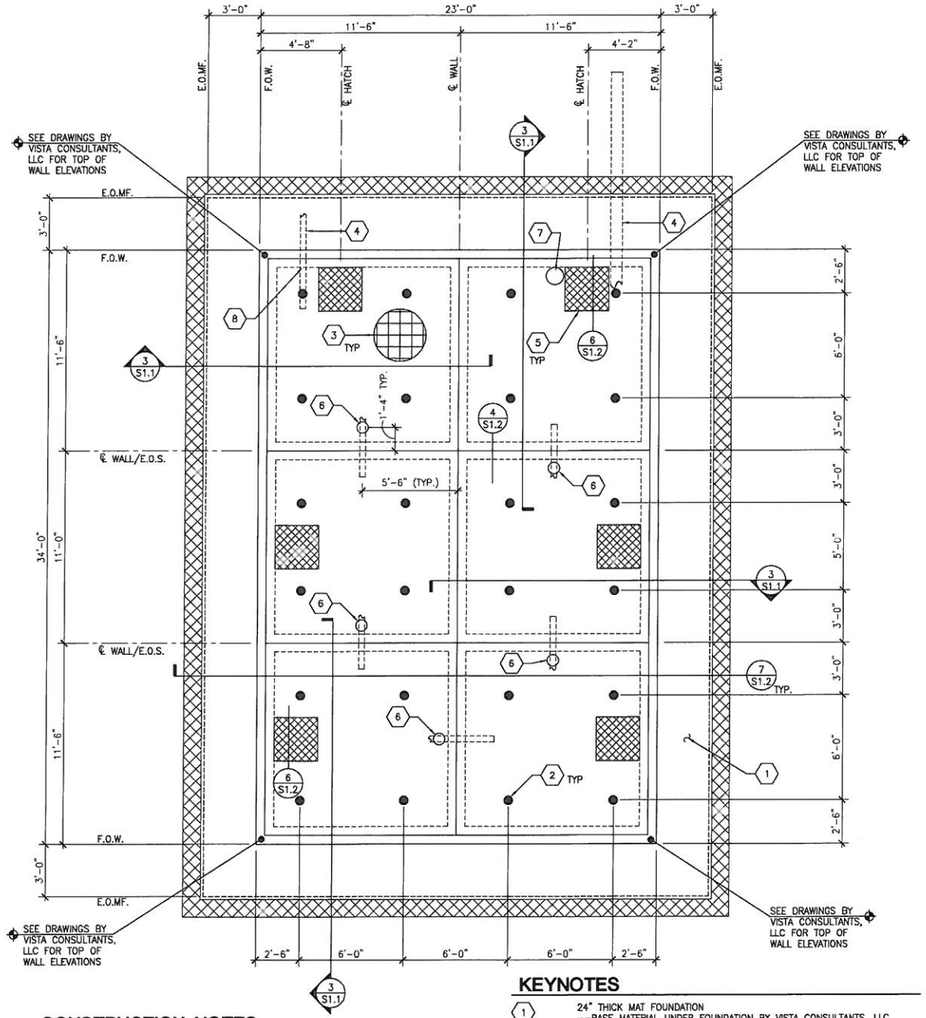
LIVERMORE architecture & engineering, inc.
leadership + vision
140 SW Arthur Street, Suite 200
Portland, Oregon 97201
Phone: 503-892-3002
Fax: 503-892-3003

FINAL CLEAN UP ACTION PHASE 1 FOR
BSB DIVERSIFIED, INC. PROPERTY
KENT (KING COUNTY), WASHINGTON

Livermore A&E
JOB NO: 208009.00

DRAWING TITLE:
STRUCTURAL GENERAL NOTES
DRAWN BY: CSN
CHECKED BY: GML

S0.1



CONSTRUCTION NOTES

1. DEWATERING TO REMAIN BELOW MAT FOUNDATION UNTIL BACKFILL AGAINST EXTRIOR WALLS FULLY PLACED & LIDS INSTALLED
2. VERIFY LOCATIONS OF ALL WALL AND LID PENETRATIONS WITH DRAWING 1-8 BY VISTA CONSULTANTS, LLC.
3. ALL ELEVATION INFORMATION PROVIDED BY VISTA CONSULTANTS, LLC. VERIFY ALL ELEVATIONS SHOWN.
4. ALL PIPING AND VALVE ANCHORAGE AS PER SPECIFICATIONS BY VISTA CONSULTANTS, LLC.

LEGEND

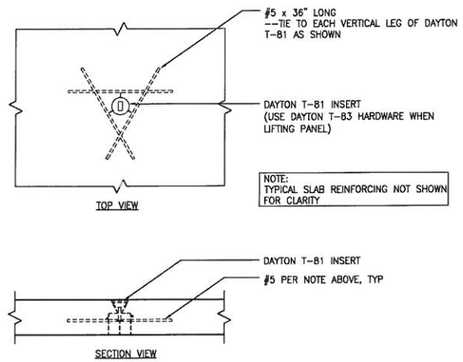
F.O.W.	FACE OF WALL
E.O.MF.	EDGE OF MAT FOUNDATION
	INDICATES WALL SHORING BY OTHERS

KEYNOTES

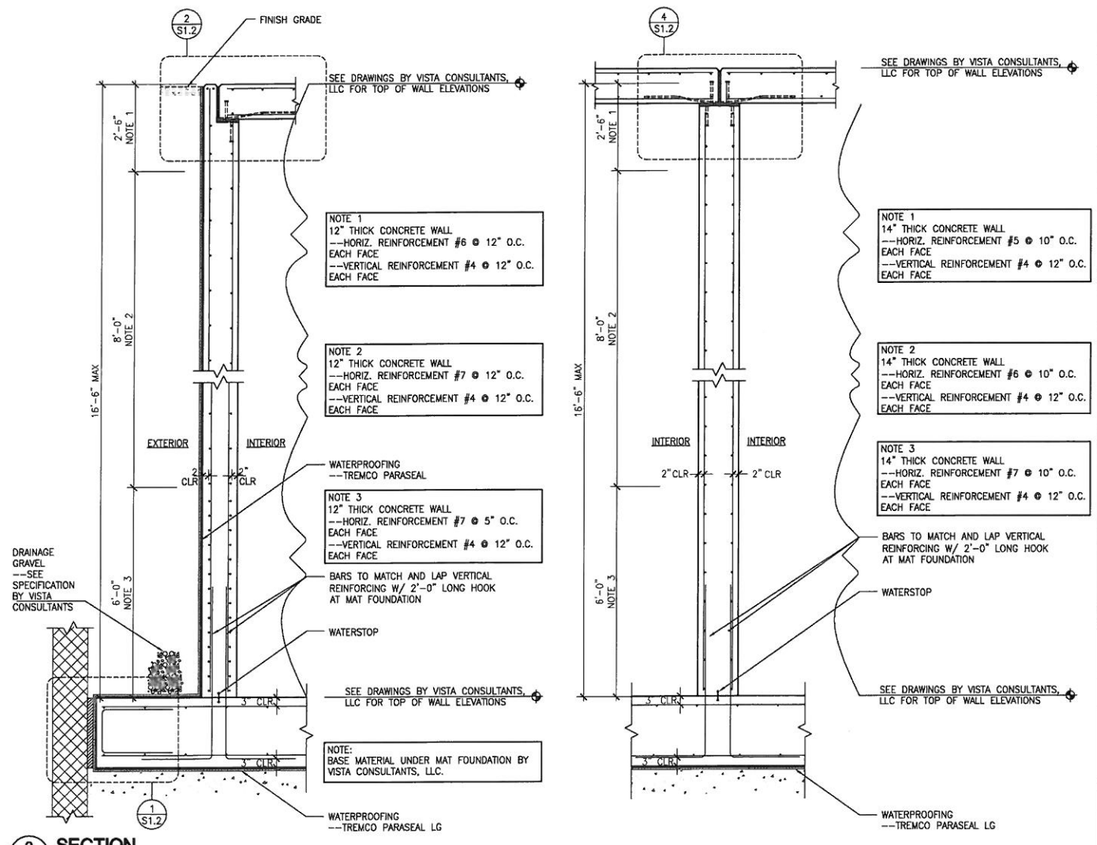
1. 24" THICK MAT FOUNDATION
   --BASE MATERIAL UNDER FOUNDATION BY VISTA CONSULTANTS, LLC.
   --REINFORCE W/ #6 @ 10" O.C. E.W. TOP AND BOTTOM
2. INDICATES PICK POINT INSERT (24 TOTAL)
   --SEE 2/S1.1
   --USE ALL PICK POINTS WHEN LIFTING PANELS
3. 12" THICK PRECAST LID (6) TOTAL
   --REINFORCE W/ #6 @ 8" O.C. E.W. TOP & BOTTOM
4. AT PIPE PENETRATION THROUGH WALL, INSTALL LINK SEAL LS-300-0 AT 4" DIA. PIPE, LS-475-0 AT 8" DIA. PIPE
5. VAULT LID ACCESS HATCHES
   --30"x30" ACUDOR W-AHS ACUDOR CHANNEL FRAME, HEAVY DUTY, SINGLE DOOR FLOOR HATCH W/ BOWCO PRESS FIT TYP-R 12" WIDE STEPS (APPROX. 13 TOTAL).
   --SEE DETAIL 6/S1.2 FOR MORE INFORMATION
6. WATER-TIGHT MANHOLES
   --7 5/8" DIA. (CLR. OPENING) EAST JORDAN IRONWORKS WATERTIGHT MANHOLE (CATALOGUE #V2610-1)
7. WATER-TIGHT MANHOLES
   --12" DIA. (CLR. OPENING) EAST JORDAN IRONWORKS WATERTIGHT MANHOLE

NORTH

1 S1.1 FOUNDATION PLAN
1/4" = 1'-0"



2 S1.1 PICK POINT INSERT DETAIL
3/4" = 1'-0"



3 S1.1 SECTION
1/2" = 1'-0"

#	DATE	DESC.
5	07.15.11	C.O. #8 UPDATE
4	06.10.11	C.O. #8
3	05.01.11	PRMT ISSUE
2	09.14.09	ISSUED FOR CONST.
1	07.20.09	ISSUE FOR BID

ADAM MICHAEL LIVERMORE — STATE OF WASHINGTON — 36765 — REGISTERED PROFESSIONAL ENGINEER

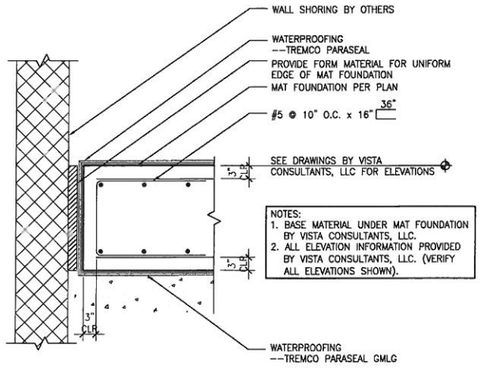
LIVERMORE architecture & engineering, inc.
140 SW Arthur Street, Suite 200
Portland, Oregon 97201
Phone: 503-892-7532
Fax: 503-892-7533

FINAL CLEAN UP ACTION PHASE 1 FOR
BSB DIVERSIFIED, INC. PROPERTY
KENT (KING COUNTY), WASHINGTON

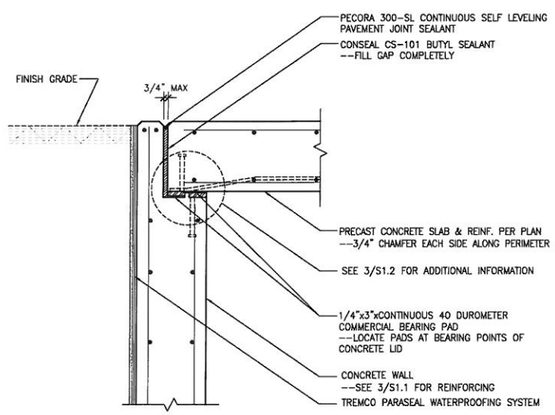
Livermore A&E
JOB NO: 208009.00

DRAWING TITLE:
FOUNDATION PLAN AND DETAILS
DRAWN BY: CSN
CHECKED BY: GML

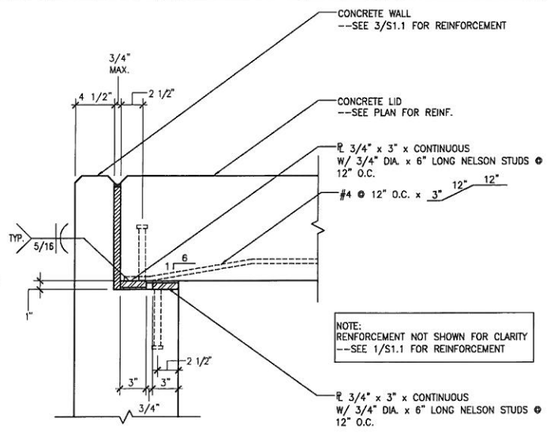
S1.1



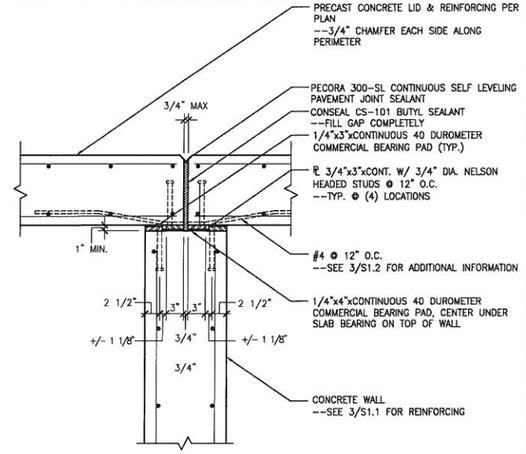
1 S12 **EDGE DETAIL**
3/4" = 1'-0"



2 S12 **CURB DETAIL (EXTERIOR)**
3/4" = 1'-0"



3 S12 **ENLARGED CURB DETAIL**
1 1/2" = 1'-0"



4 S12 **CURB DETAIL (INTERIOR)**
3/4" = 1'-0"

5 S12 **NOT USED**
3/4" = 1'-0"

6 S12 **VAULT LID ACCESS HATCH DETAIL**
1" = 1'-0"

#	DATE	DESC.
5	07.15.11	C.O. #8 UPDATE
4	05.10.11	C.O. #6
3	03.01.11	PERMIT ISSUE
2	08.14.09	ISSUED FOR CONST.
1	07.20.09	ISSUE FOR BID

LIVERMORE architecture & engineering, inc.
140 SW Arthur Street, Suite 200
Portland, Oregon 97201
Phone: 503-802-2000
Fax: 503-802-2003

FINAL CLEAN UP ACTION PHASE 1 FOR
BSB DIVERSIFIED, INC. PROPERTY
KENT (KING COUNTY), WASHINGTON

Livermore A&E
JOB NO: 208009.00

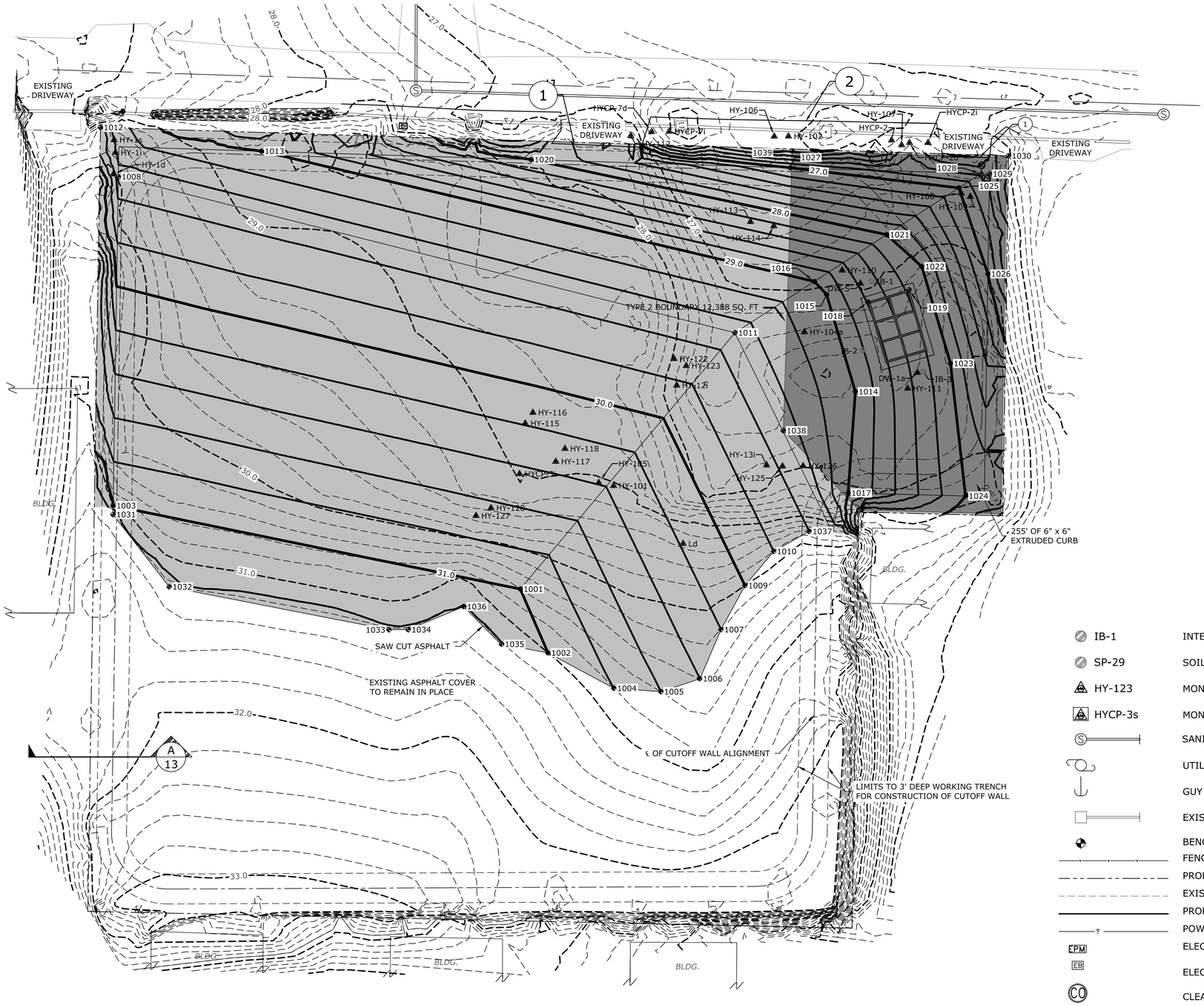
DRAWING TITLE:
DETAILS

DRAWN BY: CSN
CHECKED BY: GML

S1.2

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\FINAL COVER PLAN II.DWG PLOTTED: 10/27/2011 1:21 PM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

Point Table			
Point #	Northing	Easting	Elevation
1001	157130.66	1294419.28	31.00
1002	157096.59	1294434.09	31.00
1003	157175.20	1294201.80	31.00
1004	157077.65	1294469.28	30.80
1005	157075.85	1294494.39	30.60
1006	157082.81	1294515.07	30.40
1007	157109.01	1294526.45	30.20
1008	157350.91	1294204.62	29.50
1009	157132.53	1294539.28	30.00
1010	157150.78	1294554.60	29.80
1011	157267.57	1294533.93	29.50
1012	157377.28	1294195.04	29.49
1013	157364.59	1294281.02	29.00
1014	157236.13	1294598.21	29.00
1015	157287.92	1294582.89	29.00
1016	157295.00	1294576.33	29.00
1017	157182.01	1294594.36	29.00
1018	157284.00	1294604.91	28.59
1019	157290.52	1294626.96	28.16
1020	157360.08	1294425.08	28.00
1021	157319.98	1294614.93	28.00
1022	157302.95	1294633.71	28.00
1023	157251.17	1294649.03	28.00
1024	157180.36	1294657.05	28.00
1025	157344.95	1294653.53	27.00
1026	157299.02	1294669.02	27.00
1027	157355.74	1294563.47	27.00
1028	157352.56	1294665.29	26.55
1029	157352.41	1294669.88	26.53
1030	157362.10	1294680.04	26.22
1031	157170.47	1294201.78	31.29
1032	157131.86	1294231.80	31.25
1033	157108.93	1294349.15	31.21
1034	157108.99	1294359.47	31.21
1035	157101.20	1294409.28	31.21
1036	157121.30	1294389.06	31.21
1037	157161.48	1294573.57	29.60
1038	157215.29	1294559.76	29.50
1039	157364.72	1294564.44	26.15



REDUCTION SCALE CHECK

1"

0 30' 60'

GRAPHICAL SCALE

ROGER B NORTH
STATE OF WASHINGTON
43597
REGISTERED
PROFESSIONAL ENGINEER

LEGEND:

- IB-1 — INTERCONNECT BORING
- SP-29 — SOIL BORING OR SOIL PROBE
- HY-123 — MONITORING WELL (PROTECT)
- HYCP-3s — MONITORING WELL (DECOMMISSION BY OTHERS)
- SANITARY SEWER MANHOLE AND SEWER
- UTILITY POLE
- GUY WIRE
- EXISTING CATCH BASIN AND PIPE
- BENCHMARK
- FENCE
- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR (TOP OF ASPHALT)
- POWER LINE 480V
- EPM — ELECTRIC POWER METER
- EB — ELECTRICAL BOX
- CO — CLEANOUT
- PV — POWER VAULT

KEYNOTES:

1. ABANDON SITE ENTRANCE. REMOVE GATES AND INSTALL NEW FENCE.
2. INSTALL NEW 16 FOOT WIDE ENTRANCE WITH GATES.

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-13

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN
1	10/25/11	REVISED GRADES	RN	STM	RN
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

SCALE: 1" = 30'

DATE: 10/27/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

FINAL COVER GRADE

DRAWING NO. 10 OF 13

CONSTRUCTION DRAWINGS
FINAL CLEANUP ACTION PHASE II

FOR

BSB DIVERSIFIED, INC. PROPERTY
8202 S. 200TH STREET, KENT, WASHINGTON

AUGUST 2011

PREPARED FOR:

BSB DIVERSIFIED, INC.

C/O BURT GEOLOGY AND ENVIRONMENTAL APPLICATIONS PLLC
902 GRAPEVINE LANE
NASHVILLE, TENNESSEE 37221
PH. (615) 828-6126
RON BURT (OWNER'S REPRESENTATIVE)

ENVIRONMENTAL ENGINEER:

PES Environmental, Inc.
Engineering & Environmental Services

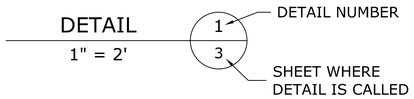
1215 4TH AVENUE - SUITE 1350
SEATTLE, WASHINGTON 98161
PH. 206-529-3980
FX. 206-529-3985
BRIAN O'NEAL P.E. (PROJECT MANAGER)

CIVIL ENGINEER:

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
PH. (503) 922-2522
ROGER NORTH P.E. (PROJECT MANAGER)

DETAIL INDICATOR:

SHEET WHERE DETAIL IS SHOWN:



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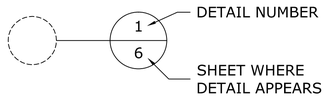
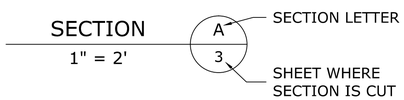


SECTION INDICATOR:

SHEET WHERE SECTION IS SHOWN:



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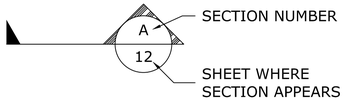
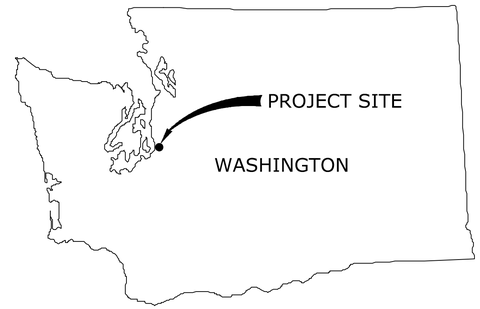
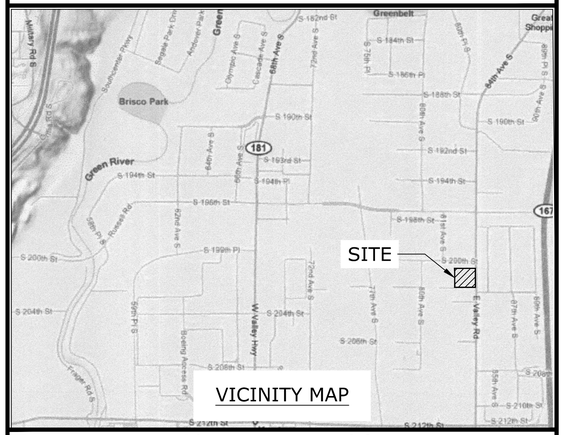


ABBREVIATIONS:

AC	ACRES	X	EXISTING
ADS	ADVANCED DRAINAGE SYSTEM	FT	FEET
BLDG	BUILDING	G.B.	GRADE BREAK
℄	CENTERLINE	GALV	GALVANIZED
CO	CLEANOUT	HORIZ	HORIZONTAL
DIA or Ø	DIAMETER	HP	HIGH POINT
DWG	DRAWING	ID	INSIDE DIAMETER
E	EAST	I.E.	INVERT ELEVATION
EL or ELEV	ELEVATION	L	LENGTH
FT	FEET	L.F.	LINEAR FEET
H or h	HEIGHT	N	NORTH
HDPE	HIGH DENSITY POLYETHYLENE	N.I.C.	NOT IN CONTRACT
E	EAST	OD	OUTSIDE DIAMETER
EL OR ELEV	ELEVATION	℄	PROPERTY LINE
		S	SLOPE IN FEET/FOOT
		TYP	TYPICAL



REGIONAL MAP



VICINITY MAP

Sheet List Table

Sheet Number	Sheet Title
1	TITLE PAGE
2	NOTES
3	SITE PLAN
4	EROSION CONTROL AND DEMO PLAN
5	CUTOFF WALL PLAN
6	CUTOFF WALL PLAN AND PROFILE 1
7	CUTOFF WALL PLAN AND PROFILE 2
8	CUTOFF WALL PLAN AND PROFILE 3
9	CUTOFF WALL PLAN AND PROFILE 4
10	COVER GRADING
11	VAULT AREA DETAILS
12	FINAL COVER
13	DETAILS

APPROVED:

ROGER B NORTH · STATE OF WASHINGTON · 22570 · REGISTERED PROFESSIONAL ENGINEER

ENGINEER OF RECORD - ROGER B. NORTH, P.E.

8-26-11
DATE

GENERAL NOTES:

1. CONTRACTOR SHALL PROCURE AND CONFORM TO ALL CONSTRUCTION PERMITS REQUIRED BY THE CITY. OWNER TO PAY ALL PROJECT PERMIT COSTS. CONTRACTOR SHALL PROVIDE OWNER 48 HOURS NOTICE PRIOR TO REQUIRING PAYMENT FOR PERMITS.

2. THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO COMPLETE THE PROJECT IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DRAWINGS INCLUDING SUCH INCIDENTALS AS MAY BE NECESSARY TO MEET APPLICABLE AGENCY REQUIREMENTS AND PROVIDE A COMPLETED PROJECT.

3. ANY INSPECTION BY THE CITY OR OTHER AGENCIES SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM THE WORK IN STRICT COMPLIANCE WITH THE CONTRACT DOCUMENTS, APPLICABLE CODES AND AGENCY REQUIREMENTS.

4. CONTRACTOR SHALL ERECT AND MAINTAIN BARRICADES, WARNING SINGS, TRAFFIC CONES PER CITY REQUIREMENTS IN ACCORDANCE WITH THE MUTCD (INCLUDING WASHINGTON AMENDMENTS). ACCESS TO DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES. ALL TRAFFIC CONTROL MEASURES SHALL BE APPROVED AND IN PLACE PRIOR TO ANY CONSTRUCTION ACTIVITY.

5. CONTRACTOR SHALL BE LICENSED WITH THE CONSTRUCTION CONTRACTOR BOARD.

6. ELEVATIONS ARE BASED ON NAVD 1988 DATUM.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MANAGING CONSTRUCTION ACTIVITIES TO ENSURE THAT PUBLIC STREETS AND RIGHT-OF-WAYS ARE KEPT CLEAN OF MUD, DUST OR DEBRIS. DUST ABATEMENT SHALL BE MAINTAINED BY ADEQUATE WATERING OF THE SITE BY THE CONTRACTOR.

EXISTING UTILITIES & FACILITIES:

1. CONTRACTOR SHALL PROTECT EXISTING GROUNDWATER TREATMENT EQUIPMENT UNTIL OWNER INDICATES IT MAY BE DECOMMISSIONED. ANY DAMAGE TO SAME WILL BE REPAIRED BY CONTRACTOR AT CONTRACTOR'S EXPENSE.

2. THE CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF APPROVED DRAWINGS ON THE CONSTRUCTION SITE AT ALL TIMES WHEREON HE WILL RECORD ANY APPROVED DEVIATIONS IN CONSTRUCTION FROM THE APPROVED DRAWINGS, AS WELL AS THE LOCATIONS AND DEPTHS OF ALL EXISTING UTILITIES ENCOUNTERED. THESE FIELD RECORD DRAWINGS SHALL BE KEPT UP TO DATE AT ALL TIMES AND SHALL BE AVAILABLE FOR INSPECTION BY THE OWNER UPON REQUEST. FAILURE TO CONFORM TO THIS REQUIREMENT MAY RESULT IN DELAY OF PAYMENT AND/OR FINAL ACCEPTANCE OF THE PROJECT.

3. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL SUBMIT A CLEAN SET OF FIELD RECORD DRAWINGS TO THE OWNER. ALL INFORMATION SHOWN ON THE CONTRACTOR'S RECORD DRAWINGS SHALL BE SUBJECT TO VERIFICATION BY THE ENGINEER. IF SIGNIFICANT ERRORS OR DEVIATIONS ARE NOTED BY THE ENGINEER, A RECORD SURVEY PREPARED AND STAMPED BY A REGISTERED PROFESSIONAL LAND SURVEYOR AND/OR QUALIFIED ENGINEER SHALL BE COMPETED AT THE CONTRACTOR'S EXPENSE.

4. THE LOCATION AND DESCRIPTIONS OF EXISTING UTILITIES SHOWN ON THE DRAWING, ARE COMPILED FROM AVAILABLE RECORDS AND/OR FIELD SURVEYS. THE ENGINEER OR UTILITY COMPANIES DO NOT GUARANTEE THE ACCURACY OR THE COMPLETENESS OF SUCH RECORDS. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND SIZES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. THE CONTRACTOR SHALL LOCATE AND MARK ALL EXISTING PROPERTY AND STREET MONUMENTS PRIOR TO CONSTRUCTION. ANY MONUMENTS DISTURBED DURING CONSTRUCTION OF THE PROJECT SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR AT THE CONTRACTORS EXPENSE.

6. CONTRACTOR SHALL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING POTENTIAL UTILITY CONFLICTS FAR ENOUGH AHEAD OF CONSTRUCTION TO MAKE NECESSARY CONSTRUCTION MODIFICATIONS WITHOUT DELAYING THE WORK.

7. ALL FACILITIES SHALL BE MAINTAINED IN-PLACE BY THE CONTRACTOR UNLESS OTHERWISE SHOWN OR DIRECTED. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO SUPPORT, MAINTAIN, OR OTHERWISE PROTECT EXISTING UTILITIES AND OTHER FACILITIES AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR TO LEAVE EXISTING FACILITIES IN AN EQUAL OR BETTER-THAN-ORIGINAL CONDITION AND TO THE SATISFACTION OF THE OWNER.

8. UTILITIES OR INTERFERING PORTIONS OF UTILITIES THAT ARE ABANDONED IN PLACE SHALL BE REMOVED BY THE CONTRACTOR TO THE EXTENT NECESSARY TO ACCOMPLISH THE WORK. THE CONTRACTOR SHALL PLUG THE REMAINING EXPOSED ENDS OF ABANDONED UTILITIES.

9. UTILITIES OR INTERFERING PORTIONS OF UTILITIES THAT ARE ABANDONED IN PLACE SHALL BE REMOVED BY THE CONTRACTOR TO THE EXTENT NECESSARY TO ACCOMPLISH THE WORK. THE CONTRACTOR SHALL PLUG THE REMAINING EXPOSED ENDS OF ABANDONED UTILITIES.

10. ALL PIPED UTILITIES ABANDONED IN PLACE SHALL HAVE ALL OPENINGS CLOSED WITH CONCRETE PLUGS WITH A MINIMUM LENGTH EQUAL TO 2 TIMES THE DIAMETER OF THE ABANDONED PIPE.

11. ANY WELLS TO BE DECOMISSIONED SHALL BE ABANDONED PER STATE REQUIREMENTS.

TESTING AND INSPECTION:

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THAT ALL REQUIRED OR NECESSARY INSPECTIONS ARE COMPLETED BY THE OWNER'S AUTHORIZED INSPECTORS PRIOR TO PROCEEDING WITH SUBSEQUENT WORK, WHICH COVERS OR THAT IS DEPENDENT ON THE WORK TO BE INSPECTED. FAILURE TO OBTAIN NECESSARY INSPECTION(S) AND APPROVAL(S) SHALL RESULT IN THE CONTRACTOR BEING FULLY RESPONSIBLE FOR ALL PROBLEMS ARISING FROM UNINSPECTED WORK.

GRADING, & DRAINAGE:

1. CLEAR AND GRUB WITHIN WORK LIMITS ALL SURFACE VEGETATION, TREES, STUMPS, BRUSH, ETC.

2. ALL TREES, BRUSH AND DEBRIS ASSOCIATED WITH CLEARING, STRIPPING OR GRADING SHALL BE REMOVED AND DISPOSED OF OFF-SITE.

3. FINISH PAVEMENT GRADES AT TRANSITION IN EXISTING PAVEMENT SHALL MATCH EXISTING PAVEMENT GRADES OR BE FEATHERED PAST JOINTS WITH EXISTING PAVEMENT AS REQUIRED TO PROVIDE A SMOOTH, FREE DRAINING SURFACE.

4. ALL EXISTING OR CONSTRUCTED MANHOLES, CLEANOUTS, MONUMENTS, GAS VALVES, WATER VALVES AND SIMILAR STRUCTURES SHALL BE ADJUSTED TO MATCH FINISH GRADES OF THE PAVEMENT, SIDEWALK, LANDSCAPED AREA OR MEDIAN STRIP WHEREIN THEY LIE.

5. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, NO CUT OR FILL SLOPES SHALL BE CONSTRUCTED STEEPER THAN 2H:1V.

UTILITIES:

1. THE END OF ALL UTILITY STUBS SHALL BE MARKED WITH A 2X4 COLOR CODED TAG WIRED TO THE PIPE STUB.

2. ALL NON-METALLIC WATER, SANITARY AND STORM SEWER PIPING SHALL HAVE 14 GAUGE COLOR CODED TRACER WIRE INSTALLED AS PER CITY OF KENT DETAILS

SANITARY SEWER NOTES:

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE CITY OF KENT STANDARD SPECIFICATIONS, AND WSDOT/APWA STANDARD SPECIFICATIONS, LATEST EDITION.

2. PRIOR TO ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL SCHEDULE AND ATTEND A PRE-CONSTRUCTION CONFERENCE WITH THE CITY OF KENT CONSTRUCTION INSPECTION PERSONNEL BY PHONING 253-856-5500.

3. A COPY OF THESE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.

4. ALL SANITARY SEWER IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE APPROVED PLANS. ANY DEVIATION FROM THESE PLANS WILL REQUIRE APPROVAL FROM THE OWNER, ENGINEER AND APPROPRIATE PUBLIC AGENCIES.

5. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN STREET USE AND ANY OTHER RELATED PERMITS PRIOR TO ANY CONSTRUCTION ACTIVITY.

6. ALL LOCATIONS OF EXISTING UTILITIES SHOWN HEREON HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN. THE CONTRACTOR SHALL CONTACT THE UNDERGROUND UTILITIES LOCATION SERVICE (1-800-424-5555) AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE OWNER OR HIS REPRESENTATIVE AND THE ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.

7. ALL SEWER PIPE SHALL CONFORM TO ONE OF THE FOLLOWING SPECIFICATIONS:

   - DUCTILE IRON - CLASS 50 (ONLY WHERE SPECIFIED ON THE PLANS).
   - PVC - CONFORMING TO ASTM D-3034 OR 3035, SDR 35, WITH FITTINGS AND GASKETS CONFORMING TO CITY OF KENT STANDARDS.

8. ALL DUCTILE IRON PIPE SHALL HAVE AN APWA CLASS "B" PIPE BEDDING. ALL PVC PIPE SHALL HAVE AN APWA CLASS "F" (5/8 INCH MINUS CRUSHED ROCK) FLEXIBLE PIPE BEDDING.

9. PIPE TRENCH BACKFILL FOR THE LATERAL SHALL BE ONE AND ONE QUARTER (1-1/4) INCH MINUS CRUSHED ROCK IN CONFORMANCE WITH SECTION 9.03.9(3) OF THE CITY OF KENT STANDARD SPECIFICATIONS.

10. SIDE SEWER STUB SHALL BE A MINIMUM SIX (6) INCH DIAMETER AND HAVE A MINIMUM SLOPE OF 1.0 PERCENT. SIDE SEWER TEE STATIONS ARE REFERENCED FROM THE NEAREST DOWNSTREAM MANHOLE.

11. THE CONTRACTOR SHALL PROVIDE THE CITY OF KENT WITH ACCURATE AS-BUILT RECORDS OF ALL SIDE SEWER LOCATIONS.

12. WHERE A WATER MAIN CROSSES ABOVE THE SANITARY SEWER, AND LESS THAN 1.5 FEET OF VERTICAL CLEARANCE EXISTS BETWEEN THE TOP OF SEWER AND BOTTOM OF WATER MAIN, THE SEWER SHALL BE CONSTRUCTED OR RECONSTRUCTED WITH DUCTILE IRON PIPE (CLASS 50) FOR A MINIMUM HORIZONTAL DISTANCE OF ONE CONTINUOUS EIGHTEEN (18) FEET NOMINAL PIPE ACROSS THE WATER MAIN CROSSING WITH NO JOINTS.

13. ANY OPEN CUTS OF EXISTENT PUBLIC ROADWAYS SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH CITY OF KENT STANDARDS. ALL CUTS INTO EXISTING ASPHALT SHALL BE ALONG NEAT, CONTINUOUS, SAW CUT LINE. A TEMPORARY COLD MIX PATCH MUST BE PLACED IMMEDIATELY AFTER BACKFILL AND COMPACTIONS. IN PAVED AREAS THE MATERIAL USED SHALL MATCH THE EXISTING STREET SECTION UNLESS OTHERWISE DIRECTED BY THE ENGINEER. IN NO CASE SHALL THE THICKNESS OF THE ASPHALT CONCRETE BE LESS THAN THREE (3) INCH OF CLASS B ASPHALT CONCRETE. TRENCH BACKFILL AND COMPACTION SHALL BE COMPLETED PRIOR TO TESTING LINES FOR LEAKAGE. THE CONTRACTOR SHALL CLOSELY FOLLOW REQUIREMENTS OF THE RIGHT-OF-WAY PERMIT; SPECIFICALLY, WORKING HOURS, DETOUR AND WARNING SIGNS AND NOTIFICATION OF ROAD ALTERATIONS TO THE POLICE AND/OR OTHER EMERGENCY SERVICES.

14. NEW CONNECTIONS TO EXISTING FACILITIES SHALL BE SEALED OFF UNTIL UPSTREAM CONSTRUCTION IS FINISHED, TESTED, CLEANED AND ACCEPTED. ALL CONSTRUCTION DEBRIS AND WATER SHALL BE REMOVED PRIOR TO OPENING THE SEAL. ALL TV INSPECTION AND PRESSURE TESTING SHALL BE IN THE PRESENCE OF A CITY OF KENT INSPECTOR.

ROGER B NORTH
STATE OF WASHINGTON
43593
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE:

DATE: 8/26/2011

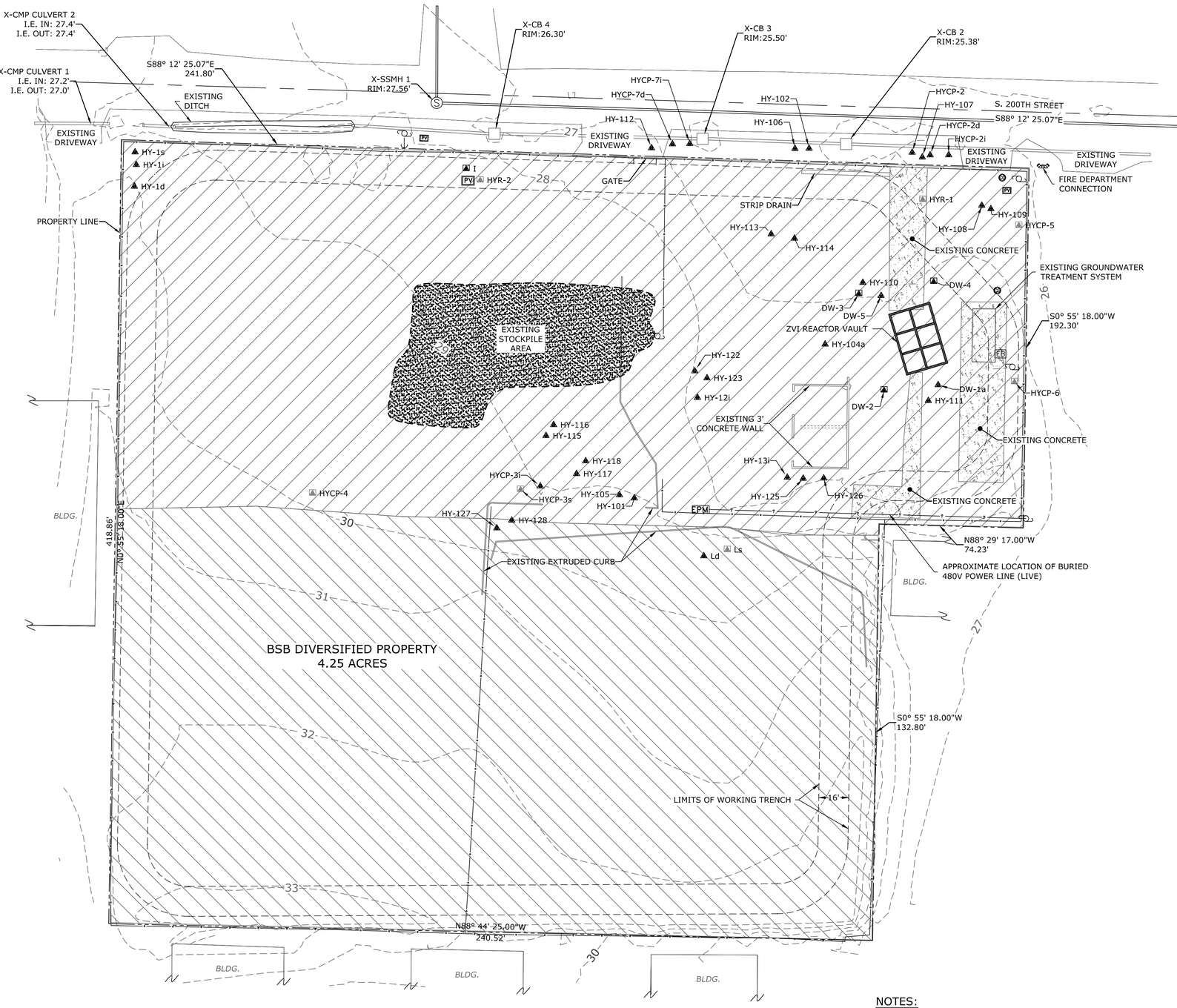
FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

NOTES

DRAWING NO. 2

OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\LEGEND AND NOTES.DWG PLOTTED: 8/26/2011 6:44 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)



LEGEND:

- EXISTING ASPHALT PAVED PRIOR TO 1980
- EXISTING ASPHALT PAVED IN 2002
- SP-29 — SOIL BORING OR SOIL PROBE
- HY-123 — MONITORING WELL (PROTECT)
- HYCP-3s — MONITORING WELL (DECOMMISSION BY OTHERS)
- SANITARY SEWER MANHOLE AND SEWER
- UTILITY POLE
- GUY WIRE
- EXISTING CATCH BASIN AND PIPE
- BENCHMARK
- FENCE
- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- POWER LINE 480V
- EPM — ELECTRIC POWER METER
- EB — ELECTRICAL BOX
- CO — CLEANOUT
- PV — POWER VAULT

NOTES:

1. TOPOGRAPHICAL DATA PROVIDED BY CRAMER NORTHWEST, INC.
2. HORIZONTAL DATUM NAD 83/91. BEARINGS SHOWN ARE BASED ON THE EAST LINE OF S.E. 1/4 SEC. 1, TWN. 22N., R 4E, BEING NORTH 00°55'18" EAST, PER CITY OF KENT.
3. VERTICAL DATUM: NAVD 1988 FROM BENCH MARK #939: ELEVATION = 27.20; CITY OF KENT, WASHINGTON.
4. VISTA CONSULTANTS, LLC, ASSUMES NO RESPONSIBILITY FOR TOPOGRAPHIC DATA PRESENTED IN THIS DRAWING.

ROGER B NORTH
STATE OF WASHINGTON
13597
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 30' 60'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 30'

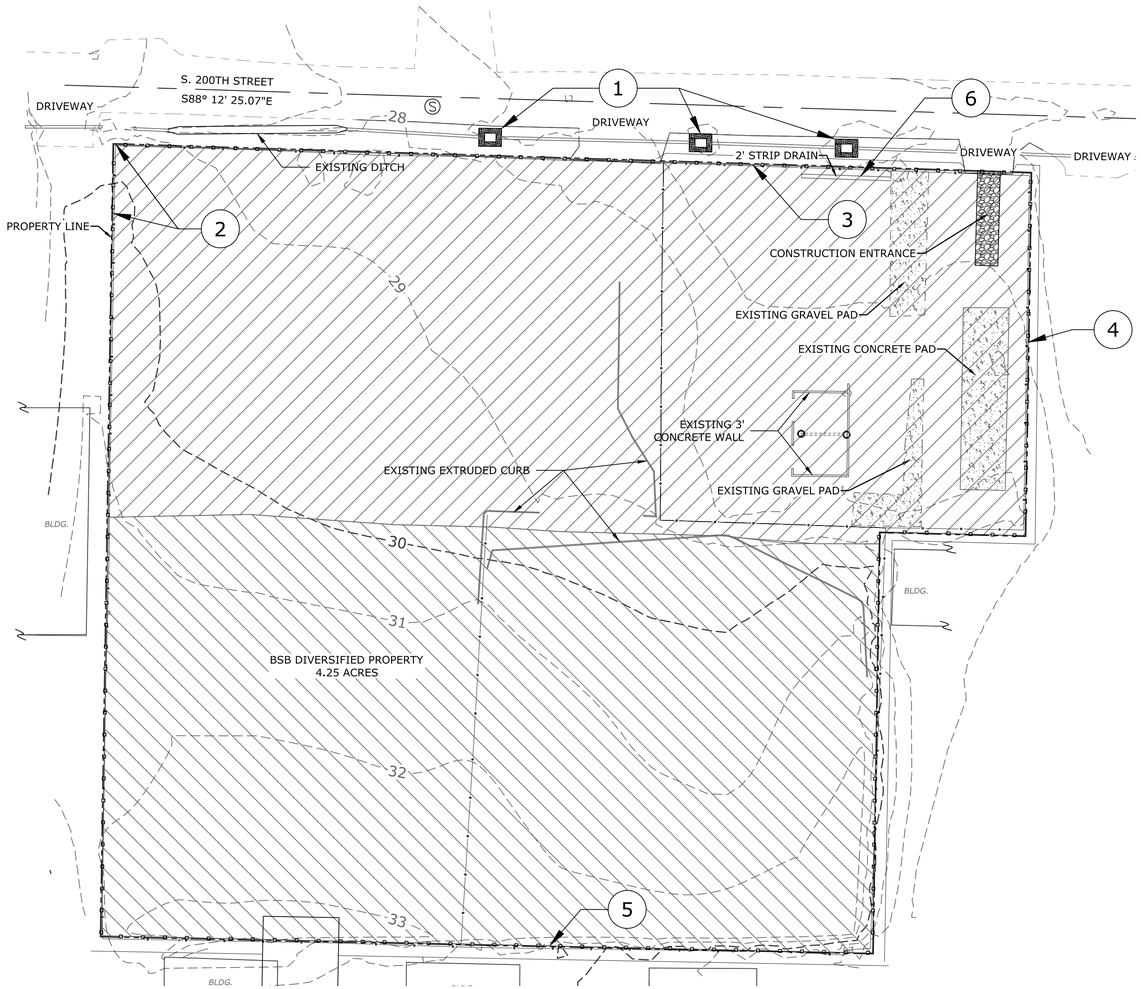
DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

SITE PLAN

DRAWING NO. 3 OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\SITE PLAN.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

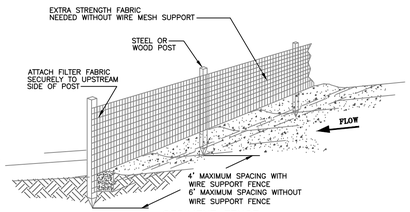


EROSION CONTROL NOTES:

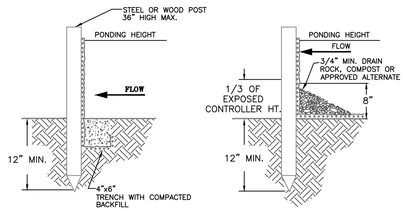
1. SILT FABRIC SHALL BE PLACED OVER THE CATCH BASIN INLETS SO THAT NO SEDIMENT WILL ACCUMULATE IN THE CATCH BASINS.
2. THE CONTRACTOR SHALL INSPECT SITE AND ENTRANCE DRIVEWAY DAILY AND WASH AS NEEDED SO THAT NO SEDIMENT IS WASHED OR CARRIED OFF-SITE.
3. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED.
4. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING, GRADING AND CONSTRUCTION ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
5. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
6. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY.
7. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

NOTES FOR SEDIMENT FENCES:

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND SHALL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST, OR OVERLAP 2"X 2" POSTS AND ATTACHED AS SHOWN ON DETAIL.
2. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS WHERE FEASIBLE. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 18 INCHES.
3. THE FILTER FABRIC SHALL HAVE A MINIMUM VERTICAL BURIAL OF 6 INCHES. ALL EXCAVATED MATERIAL FROM FILTER FABRIC FENCE INSTALLATION SHALL BE BACKFILLED AND COMPACTED ALONG THE ENTIRE DISTURBED AREA.
4. STANDARD OR HEAVY DUTY FILTER FABRIC FENCE SHALL HAVE MANUFACTURED STITCHED LOOPS FOR 2"X 2" POST INSTALLATION. STITCHED LOOPS SHALL BE INSTALLED ON THE UPHILL SIDE OF THE SLOPED AREA.
5. FILTER FABRIC FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED.
6. FILTER FABRIC FENCES SHALL BE INSPECTED BY APPLICANT/CONTRACTOR IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.



SEDIMENT FENCE



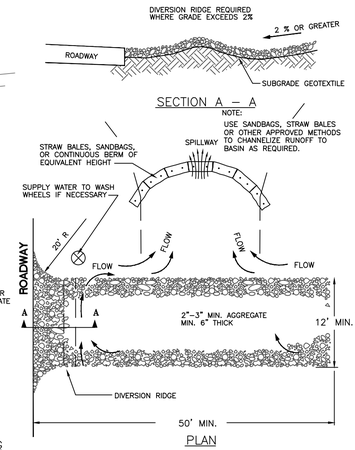
INSTALLATION WITHOUT TRENCHING

TRENCH DETAIL

NOTES:

1. SEDIMENT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
2. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN IT EXCEEDS 1/3 THE EXPOSED HEIGHT OF CONTROLLER STORAGE DEPTH.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

SILT FENCE STANDARD DETAILS



PLAN

NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT–OF–WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

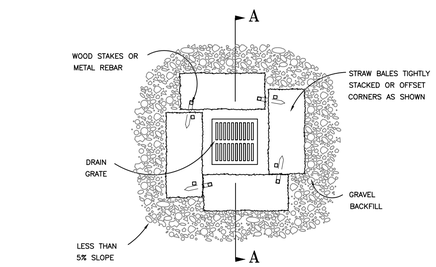
GRAVEL CONSTRUCTION ENTRANCE DETAIL

KEYNOTES NOTES:

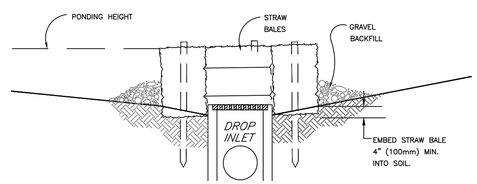
1. INSTALL STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER
2. INSTALL 685 LF SILT FENCE
3. INSTALL 165 LF SILT FENCE
4. INSTALL 515 LF SILT FENCE
5. INSTALL 420 LF SILT FENCE
6. ABANDON EXISTING 2' STRIP DRAIN

OTHER NOTES:

1. CLEAR AND GRUB ALL VEGETATION
2. REMOVE CURBS, WALLS AND CONCRETE PADS



PLAN VIEW



SECTION A–A

NOTES:

1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%).
2. EMBED THE BALES 4" (100mm) INTO THE SOIL AND OFFSET CORNERS OR PLACE BALES WITH ENDS TIGHTLY ABUTTING. GRAVEL BACKFILL WILL PREVENT EROSION OR FLOW AROUND THE BALES. STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION. DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. EXCAVATION OF A BASIN ADJACENT TO THE DROP INLET OR A TEMPORARY DIKE ON THE DOWNSLOPE OF THE STRUCTURE MAY BE NECESSARY.

ROGER B. NORTH
STATE OF WASHINGTON
13591
REGISTERED
PROFESSIONAL ENGINEER

N

REDUCTION SCALE CHECK
1"
0 40' 80'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE:
1" = 40'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

EROSION CONTROL AND DEMO PLAN

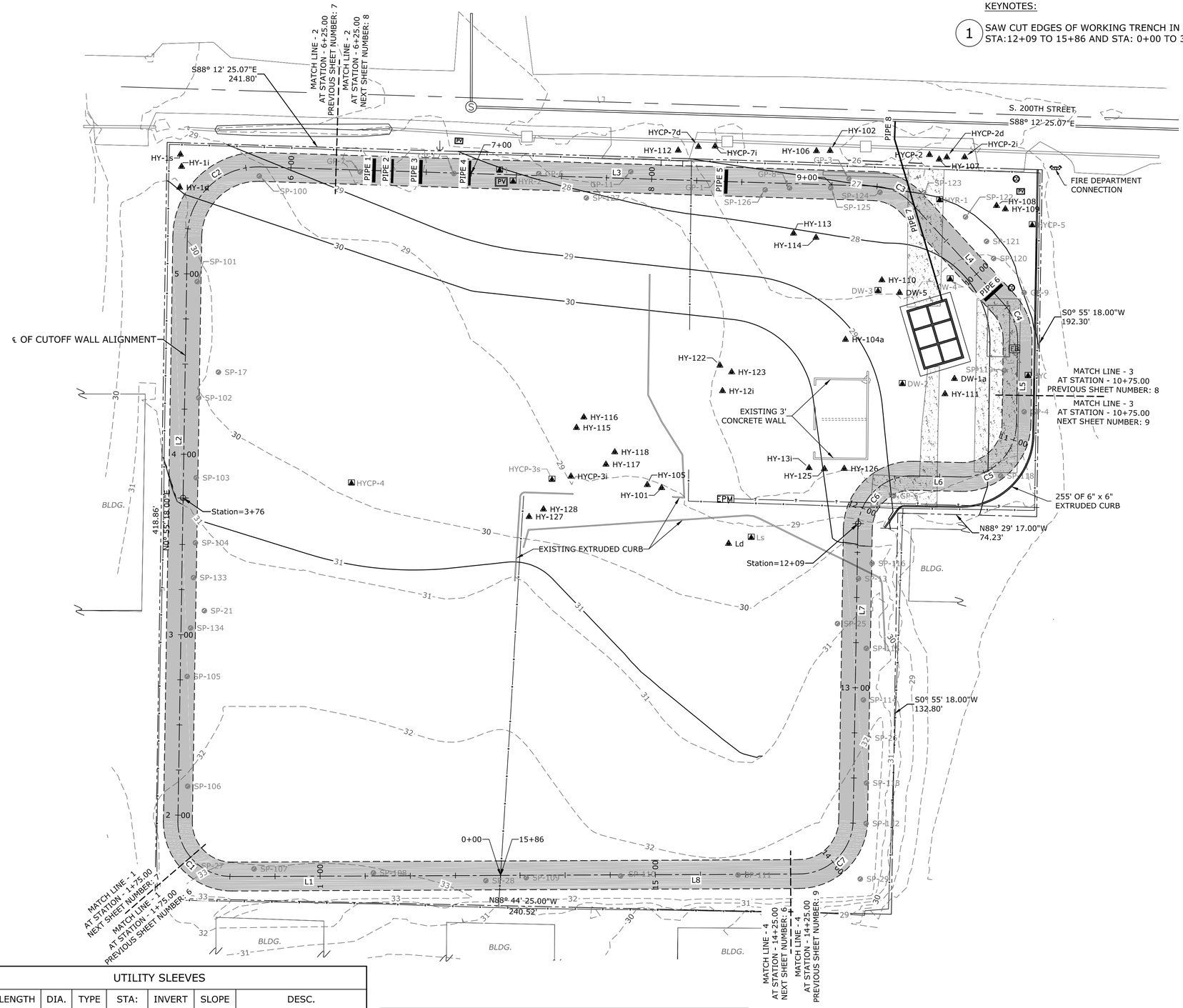
DRAWING NO.
4
OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\EROSION CONTROL AND DEMO PLAN.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\CUTOFF WALL.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

KEYNOTES:

1 SAW CUT EDGES OF WORKING TRENCH IN AREA PAVED IN 2002 STA:12+09 TO 15+86 AND STA: 0+00 TO 3+76



CUTOFF WALL				
Number	LENGTH/ CHORD LENGTH	BEARING/ CHORD BEARING	RADIUS	START STATION
L1	148.70	S89° 44' 42"W		0+00.00
C1	42.86	N44° 40' 00"W	30.0	1+48.70
L2	324.47	N0° 55' 18"E		1+96.44
C2	55.57	N46° 21' 26"E	39.0	5+20.91
L3	340.43	S88° 12' 25"E		5+82.76
C3	23.30	S65° 21' 33"E	30.0	9+23.19
L4	74.95	S42° 30' 42"E		9+47.11
C4	22.13	S20° 52' 15"E	30.0	10+22.06
L5	45.97	S0° 46' 11"W		10+44.73
C5	42.70	S46° 08' 27"W	30.0	10+90.69
L6	26.37	N88° 29' 17"W		11+38.21
C6	42.64	S46° 13' 00"W	30.0	11+64.58
L7	161.72	S0° 55' 18"W		12+12.01
C7	41.99	S45° 20' 00"W	30.0	13+73.73
L8	165.55	S89° 44' 42"W		14+20.24

LEGEND:

SP-29	SOIL BORING OR SOIL PROBE
HY-123	MONITORING WELL (PROTECT)
HYCP-3s	MONITORING WELL (DECOMMISSION BY OTHERS)
	SANITARY SEWER MANHOLE AND SEWER
	UTILITY POLE
	GUY WIRE
	EXISTING CATCH BASIN AND PIPE
	BENCHMARK
	FENCE
	PROPERTY LINE
	EXISTING CONTOUR
	PROPOSED CONTOUR
?	POWER LINE 480V
EPM	ELECTRIC POWER METER
EB	ELECTRICAL BOX
CO	CLEANOUT
PV	POWER VAULT

UTILITY SLEEVES							
NAME	LENGTH	DIA.	TYPE	STA:	INVERT	SLOPE	DESC.
PIPE 1	13'	18"	N-12	6+46	23.00'	0.00%	DRY UTILITY SLEEVE
PIPE 2	13'	12"	N-12	6+56	22.00'	0.00%	WATER SLEEVE
PIPE 3	13'	18"	N-12	6+72	24.50'	0.00%	RAIN DRAIN SLEEVE
PIPE 4	13'	12"	N-12	6+99	22.00'	0.00%	SANITARY SEWER SLEEVE
PIPE 5	13'	18"	N-12	8+41	23.80'	0.00%	RAIN DRAIN SLEEVE 2
PIPE 6	13'	18"	N-12	10+14	24.10'	0.00%	STORM WATER SLEEVE

VAULT SS						
NAME	LENGTH	DIA.	TYPE	SLOPE	INVERT	INVERT LOCATION
PIPE 7	93'	4" & 6"	PVC	1.00%	16.75'	AT VAULT
PIPE 8	10'	6"	PVC	UNKNOWN	15.82'	AT PIPE 7/8 JOINT

NOTE: LENGTHS OF PIPES 7 AND 8 MAY HAVE TO BE ADJUSTED DEPENDING ON PIPE 8 CONNECTION TO SANITARY SEWER.

OTHER NOTES:

PERFORM THE FOLLOWING ALONG THE ALIGNMENT OF THE CUTOFF WALL PRIOR TO PERFORMING ANY EXCAVATION ACTIVITIES FOR THE CUTOFF WALL IN THE FORMER SLUDGE DRYING BED AREAS, TO EXPLORE FOR THE PRESENCE OF UNSTABILIZED SLUDGE AND/OR THE PRESENCE OF PVC COVER MATERIALS:

- FROM STATION 12+25 TO STATION 1+75 EXCAVATE A CONTINUOUS 6-FOOT DEEP TRENCH APPROXIMATELY 1-FOOT WIDE.
- FROM STATION 1+75 TO STATION 3+75 EXCAVATE 6-FOOT DEEP POTHOLES AT 50-FOOT INTERVALS.

ROGER B NORTH STATE OF WASHINGTON 43597 REGISTERED PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 30' 60'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRM	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 30'

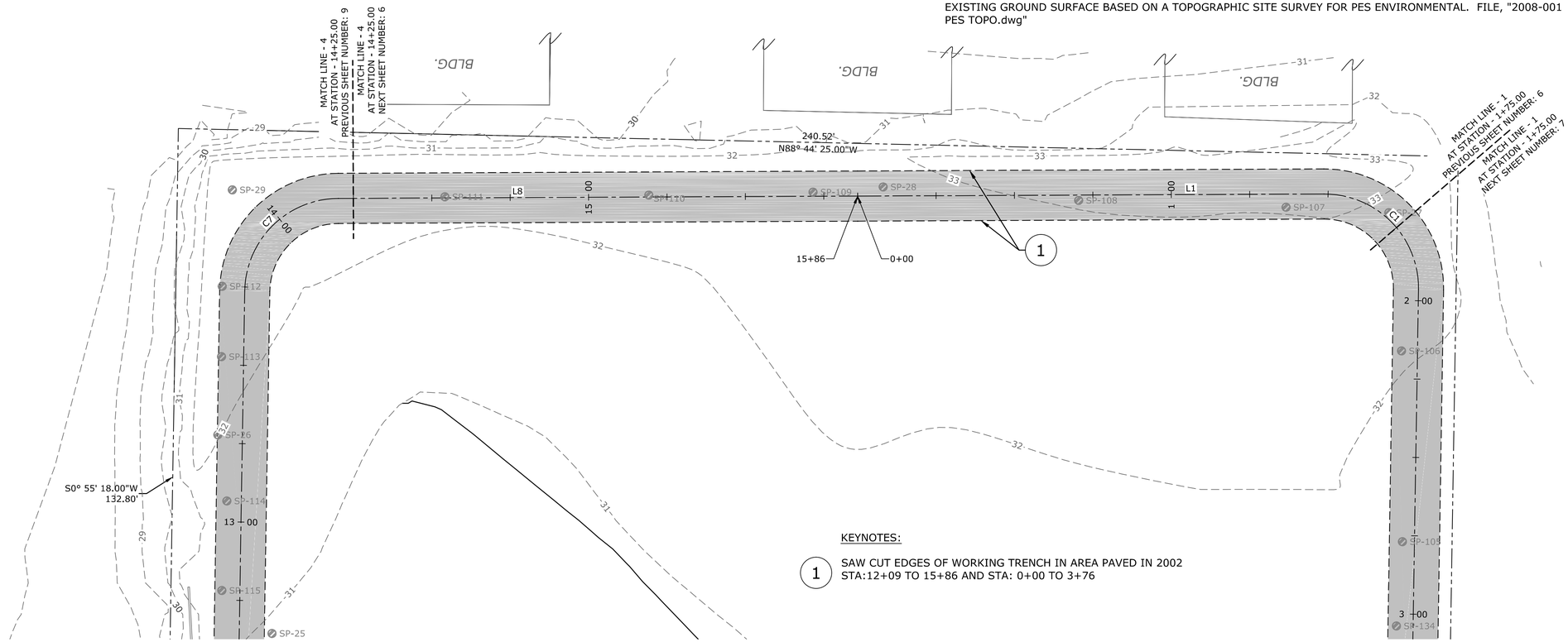
DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

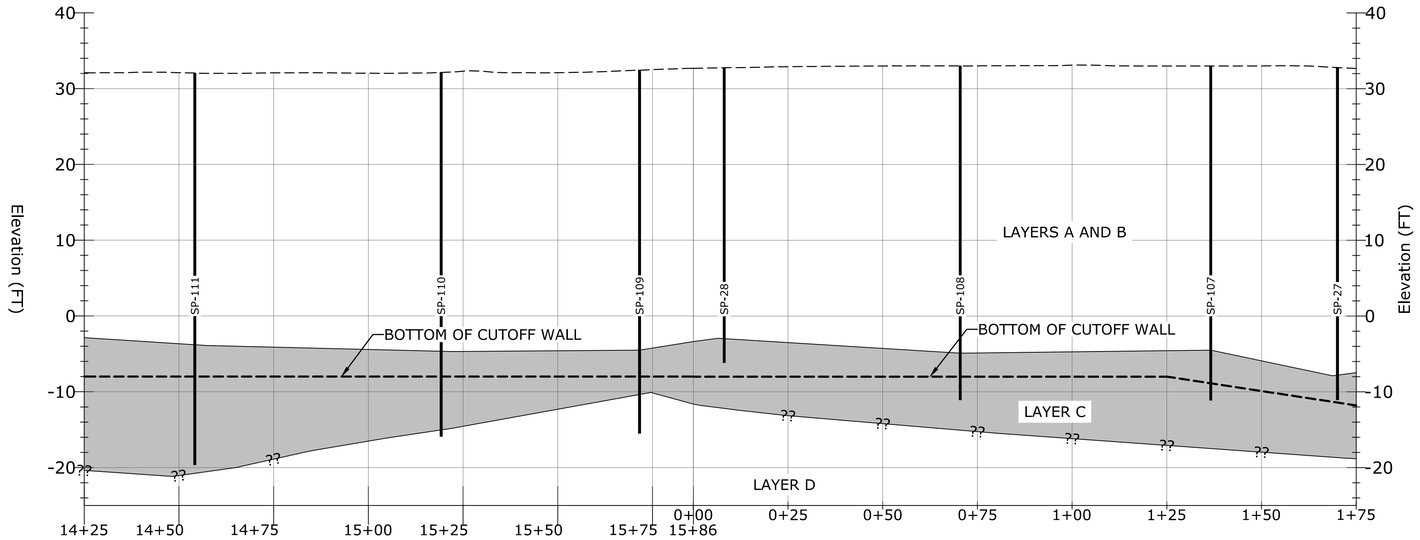
CUTOFF WALL PLAN

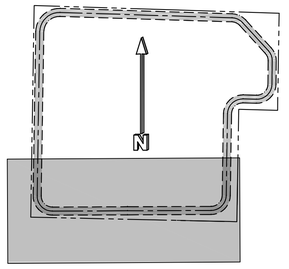
DRAWING NO. 5 OF 13

EXISTING GROUND SURFACE BASED ON A TOPOGRAPHIC SITE SURVEY FOR PES ENVIRONMENTAL. FILE, "2008-001 PES TOPO.dwg"



CUTOFF WALL PLAN





32.1'	32.1'	32.0'	32.3'	32.1'	32.5'		32.9'	33.0'	33.0'	33.1'	33.0'	33.0'	32.7'	EXISTING GROUND ELEVATION (FT)
-3.7'	-4.1'	-4.4'	-4.7'	-4.6'	-4.2'		-3.5'	-4.3'	-4.9'	-4.7'	-4.6'	-5.9'	-7.5'	TOP OF LAYER C ELEVATION (FT)
-8.0'	-8.0'	-8.0'	-8.0'	-8.0'	-8.0'		-8.0'	-8.0'	-8.0'	-8.0'	-8.0'	-9.9'	-11.8'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
40.1'	40.1'	40.0'	40.3'	40.1'	40.5'		40.9'	41.0'	41.0'	41.1'	41.0'	42.9'	44.5'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE

REDUCTION SCALE CHECK
1"
0 20' 40'
GRAPHICAL SCALE

ROGER B NORTH
STATE OF WASHINGTON
13597
REGISTERED
PROFESSIONAL ENGINEER

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 20'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 1

DRAWING NO. 6 OF 13

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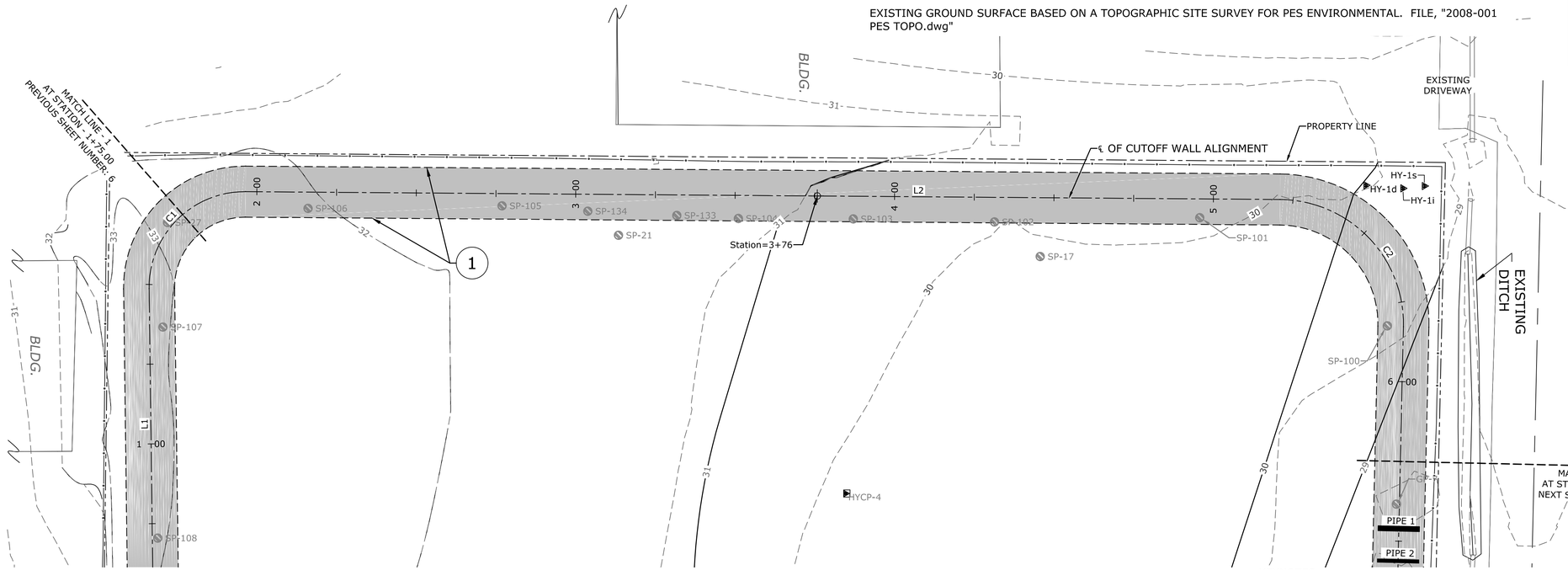
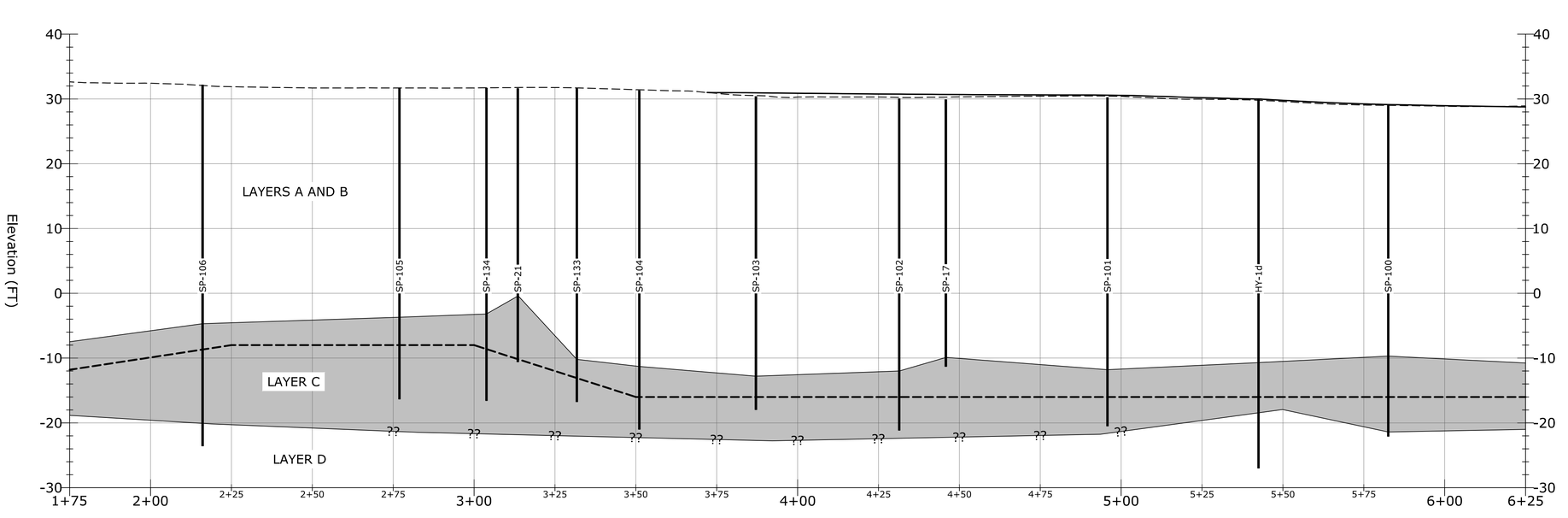
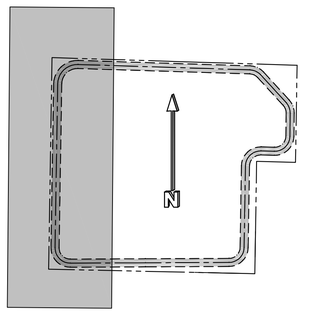


CUTOFF WALL PLAN





32.4'	31.9'	31.7'	31.7'	31.7'	31.8'	31.4'	30.9'	30.3'	30.3'	30.3'	30.4'	30.4'	30.0'	29.6'	29.1'	28.9'	28.9'	EXISTING GROUND ELEVATION (FT)
-5.8'	-4.6'	-4.1'	-3.7'	-3.3'	-6.5'	-11.2'	-12.3'	-12.6'	-12.1'	-10.0'	-11.0'	-11.7'	-11.1'	-10.5'	-9.9'	-10.1'	-10.8'	TOP OF LAYER C ELEVATION (FT)
-9.9'	-8.0'	-8.0'	-8.0'	-8.0'	-12.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
42.3'	39.9'	39.7'	39.7'	39.7'	43.8'	47.4'	46.9'	46.3'	46.3'	46.3'	46.4'	46.4'	46.0'	45.6'	45.1'	44.9'	44.9'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE

ROGER B NORTH
STATE OF WASHINGTON
43593
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 20' 40'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

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SCALE: 1" = 20'

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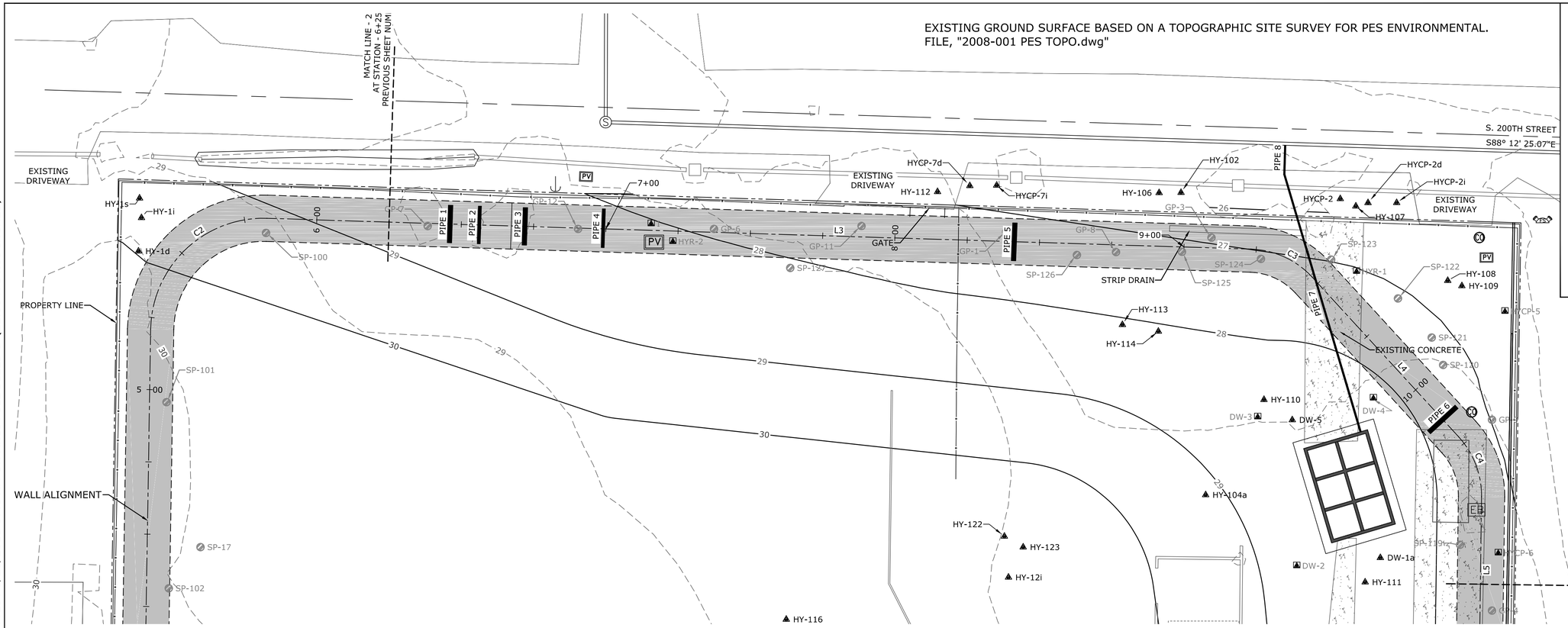
FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 2

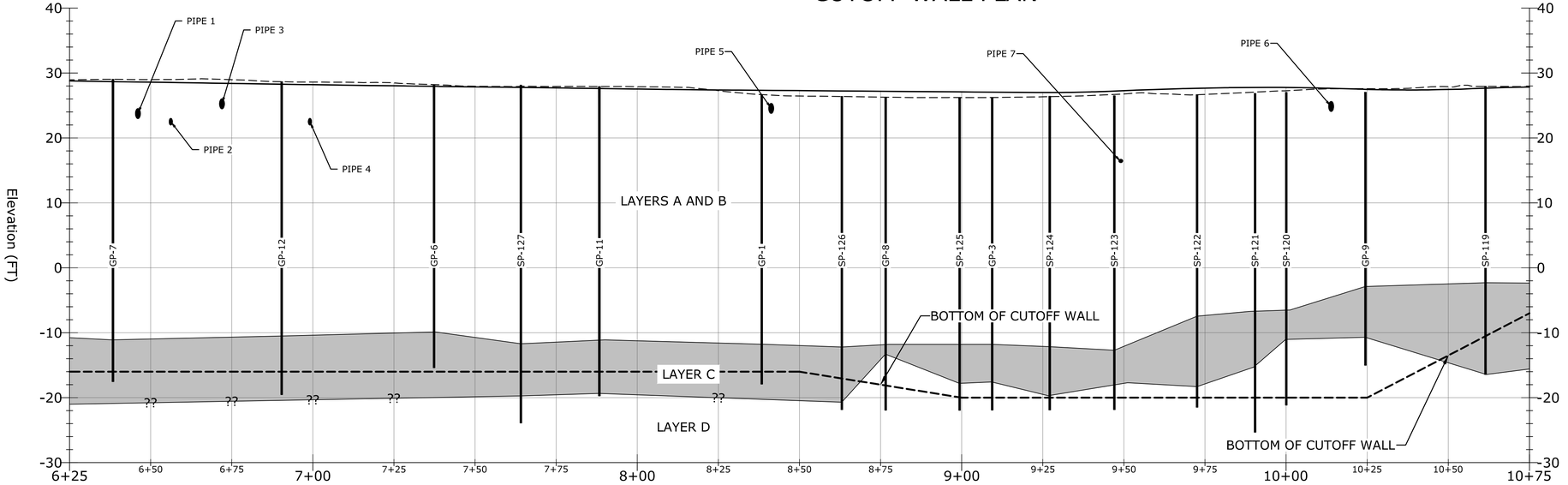
DRAWING NO. 7 OF 13

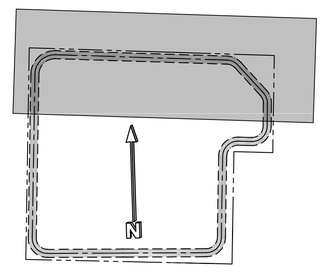
C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\CUTOFF WALL.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

EXISTING GROUND SURFACE BASED ON A TOPOGRAPHIC SITE SURVEY FOR PES ENVIRONMENTAL.
FILE, "2008-001 PES TOPO.dwg"



CUTOFF WALL PLAN





29.0'	29.0'	28.6'	28.5'	28.0'	27.9'	27.9'	27.3'	26.5'	26.3'	26.2'	26.3'	26.8'	26.7'	27.3'	27.6'	27.9'	27.9'	EXISTING GROUND ELEVATION (FT)
-11.0'	-10.7'	-10.4'	-10.1'	-10.7'	-11.4'	-11.2'	-11.6'	-12.0'	-11.9'	-11.8'	-12.1'	-12.1'	-7.3'	-6.5'	-2.9'	-2.5'	-2.3'	TOP OF LAYER C ELEVATION (FT)
-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-18.0'	-20.0'	-20.0'	-20.0'	-20.0'	-20.0'	-20.0'	-13.5'	-7.0'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
45.0'	45.0'	44.6'	44.5'	44.0'	43.9'	43.9'	43.3'	42.5'	44.3'	46.2'	46.3'	46.8'	46.7'	47.3'	47.6'	41.4'	34.9'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE

REDUCTION SCALE CHECK
1"
0 20' 40'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

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SCALE: 1" = 20'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 3

DRAWING NO. 8 OF 13

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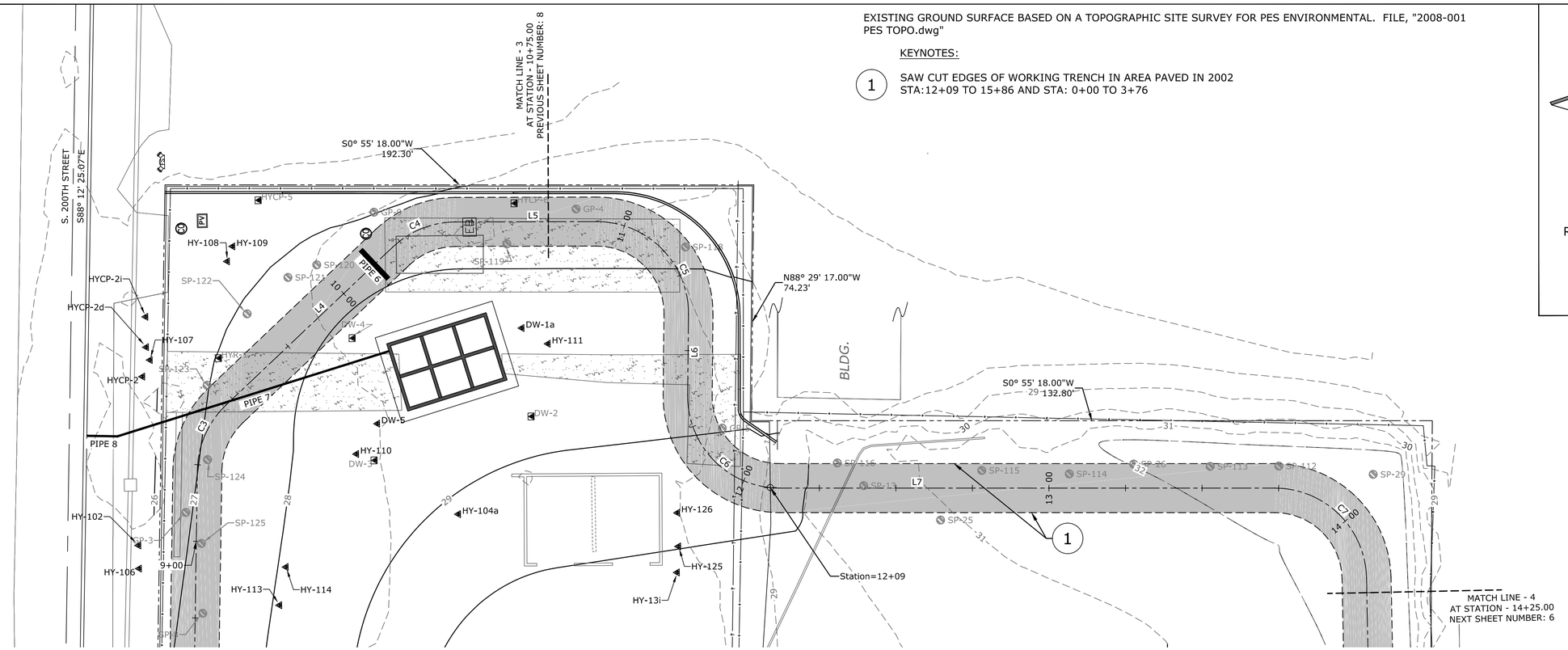
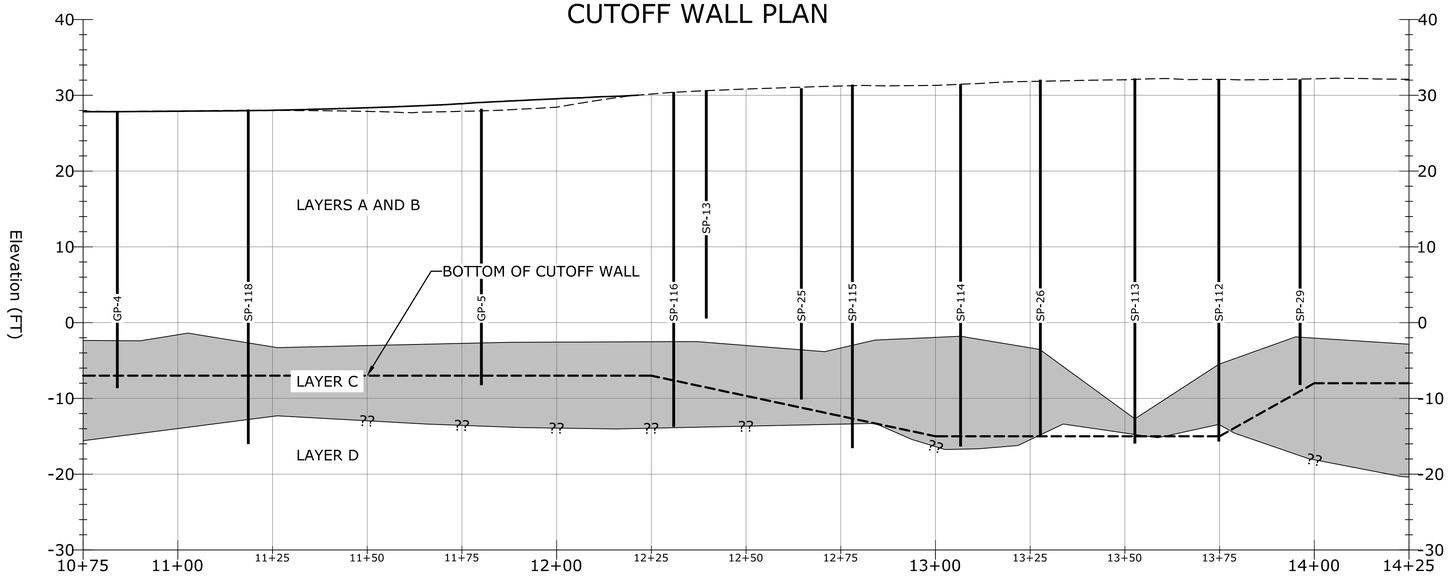
EXISTING GROUND SURFACE BASED ON A TOPOGRAPHIC SITE SURVEY FOR PES ENVIRONMENTAL. FILE, "2008-001 PES TOPO.dwg"

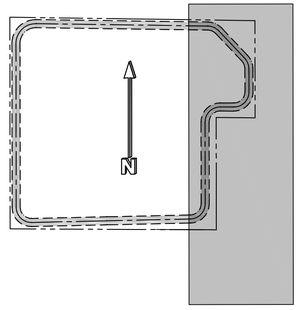
KEYNOTES:

1 SAW CUT EDGES OF WORKING TRENCH IN AREA PAVED IN 2002 STA:12+09 TO 15+86 AND STA: 0+00 TO 3+76



CUTOFF WALL PLAN





27.9'	28.0'	27.9'	27.9'	28.4'	30.2'	30.8'	31.2'	31.3'	31.8'	32.0'	32.1'	32.2'	EXISTING GROUND ELEVATION (FT)
-1.6'	-3.2'	-3.0'	-2.7'	-2.6'	-2.5'	-3.0'	-3.3'	-1.9'	-3.3'	-11.7'	-5.5'	-2.0'	TOP OF LAYER C ELEVATION (FT)
-7.0'	-7.0'	-7.0'	-7.0'	-7.0'	-7.0'	-9.7'	-12.3'	-15.0'	-15.0'	-15.0'	-15.0'	-8.0'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
34.9'	35.0'	34.9'	34.9'	35.4'	37.2'	40.5'	43.6'	46.3'	46.8'	47.0'	47.1'	40.2'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE

REDUCTION SCALE CHECK
1"
0 20' 40'
GRAPHICAL SCALE

ROGER B NORTH
STATE OF WASHINGTON
43593
REGISTERED
PROFESSIONAL ENGINEER

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
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SCALE: 1" = 20'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 4

DRAWING NO. 9 OF 13

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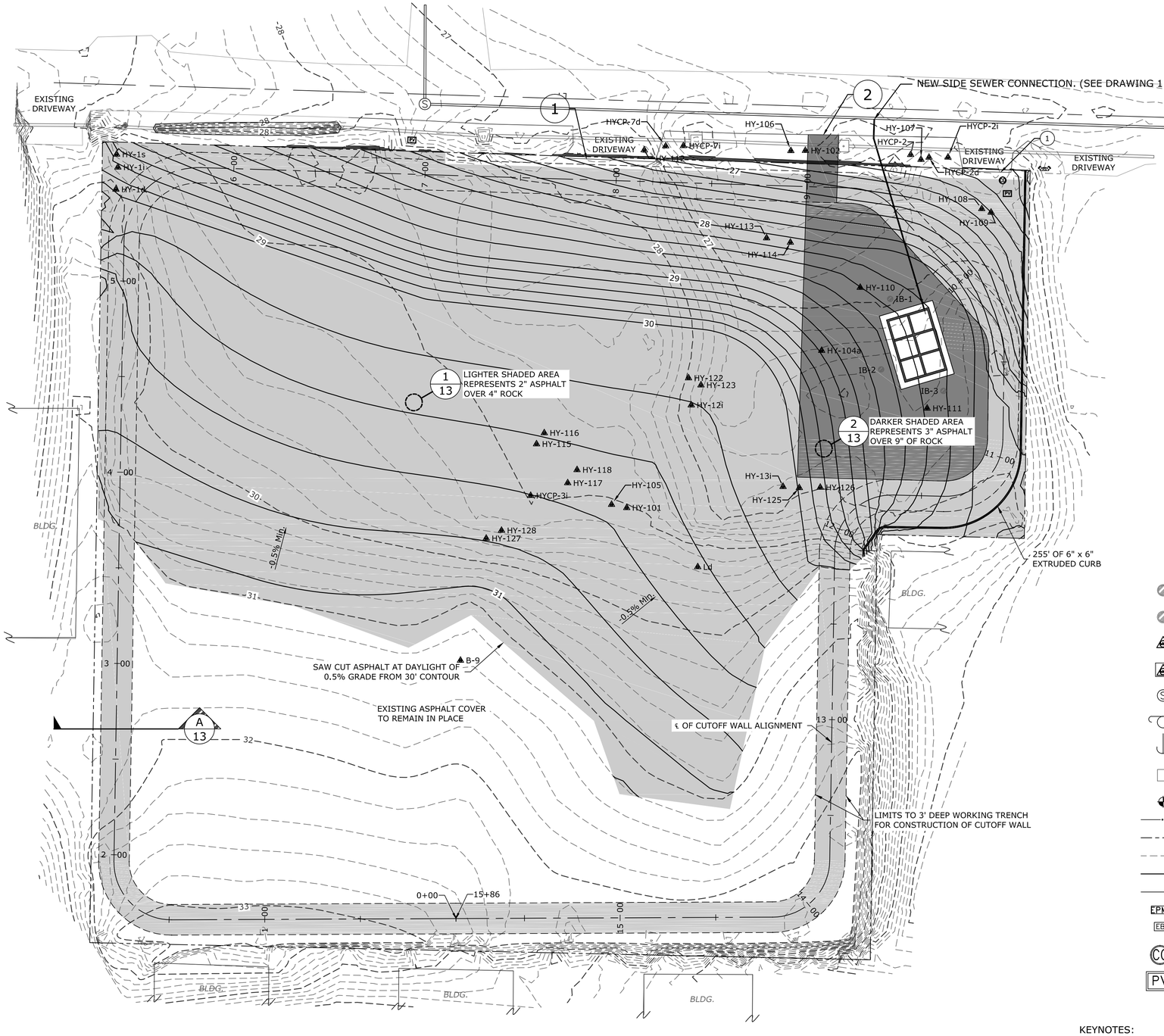

LEGEND:

IB-1	INTERCONNECT BORING
SP-29	SOIL BORING OR SOIL PROBE
HY-123	MONITORING WELL (PROTECT)
HYCP-3s	MONITORING WELL (DECOMMISSION BY OTHERS)
	SANITARY SEWER MANHOLE AND SEWER
	UTILITY POLE
	GUY WIRE
	EXISTING CATCH BASIN AND PIPE
	BENCHMARK
	FENCE
	PROPERTY LINE
	EXISTING CONTOUR
	PROPOSED CONTOUR (TOP OF ASPHALT)
?	POWER LINE 480V
EPM	ELECTRIC POWER METER
EB	ELECTRICAL BOX
CO	CLEANOUT
PV	POWER VAULT

KEYNOTES:

1. ABANDON SITE ENTRANCE. REMOVE GATES AND INSTALL NEW FENCE.
2. INSTALL NEW 16 FOOT WIDE ENTRANCE WITH GATES.

ROGER B NORTH
STATE OF WASHINGTON
43597
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 30' 60'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 30'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

COVER GRADING

DRAWING NO. 10 OF 13

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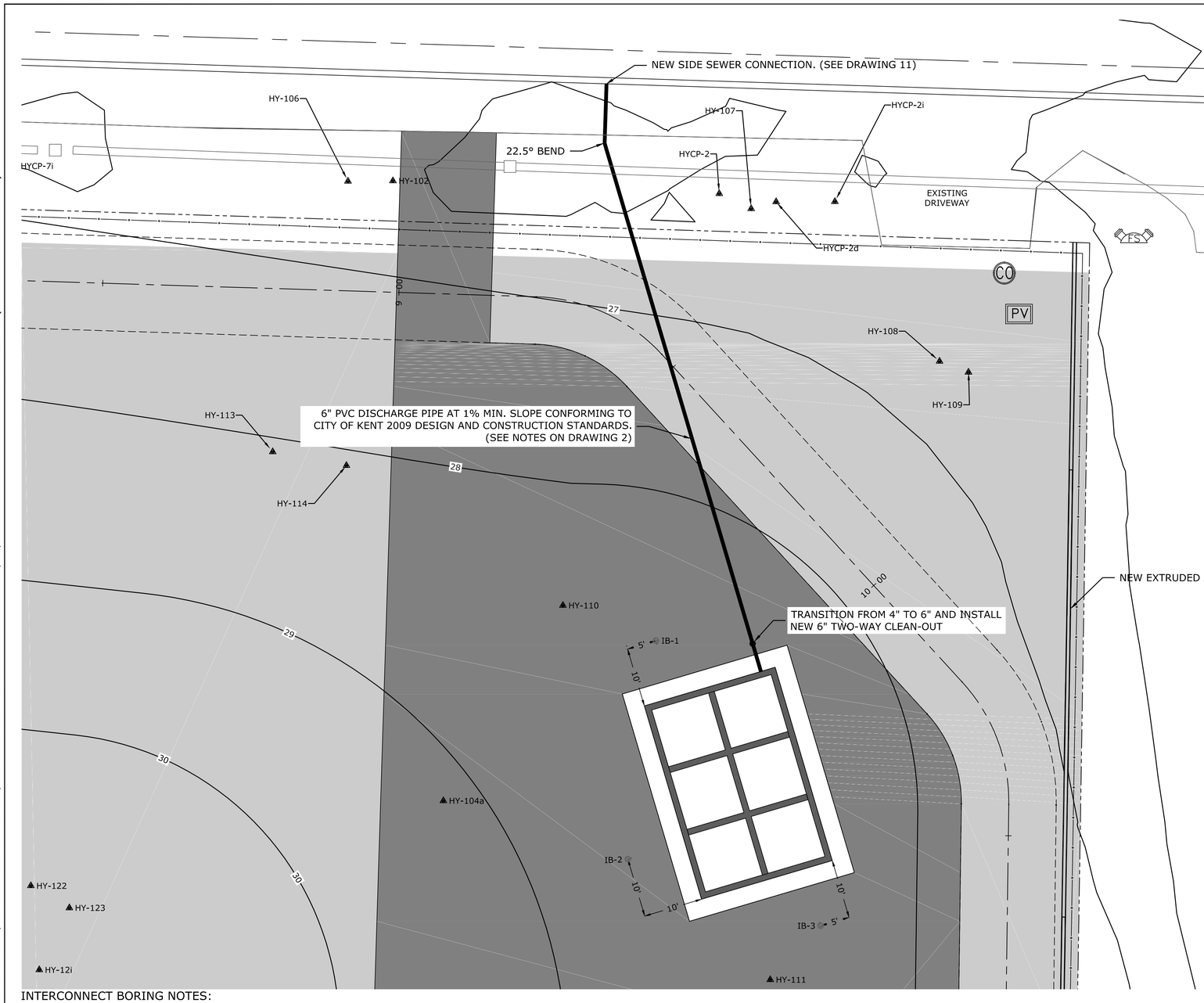

INTERCONNECT BORING NOTES:

1. BORINGS TO BE DRILLED USING A DRILL RIG EQUIPPED WITH NOMINAL 12-INCH INSIDE-DIAMETER HOLLOW STEM AUGERS.
2. AUGERS TO BE ADVANCED TO THE BOTTOM DEPTH/ELEVATION WITH A WOOD PLUG SEALING THE BOTTOM OF THE LEAD AUGER.
3. WHEN FINAL DEPTH IS REACHED, AUGERS TO BE FILLED WITH POTABLE WATER, THE WOOD PLUG KNOCKED OUT, AND 10X20 COLORADO SILICA SAND® POURED IN THE INTERIOR OF THE AUGERS.
4. SAND TO BE KEPT UP IN THE AUGERS AS THE AUGERS ARE WITHDRAWN.
5. SAND TO FILL EACH BORING FROM THE BOTTOM DEPTH TO A DEPTH 5 FEET BELOW PROPOSED FINAL GRADE ELEVATION.
6. EACH BORING TO BE FILLED FROM A DEPTH OF 5 FEET BELOW PROPOSED GRADE ELEVATION TO THE BOTTOM OF THE SURFACE PAVING WITH CONCRETE.
7. EACH BORING TO BE SURVEYED FOR HORIZONTAL LOCATION PRIOR TO PAVING OVER THE LOCATION.
8. SOIL GENERATED DURING DRILLING TO BE STOCKPILED WITH OTHER EXCAVATED SOILS.

Interconnect Boring Reference	Bottom of Boring Depth Below Existing Grade (ft)	Approximate Proposed Final Grade Elevation (ft)	Approximate Existing Grade Elevation (ft)	Proposed Bottom of Boring Elevation (ft)
IB-1	30	28.3	27.0	-3.0
IB-2	25	28.7	27.7	2.7
IB-3	27	28.2	27.7	0.7

LEGEND:

IB-1	INTERCONNECT BORING
SP-29	SOIL BORING OR SOIL PROBE
HY-123	MONITORING WELL (PROTECT)
HYCP-3s	MONITORING WELL (DECOMMISSION BY OTHERS)
	SANITARY SEWER MANHOLE AND SEWER
	UTILITY POLE
	GUY WIRE
	EXISTING CATCH BASIN AND PIPE
	BENCHMARK
	FENCE
	PROPERTY LINE
	EXISTING CONTOUR
	PROPOSED CONTOUR (TOP OF ASPHALT)
?	POWER LINE 480V
EPM	ELECTRIC POWER METER
EB	ELECTRICAL BOX
CO	CLEANOUT
PV	POWER VAULT

ROGER B NORTH
STATE OF WASHINGTON
43597
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 10' 20'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
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SCALE: 1" = 10'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

VAULT AREA DETAILS

DRAWING NO. 11 OF 13

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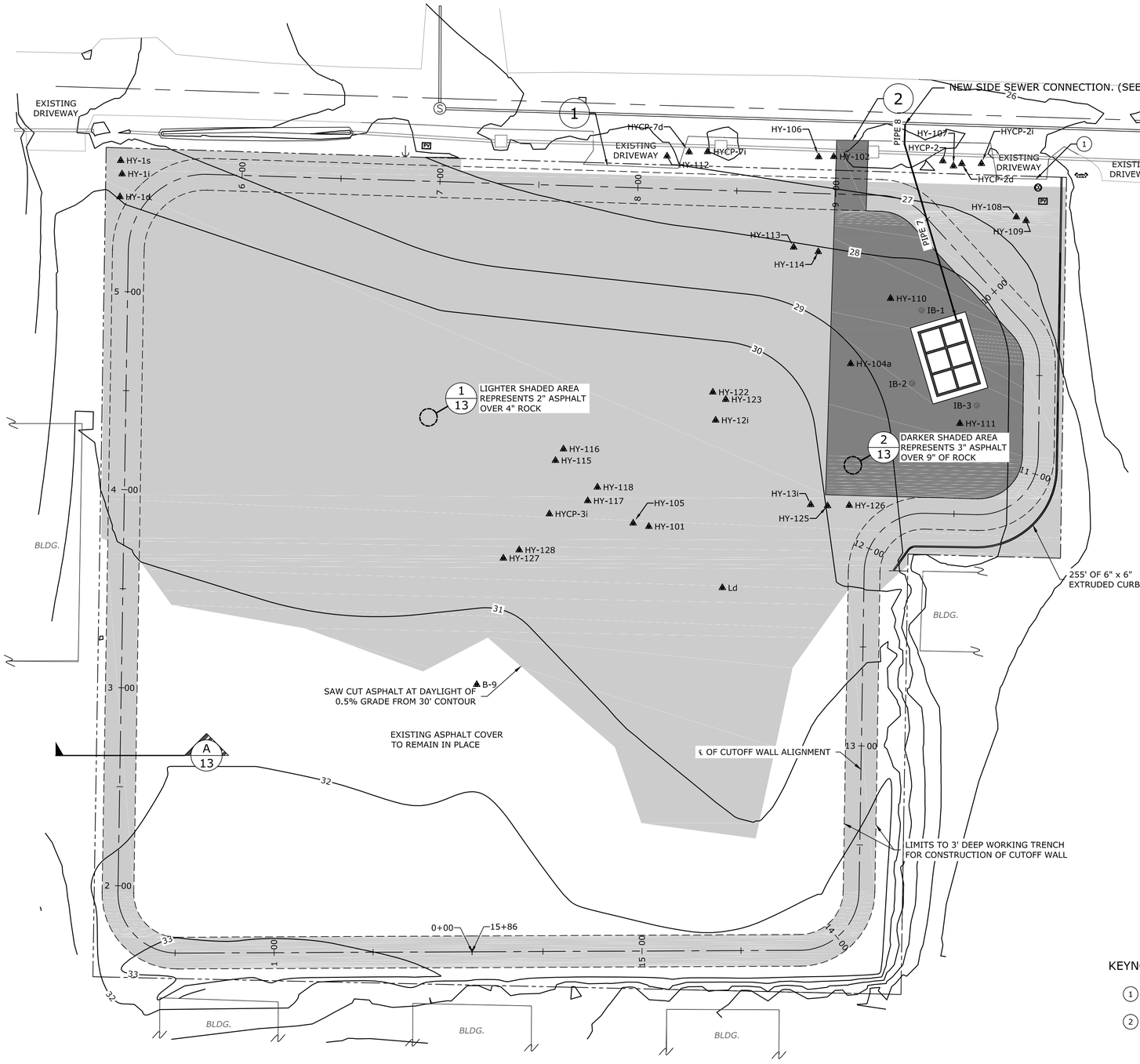

REDUCTION SCALE CHECK

1"

0 30' 60'

GRAPHICAL SCALE

LEGEND:

- IB-1 — INTERCONNECT BORING
- SP-29 — SOIL BORING OR SOIL PROBE
- HY-123 — MONITORING WELL (PROTECT)
- HYCP-3s — MONITORING WELL (DECOMMISSION BY OTHERS)
- SANITARY SEWER MANHOLE AND SEWER
- UTILITY POLE
- GUY WIRE
- EXISTING CATCH BASIN AND PIPE
- BENCHMARK
- FENCE
- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR (TOP OF ASPHALT)
- POWER LINE 480V
- EPM — ELECTRIC POWER METER
- EB — ELECTRICAL BOX
- CO — CLEANOUT
- PV — POWER VAULT

KEYNOTES:

1. ABANDON SITE ENTRANCE. REMOVE GATES AND INSTALL NEW FENCE.
2. INSTALL NEW 16 FOOT WIDE ENTRANCE WITH GATES

ROGER B NORTH
STATE OF WASHINGTON
43593
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VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
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SCALE: 1" = 30'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II

BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

FINAL COVER

DRAWING NO. 12 OF 13

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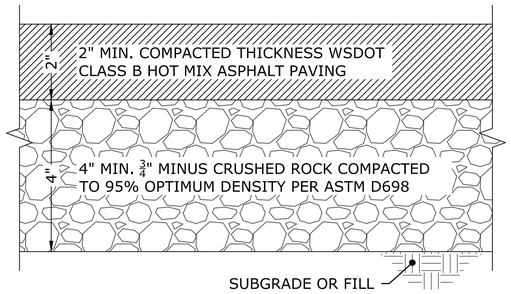
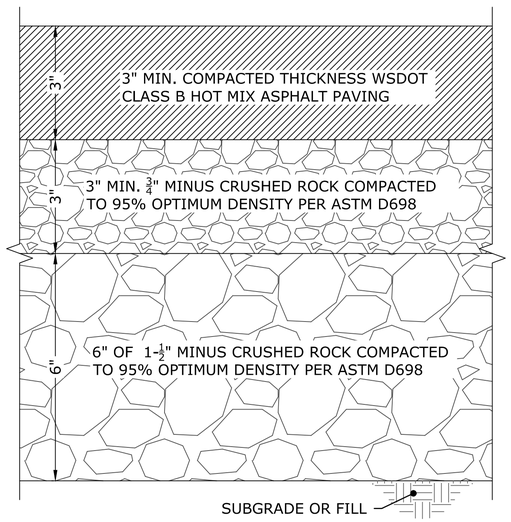


DETAIL 1/10 **TYPE 1 FINAL COVER SYSTEM**
N.T.S.



DETAIL 2/10 **TYPE 2 FINAL COVER SYSTEM**
N.T.S.

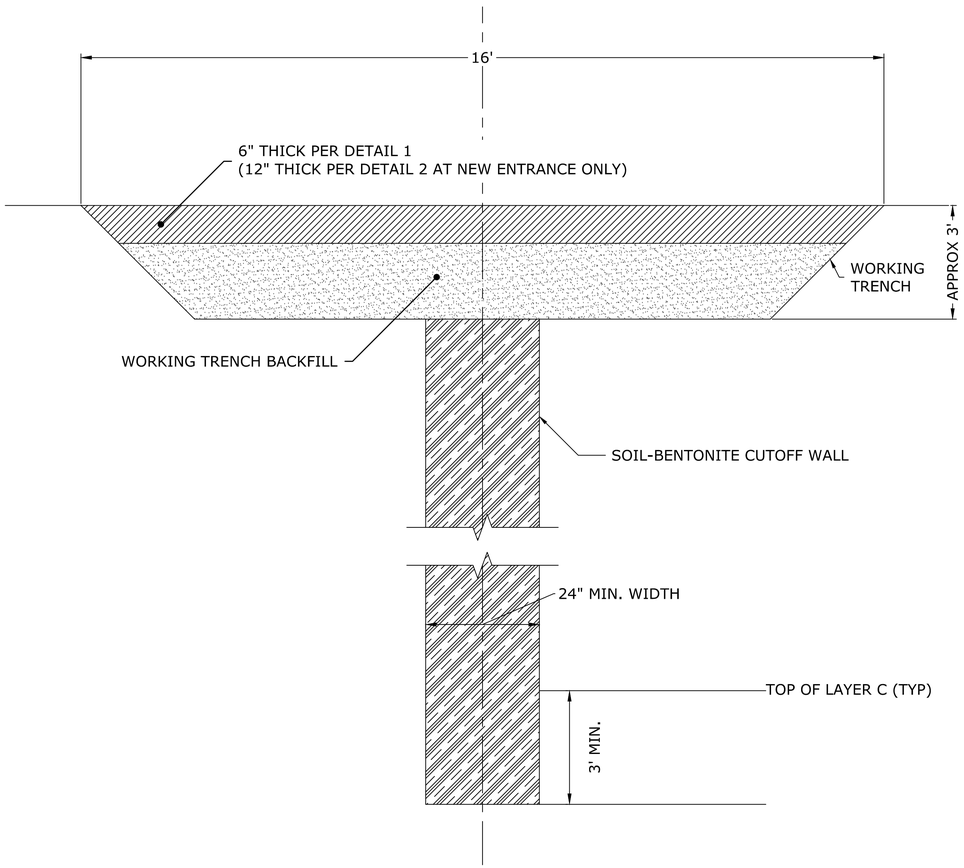
NOTES:

EXISTING MONITORING WELLS

1. PROTECT EXISTING MONITORING WELLS DURING GRADING AND PAVING ACTIVITIES.
2. SURVEY AND PLACE STEEL PLATE OVER EACH WELL SO LOCATIONS CAN BE DETERMINED AFTER GRADING AND PAVING BY SURVEY AND METAL DETECTOR.
3. NOTIFY OWNER IF ANTICIPATED FINISHED PAVED SURFACE WILL BE LESS THAN 1 FT ABOVE EXISTING MONITORING WELL COVER.
4. PERFORM GRADING AND PAVING OVER PROTECTED MONITORING WELLS.

COVER SYSTEM FILL

1. USE SOIL EXCAVATED FROM WORKING TRENCH AND REACTOR VAULT.
2. PLACE IN 6-INCH THICK MAXIMUM LIFTS.
3. COMPACT TO A MINIMUM OF 90 PERCENT OF MODIFIED PROCTOR (ASTM D1557) MAXIMUM DRY DENSITY.



SECTION A/10 **WORKING TRENCH SECTION**
N.T.S.

REDUCTION SCALE CHECK
1"

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4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

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SCALE: N.T.S.

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON
DETAILS

DRAWING NO. 13 OF 13

CONSTRUCTION DRAWINGS
FINAL CLEANUP ACTION PHASE I

FOR

BSB DIVERSIFIED, INC. PROPERTY
8202 S. 200TH STREET, KENT, WASHINGTON

AUGUST 2009

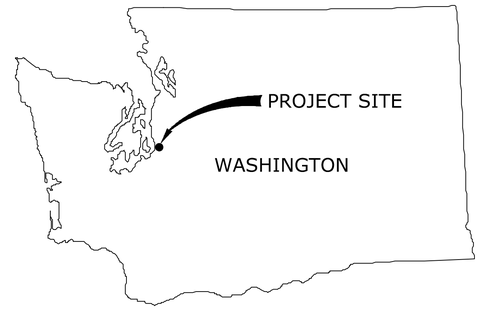
(REVISED JULY 2011)

PREPARED FOR:

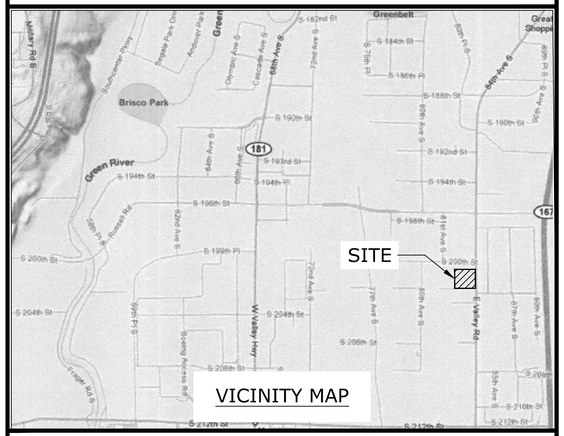
BSB DIVERSIFIED, INC.

C/O BURT GEOLOGY AND ENVIRONMENTAL APPLICATIONS PLLC
902 GRAPEVINE LANE
NASHVILLE, TENNESSEE 37221
PH. (615) 828-6126
RON BURT (OWNER'S REPRESENTATIVE)

AS-BUILT REDLINES
10/16/13



REGIONAL MAP



VICINITY MAP

ENVIRONMENTAL ENGINEER:

PES Environmental, Inc.
Engineering & Environmental Services

1215 4TH AVENUE - SUITE 1350
SEATTLE, WASHINGTON 98161
PH. 206-529-3980
FX. 206-529-3985
BRIAN O'NEAL P.E. (PROJECT MANAGER)

CIVIL ENGINEER:

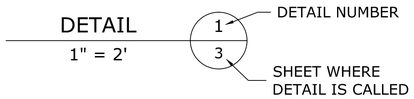
VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
PH. (503) 922-2522
ROGER NORTH P.E. (PROJECT MANAGER)

STRUCTURAL ENGINEER:

LIVERMORE ASSOCIATES, INC.
140 SW ARTHUR STREET, SUITE 200
PORTLAND, OREGON 97201
PH. 503-892-3002
FX. 503-892-3003
GARY LIVERMORE P.E. (PROJECT MANAGER)

DETAIL INDICATOR:

SHEET WHERE DETAIL IS SHOWN:



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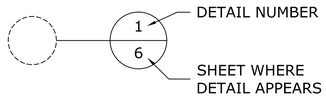

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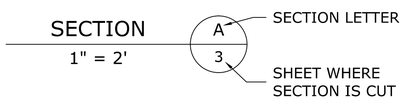

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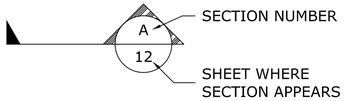

ABBREVIATIONS:

AC	ACRES	FT	FEET
BLDG	BUILDING	G.B.	GRADE BREAK
℄	CENTERLINE	GALV	GALVANIZED
CO	CLEANOUT	HORIZ	HORIZONTAL
DIA or Ø	DIAMETER	HP	HIGH POINT
DWG	DRAWING	ID	INSIDE DIAMETER
E	EAST	I.E.	INVERT ELEVATION
EL or ELEV	ELEVATION	L	LENGTH
FT	FEET	L.F.	LINEAR FEET
H or h	HEIGHT	N	NORTH
HDPE	HIGH DENSITY POLYETHYLENE	N.I.C.	NOT IN CONTRACT
E	EAST	OD	OUTSIDE DIAMETER
EL OR ELEV	ELEVATION	℄	PROPERTY LINE
EXIST OR EX	EXISTING	S	SLOPE IN FEET/FOOT
		TYP	TYPICAL

Sheet List Table

Sheet Number	Sheet Title
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5	ZVI REACTOR VAULT PLAN VIEW
6	REACTOR VAULT PLAN & DETAIL 1
7	REACTOR VAULT SECTIONS A-C
8	REACTOR VAULT SECTIONS D-E

S0.1 STRUCTURAL GENERAL NOTES
S1.1 FOUNDATION PLAN AND DETAILS
S1.2 DETAILS

APPROVED:

ENGINEER OF RECORD - ROGER B. NORTH, P.E.

7/15/11
DATE

GENERAL NOTES:

1. CONTRACTOR SHALL PROCURE AND CONFORM TO ALL CONSTRUCTION PERMITS REQUIRED BY THE CITY. OWNER TO PAY ALL PROJECT PERMIT COSTS. CONTRACTOR SHALL PROVIDE OWNER 48 HOURS NOTICE PRIOR TO REQUIRING PAYMENT FOR PERMITS.
2. THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO COMPLETE THE PROJECT IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DRAWINGS INCLUDING SUCH INCIDENTALS AS MAY BE NECESSARY TO MEET APPLICABLE AGENCY REQUIREMENTS AND PROVIDE A COMPLETED PROJECT.
3. ANY INSPECTION BY THE CITY OR OTHER AGENCIES SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM THE WORK IN STRICT COMPLIANCE WITH THE CONTRACT DOCUMENTS, APPLICABLE CODES AND AGENCY REQUIREMENTS.
4. CONTRACTOR SHALL ERECT AND MAINTAIN BARRICADES, WARNING SINGS, TRAFFIC CONES PER CITY REQUIREMENTS IN ACCORDANCE WITH THE MUTCD (INCLUDING WASHINGTON AMENDMENTS). ACCESS TO DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES. ALL TRAFFIC CONTROL MEASURES SHALL BE APPROVED AND IN PLACE PRIOR TO ANY CONSTRUCTION ACTIVITY.
5. CONTRACTOR SHALL BE LICENSED WITH THE CONSTRUCTION CONTRACTOR BOARD.
6. ELEVATIONS ARE BASED ON NAVD 1988 DATUM.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MANAGING CONSTRUCTION ACTIVITIES TO ENSURE THAT PUBLIC STREETS AND RIGHT-OF-WAYS ARE KEPT CLEAN OF MUD, DUST OR DEBRIS. DUST ABATEMENT SHALL BE MAINTAINED BY ADEQUATE WATERING OF THE SITE BY THE CONTRACTOR.

EXISTING UTILITIES & FACILITIES:

1. CONTRACTOR SHALL PROTECT EXISTING GROUNDWATER TREATMENT FACILITIES AND EQUIPMENT. ANY DAMAGE TO SAME WILL BE REPAIRED BY CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
2. THE CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF APPROVED DRAWINGS ON THE CONSTRUCTION SITE AT ALL TIMES WHEREON HE WILL RECORD ANY APPROVED DEVIATIONS IN CONSTRUCTION FROM THE APPROVED DRAWINGS, AS WELL AS THE STATION LOCATIONS AND DEPTHS OF ALL EXISITNG UTILITIES ENCOUNTERED. THESE FIELD RECORD DRAWINGS SHALL BE KEPT UP TO DATE AT ALL TIMES AND SHALL BE AVAILABLE FOR INSPECTION BY THE OWNER UPON REQUEST. FAILURE TO CONFORM TO THIS REQUIREMENT MAY RESULT IN DELAY OF PAYMENT AND/OR FINAL ACCEPTANCE OF THE PROJECT.
3. UPON COMPLETION OF CONSTRUCTION OF ALL NEW FACILITIES, CONTRACTOR SHALL SUBMIT A CLEAN SET OF FIELD RECORD DRAWINGS CONTAINING ALL AS-BUILT DRAWINGS TO THE OWNER FOR USE IN THE PREPARATION OF AS-BUILT DRAWINGS. ALL INFORMATION SHOWN ON THE CONTRACTORS FIELD RECORD DRAWINGS SHALL BE SUBJECT TO VERIFICATION BY THE ENGINEER. IF SIGNIFICANT ERRORS OR DEVIATIONS ARE NOTED BY THE ENGINEER, AN AS-BUILT SURVEY PREPARED AND STAMPED BY A REGISTERED PROFESSIONAL LAND SURVEYOR AND/OR QUALIFIED ENGINEER SHALL BE COMPETED AT THE CONTRACTOR'S EXPENSE.
4. THE LOCATION AND DESCRIPTIONS OF EXISTING UTILITIES SHOWN ON THE DRAWING, ARE COMPILED FROM AVAILABLE RECORDS AND/OR FIELD SURVEYS. THE ENGINEER OR UTILITY COMPANIES DO NOT GUARANTEE THE ACCURACY OR THE COMPLETENESS OF SUCH RECORDS. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND SIZES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
5. THE CONTRACTOR SHALL LOCATE AND MARK ALL EXISTING PROPERTY AND STREET MONUMENTS PRIOR TO CONSTRUCTION. ANY MONUMENTS DISTURBED DURING CONSTRUCTION OF THE PROJECT SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR AT THE CONTRACTORS EXPENSE.
6. CONTRACTOR SHALL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING POTENTIAL UTILITY CONFLICTS FAR ENOUGH AHEAD OF CONSTRUCTION TO MAKE NECESSARY CONSTRUCTION MODIFICATIONS WITHOUT DELAYING THE WORK.
7. ALL FACILITIES SHALL BE MAINTAINED IN-PLACE BY THE CONTRACTOR UNLESS OTHERWISE SHOWN OR DIRECTED. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO SUPPORT, MAINTAIN, OR OTHERWISE PROTECT EXISTING UTILITIES AND OTHER FACILITIES AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR TO LEAVE EXISTING MONITORING WELLS, AND OTHER FACILITIES IN AN EQUAL OR BETTER-THAN-ORIGINAL CONDITION AND TO THE SATISFACTION OF THE OWNER.
8. UTILITIES OR INTERFERING PORTIONS OF UTILITIES THAT ARE ABANDONED IN PLACE SHALL BE REMOVED BY THE CONTRACTOR TO THE EXTENT NECESSARY TO ACCOMPLISH THE WORK. THE CONTRACTOR SHALL PLUG THE REMAINING EXPOSED ENDS OF ABANDONED UTILITIES.
9. ALL PIPED UTILITIES ABANDONED IN PLACE SHALL HAVE ALL OPENINGS CLOSED WITH CONCRETE PLUGS WITH A MINIMUM LENGTH EQUAL TO 2 TIMES THE DIAMETER OF THE ABANDONED PIPE.
10. ANY WELLS TO BE DECOMISSIONED SHALL BE ABANDONED PER STATE REQUIREMENTS.

TESTING AND INSPECTION

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THAT ALL REQUIRED OR NECESSARY INSPECTIONS ARE COMPLETED BY THE OWNER'S AUTHORIZED INSPECTORS PRIOR TO PROCEEDING WITH SUBSEQUENT WORK WHICH COVERS OR THAT IS DEPENDENT ON THE WORK TO BE INSPECTED. FAILURE TO OBTAIN NECESSARY INSPECTION(S) AND APPROVAL(S) SHALL RESULT IN THE CONTRACTOR BEING FULLY RESPONSIBLE FOR ALL PROBLEMS ARISING FROM UNINSPECTED WORK.

GRADING, & DRAINAGE:

1. CLEAR AND GRUB WITHIN WORK LIMITS ALL SURFACE VEGETATION, TREES, STUMPS, BRUSH, ETC.
2. ALL TREES, BRUSH AND DEBRIS ASSOCIATED WITH CLEARING, STRIPPING OR GRADING SHALL BE REMOVED AND DISPOSED OF OFF-SITE.
3. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, STRAIGHT GRADES SHALL BE RUN BETWEEN ALL FINISH GRADE ELEVATIONS AND/OR FINISH CONTOUR LINES SHOWN.
4. FINISH PAVEMENT GRADES AT TRANSITION IN EXISTING PAVEMENT SHALL MATCH EXISTING PAVEMENT GRADES OR BE FEATHERED PAST JOINTS WITH EXISTING PAVEMENT AS REQUIRED TO PROVIDE A SMOOTH, FREE DRAINING SURFACE.
5. ALL EXISTING OR CONSTRUCTED MANHOLES, CLEANOUTS, MONUMENTS, GAS VALVES, WATER VALVES AND SIMILAR STRUCTURES SHALL BE ADJUSTED TO MATCH FINISH GRADES OF THE PAVEMENT, SIDEWALK, LANDSCAPED AREA OR MEDIAN STRIP WHEREIN THEY LIE.
6. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, NO CUT OR FILL SLOPES SHALL BE CONSTRUCTED STEEPER THAN 2H:1V.

UTILITIES:

1. THE END OF ALL UTILITY STUBS SHALL BE MARKED WITH A 2X4 COLOR CODED TAG WIRED TO THE PIPE STUB.
2. ALL NON-METALLIC WATER, SANITARY AND STORM SEWER PIPING SHALL HAVE 14 GAUGE COLOR CODED TRACER WIRE INSTALLED AS PER CITY OF KENT DETAILS.
3. SANITARY SEWER LATERALS TO BE RUN TO EDGE OF R.O.W. AT 1/4" PER 12" SLOPE. LATERALS TO BE INSTALLED DOWNSTREAM OF MAINLINE CLEAN OUTS AND/OR MANHOLES. ALL CATCH BASINS TO HAVE 8" PVC. SDR-35 LATERALS. CATCH BASIN LOCATION MAY BE MODIFIED TO ACCOMMODATE LOW SPOTS CREATED DURING CONSTRUCTION. ENGINEER AND/OR CITY PROJECT MANAGER MAY REQUIRE ADDITIONAL CATCH BASINS TO BE PLACED AT LOW SPOTS CREATED DURING CONSTRUCTION.
4. CONTRACTOR TO MAKE MINOR ADJUSTMENT TO SERVICE LOCATIONS, WHERE NECESSARY, TO AVOID CONFLICT. MAINTAIN 5' MINIMUM SEPARATION BETWEEN STORM AND SANITARY AND 10' MIN. SEPARATION BETWEEN SANITARY AND WATER, 1' TO MANHOLES OR CATCH BASINS AND 5' BETWEEN MANHOLES AND CATCH BASINS. MAINTAIN 1' VERTICAL AND 2' HORIZONTAL SEPARATION BETWEEN CITY AND PRIVATE FRANCHISE UTILITY SERVICES AND 2' HORIZONTAL SEPARATION BETWEEN CITY UTILITIES IN A COMMON TRENCH.

WATER SYSTEM:

1. CITY FORCES TO OPERATE ALL VALVES INCLUDING FIRE HYDRANTS ON EXISTING PUBLIC MAINS.
2. ALL WATER SUPPLY PIPE SHALL BE PVC C-900 COLORED BLUE THROUGHOUT THE ENTIRE COMPOSITION OF THE PIPE. ALL FITTINGS SHALL BE DUCTILE IRON FITTINGS IN CONFORMANCE WITH AWWA C-153 AND NSF 61. THE MINIMUM WORKING PRESSURE FOR ALL MJ CAST IRON OR DUCTILE IRON FITTINGS 4-INCHES THROUGH 24-INCH IN DIAMETER SHALL BE 350 PSI FOR MJ FITTING AND 250 PSI FOR FLANGED FITTINGS.
3. MATERIALS THAT COME INTO CONTACT WITH POTABLE WATER SHALL MEET NATIONAL SANITATION FOUNDATION STANDARD 61, SECTION 9 REQUIREMENTS.
4. ALL WATER MAINS TO BE INSTALLED WITH A MINIMUM 36 INCH COVER TO FINISH GRADE UNLESS OTHERWISE NOTED OR DIRECTED. SERVICE LINE TO BE INSTALLED WITH A MINIMUM 24 INCH COVER.

VALVES IN ZVI REACTOR VESSEL:

1. FURNISH AND INSTALL COMPLETE VALVE ASSEMBLIES FOR INLET AND OUTLET PIPES.
2. VALVES SHALL BE TYPE 57 BUTTERFLY VALVES MANUFACTURED BY ASAHI-AMERICA.
3. VALVES SHALL BE 4-INCH NOMINAL DIAMETER.
4. VALVES SHALL BE LEVER-OPERATED BUTTERFLY VALVES WITH TWO-PIECE STEM AND HOUSING EXTENSIONS.
5. STEM AND HOUSING EXTENSIONS SHALL BE SUPPORTED TO WALL OF ZVI REACTOR VESSEL.
6. VALVE LEVER HANDLES SHALL HAVE PROVISION FOR A PADLOCK.
7. VALVE LEVERS TO BE POSITIONED AT LOCATIONS OPERABLE FROM THE ACCESS DOOR THROUGH THE TOP OF THE REACTOR VESSEL.
8. VALVES SHALL BE SUPPLIED WITH FLANGES AT EACH END FOR CONNECTION TO FLANGES ON ENDS OF ADJACENT 4-INCH DIAMETER SDR 17 HDPE PIPE.
9. MANUFACTURERS OTHER THAN ASAHI-AMERICA SHALL BE ISO-9001 CERTIFIED AND SHALL PROVIDE DOCUMENTATION THAT PROPOSED PRODUCT IS AT LEAST EQUIVALENT TO SPECIFIED PRODUCT.

ROGER B NORTH
STATE OF WASHINGTON
43593
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	05/28/09	PHASE I REVIEW	RN	STM	RN
1	06-10-11	CHANGE ORDER #8	RN	STM	RN
2	07-11-11	C/O #8 UPDATE	RN	STM	RN
3	10/25/11	PIPING CHANGES	RN	STM	RN
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

SCALE: AS SHOWN

DATE: 10/26/2011

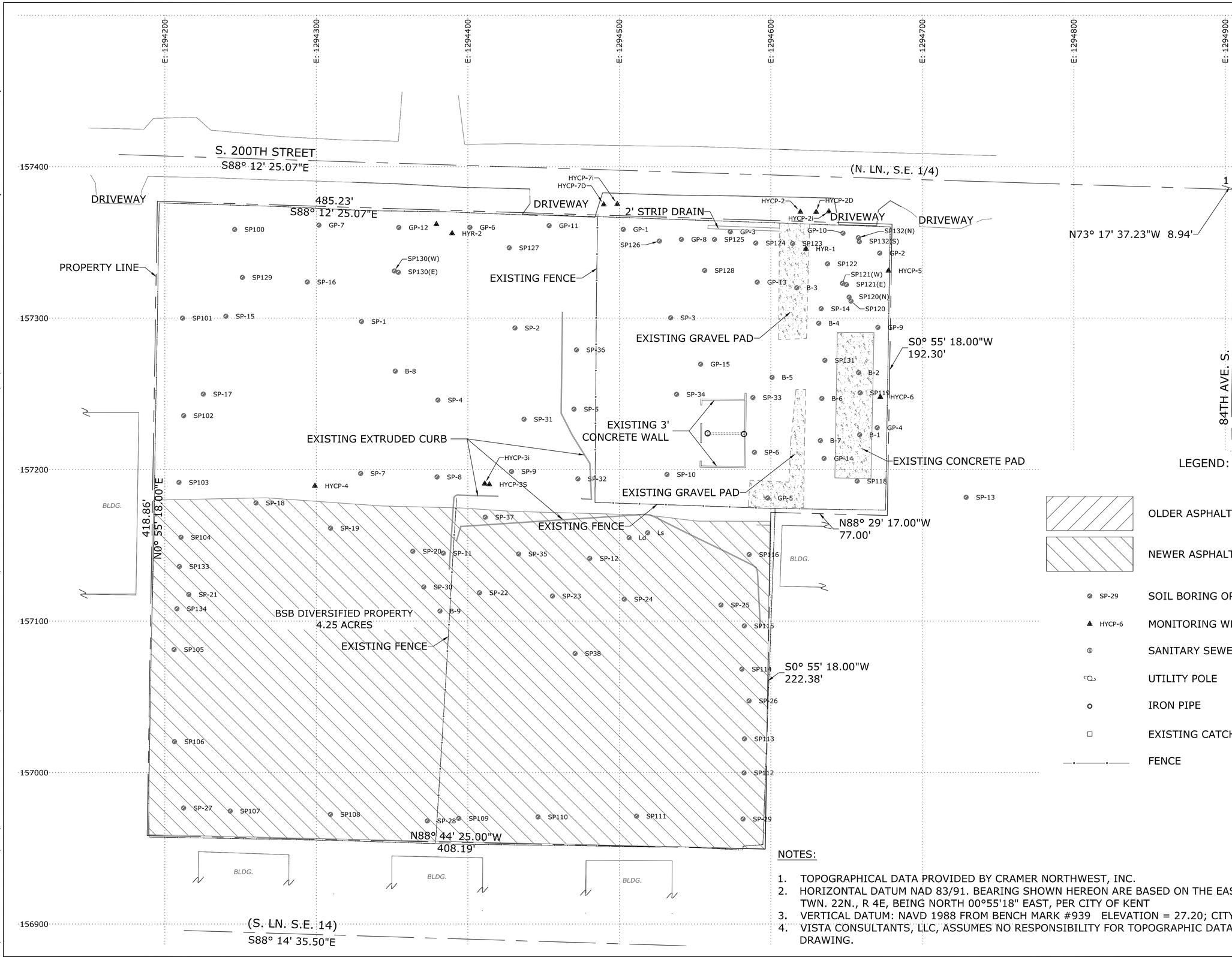
FINAL CLEANUP ACTION
FINAL CLEANUP DRAWINGS
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

NOTES

DRAWING NO. 2 OF 8

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 1 CLEANUP DRAWINGS\LEGEND AND NOTES.DWG PLOTTED: 10/26/2011 7:00 PM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 1 CLEANUP DRAWINGS\EXISTING SITE PLAN.DWG PLOTTED: 10/26/2011 7:00 PM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)



LEGEND:

- OLDER ASPHALT PAVING
- NEWER ASPHALT PAVING
- SP-29 SOIL BORING OR SOIL PROBE
- HYCP-6 MONITORING WELL
- SANITARY SEWER MANHOLE
- UTILITY POLE
- IRON PIPE
- EXISTING CATCH BASIN
- FENCE

NOTES:

1. TOPOGRAPHICAL DATA PROVIDED BY CRAMER NORTHWEST, INC.
2. HORIZONTAL DATUM NAD 83/91. BEARING SHOWN HEREON ARE BASED ON THE EAST LINE OF S.E. 1/4 SEC. 1, TWN. 22N., R 4E, BEING NORTH 00°55'18" EAST, PER CITY OF KENT
3. VERTICAL DATUM: NAVD 1988 FROM BENCH MARK #939 ELEVATION = 27.20; CITY OF KENT, WASHINGTON.
4. VISTA CONSULTANTS, LLC, ASSUMES NO RESPONSIBILITY FOR TOPOGRAPHIC DATA PRESENTED IN THIS DRAWING.

ROBERT B NORTH
STATE OF WASHINGTON
43591
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 30' 60'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	05/28/09	PHASE I REVIEW	RN	STM	RN
1	06-10-11	CHANGE ORDER #8	RN	STM	RN
2	07-11-11	C/O #8 UPDATE	RN	STM	RN
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-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

SCALE: AS SHOWN

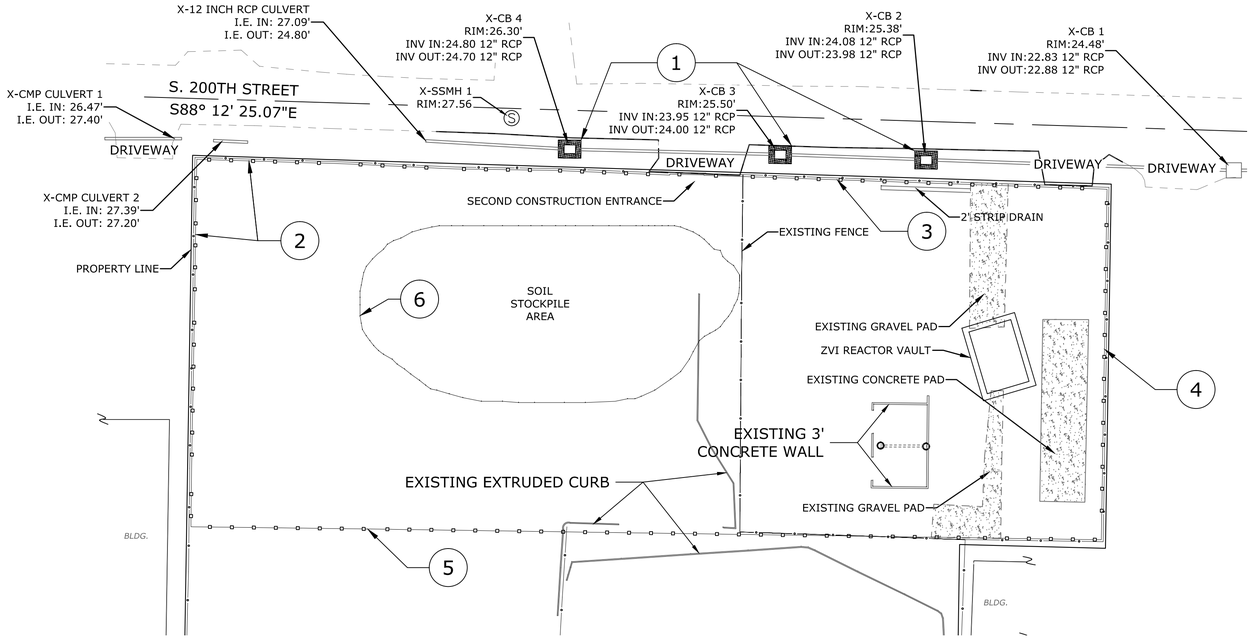
DATE: 10/26/2011

FINAL CLEANUP ACTION
FINAL CLEANUP DRAWINGS
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

EXISTING SITE PLAN

DRAWING NO. 3

OF 8

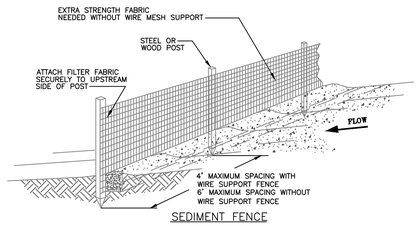


EROSION CONTROL NOTES:

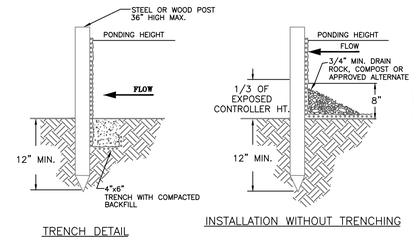
1. SILT FABRIC SHALL BE PLACED OVER THE CATCH BASIN INLETS SO THAT NO SEDIMENT WILL ACCUMULATE IN THE CATCH BASINS.
2. THE CONTRACTOR SHALL INSPECT SITE AND ENTRANCE DRIVEWAY DAILY AND WASH AS NEEDED SO THAT NO SEDIMENT IS WASHED OR CARRIED OFF-SITE.
3. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED.
4. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
5. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
6. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY.
7. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

NOTES FOR SEDIMENT FENCES:

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND SHALL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST, OR OVERLAP 2"X 2" POSTS AND ATTACHED AS SHOWN ON DETAIL.
2. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS WHERE FEASIBLE. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 18 INCHES.
3. THE FILTER FABRIC SHALL HAVE A MINIMUM VERTICAL BURIAL OF 6 INCHES. ALL EXCAVATED MATERIAL FROM FILTER FABRIC FENCE INSTALLATION SHALL BE BACKFILLED AND COMPACTED ALONG THE ENTIRE DISTURBED AREA.
4. STANDARD OR HEAVY DUTY FILTER FABRIC FENCE SHALL HAVE MANUFACTURED STITCHED LOOPS FOR 2"X 2" POST INSTALLATION. STITCHED LOOPS SHALL BE INSTALLED ON THE UPHILL SIDE OF THE SLOPED AREA.
5. FILTER FABRIC FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED.
6. FILTER FABRIC FENCES SHALL BE INSPECTED BY APPLICANT/CONTRACTOR IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.



SEDIMENT FENCE



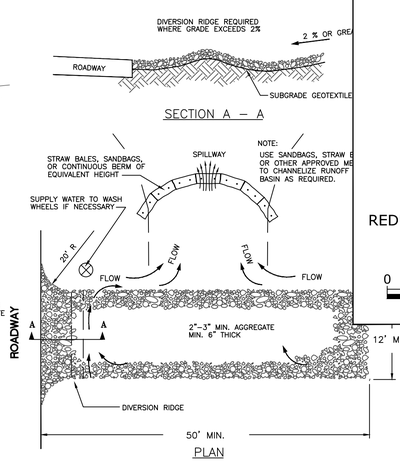
TRENCH DETAIL

INSTALLATION WITHOUT TRENCHING

NOTES:

1. SEDIMENT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
2. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN IT EXCEEDS 1/3 THE EXPOSED HEIGHT OF CONTROLLER STORAGE DEPTH.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

SILT FENCE STANDARD DETAILS



NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

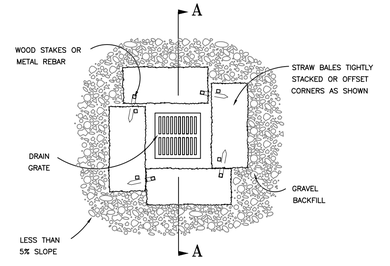
GRAVEL CONSTRUCTION ENTRANCE DETAIL

CONSTRUCTION NOTES:

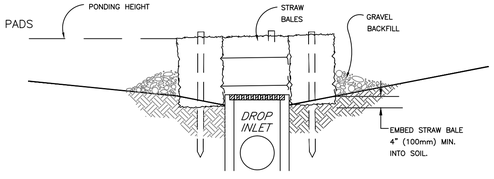
1. INSTALL STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER
2. INSTALL 430 LF SILT FENCE
3. INSTALL 190 LF SILT FENCE
4. INSTALL 190 LF SILT FENCE
5. INSTALL 480 LF SILT FENCE
6. INSTALL STRAW BALES AROUND SOIL STOCKPILE AREA. ALL STOCKPILED SOILS SHALL BE COVERED DAILY.

OTHERS NOTES:

1. CLEAR AND GRUB ALL VEGETATION
2. REMOVE FENCES, CURBS, WALLS AND CONCRETE PADS



PLAN VIEW



SECTION A–A

NOTES:

1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%).
2. EMBED THE BALES 4" (100mm) INTO THE SOIL AND OFFSET CORNERS OR PLACE BALES WITH ENDS TIGHTLY ABUTTING. GRAVEL BACKFILL WILL PREVENT EROSION OR FLOW AROUND THE BALES. STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION. DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. EXCAVATION OF A BASIN ADJACENT TO THE DROP INLET OR A TEMPORARY DIKE ON THE DOWNSLOPE OF THE STRUCTURE MAY BE NECESSARY.

ROGER B. NORTH
STATE OF WASHINGTON
43597
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 40' 80'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	05/28/09	PHASE I REVIEW	RN	STM	RN
1	06-10-11	CHANGE ORDER #8	RN	STM	RN
2	07-11-11	C/O #8 UPDATE	RN	STM	RN
3	10/25/11	PIPING CHANGES	RN	STM	RN

SCALE: AS SHOWN

DATE: 10/26/2011

FINAL CLEANUP ACTION
FINAL CLEANUP DRAWINGS
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

EROSION CONTROL PLAN

DRAWING NO. 4

OF 8

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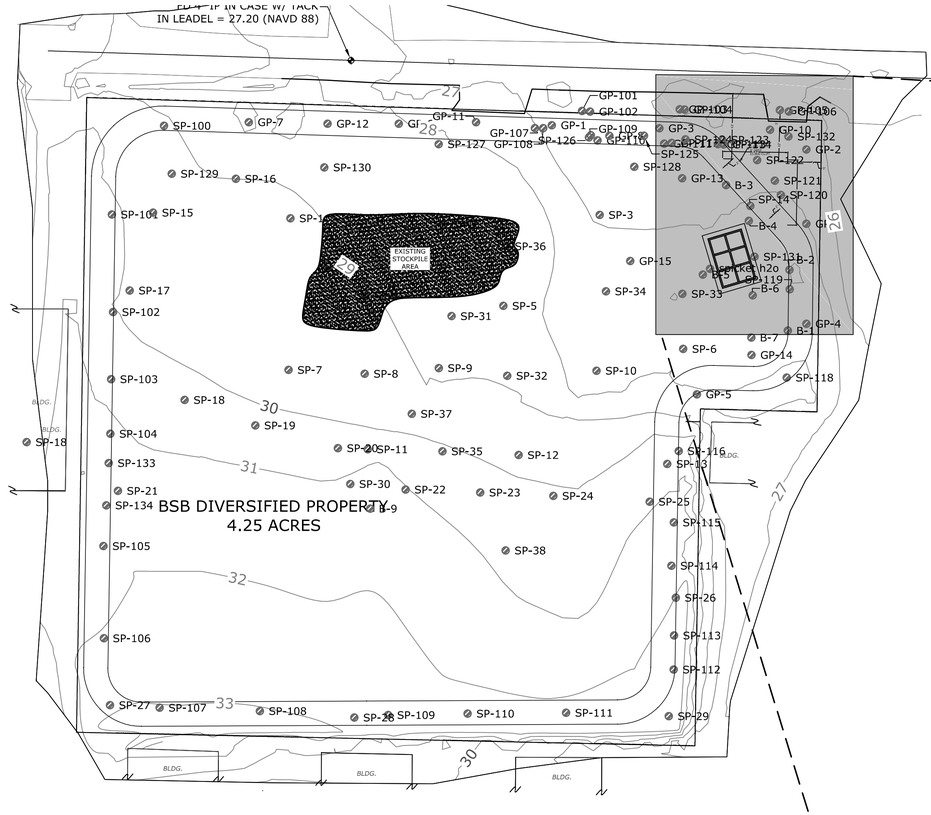

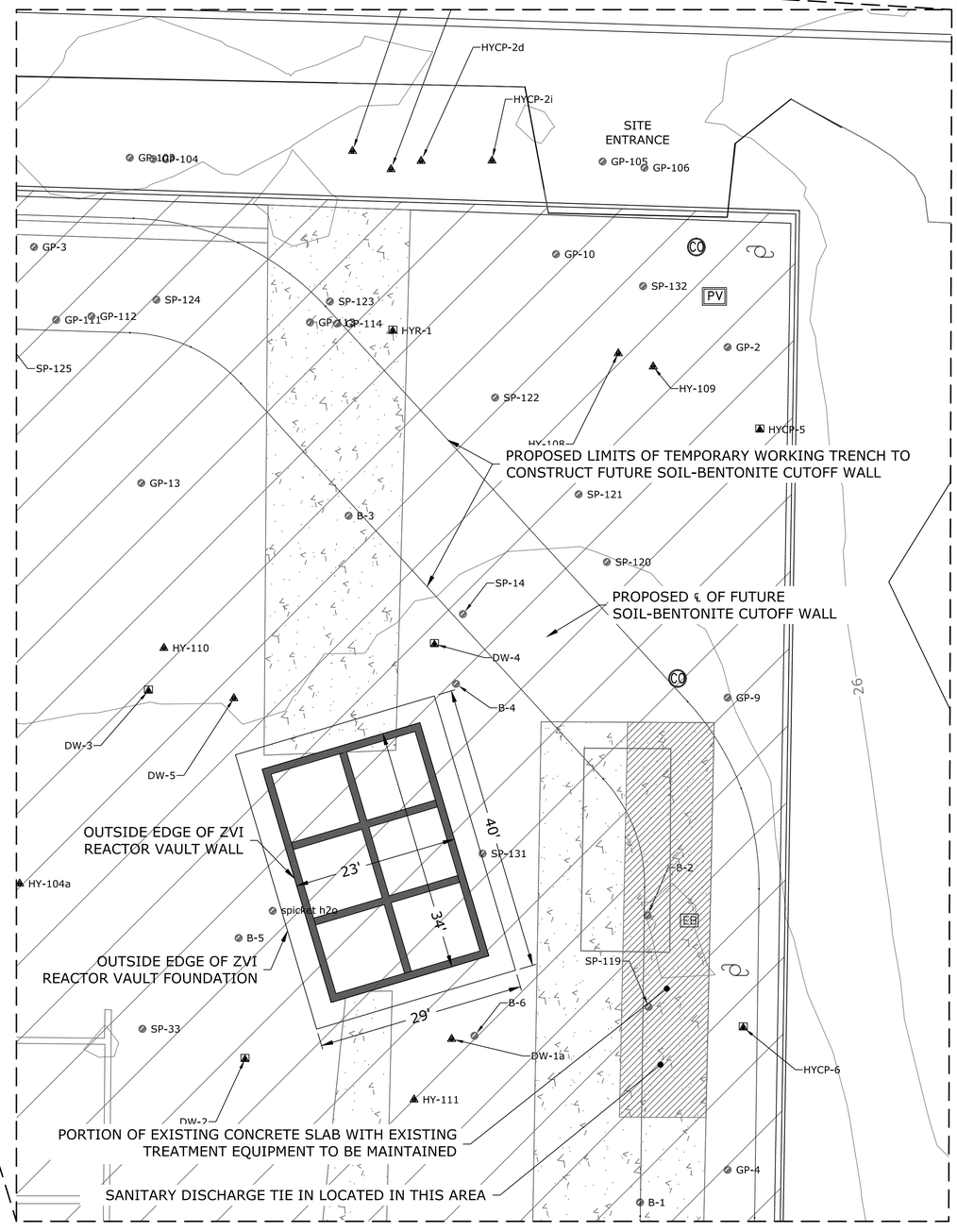

LEGEND:

⊘	SP-29	SOIL BORING OR SOIL PROBE
▲	HY-123	MONITORING WELL (PROTECT)
▲	HYCP-3s	MONITORING WELL (DECOMMISSION)
		UTILITY POLE
		GUY WIRE
EPM		ELECTRIC POWER METER
EB		ELECTRICAL BOX
CO		CLEANOUT
PV		POWER VAULT

ROGER B NORTH
STATE OF WASHINGTON
43597
REGISTERED
PROFESSIONAL ENGINEER

N

REDUCTION SCALE CHECK
1"
0 10' 20'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

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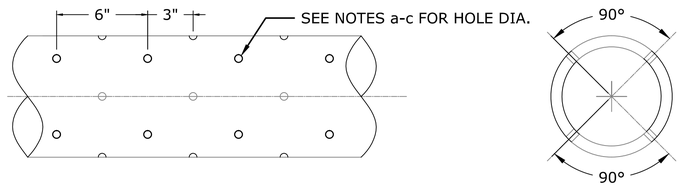
FINAL CLEANUP DRAWINGS
FINAL CLEANUP DRAWINGS
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

ZVI REACTOR VAULT PLAN VIEW

DRAWING NO. 5 OF 8



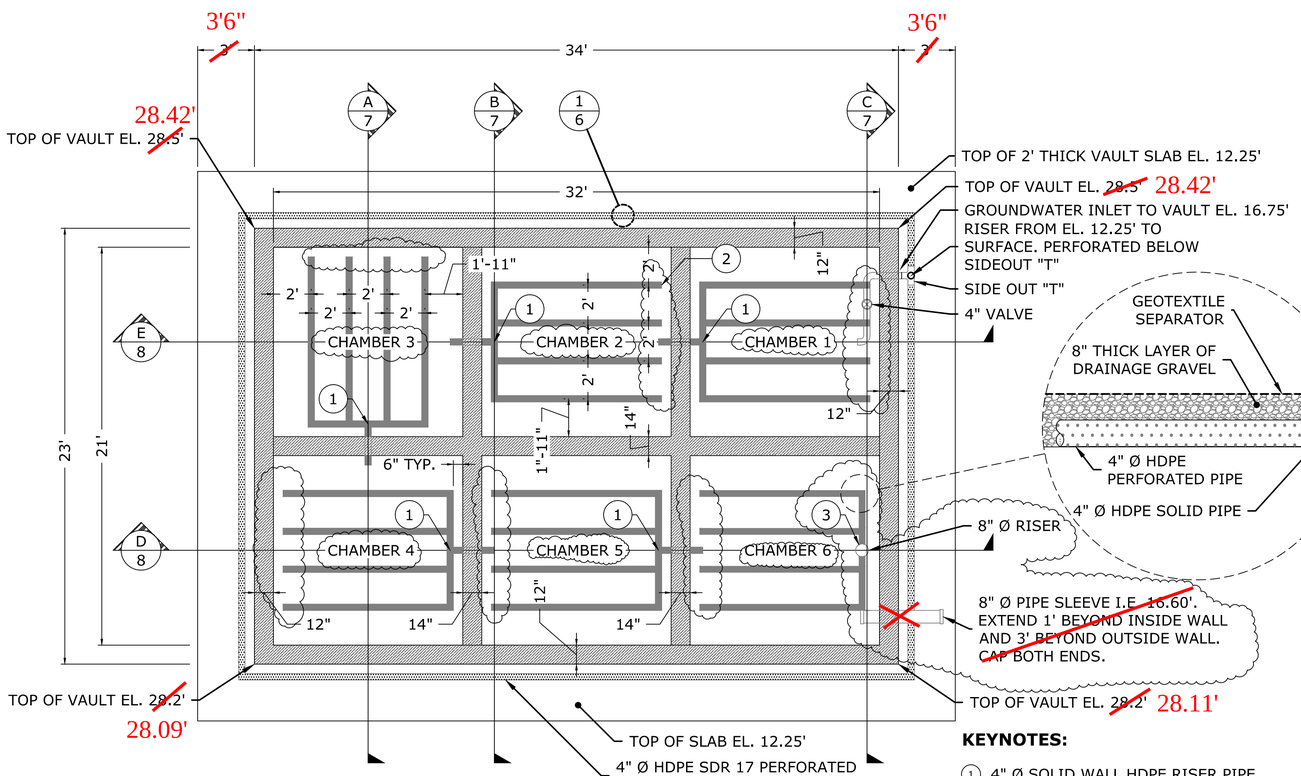
DETAIL NOTES:

a. HOLES SHALL BE DRILLED AT 90° CIRCUMFERENCE AROUND PIPE. SUCCESSIVE ROWS SHALL BE SEPARATED BY 3" AND STAGGERED.
b. HOLE DIAMETER SHALL BE 3/8" FOR ALL PERFORATED HDPE PIPE.
c. REMOVE INTERIOR WELD BEADS AND ALL CUTTINGS INSIDE AND OUT BEFORE PIPE IS INSTALLED.

CONSTRUCTION NOTES:

1. PROVIDE PIPE SADDLE CLAMP SUPPORTS (STANDON MODEL C92 [www.standon.net], OR APPROVED ALTERNATE) ON ALL PIPES NOT LOCATED ON THE BASE OF THE VAULT. SET SUPPORTS AT 5 FEET MAXIMUM SPACING AND WITHIN 9 INCHES OF PIPE ENDS AND WALL PENETRATIONS. SET OUTSIDE PIPE WALL A MINIMUM OF 7 INCHES FROM VAULT WALLS. CENTER REMOVABLE COVERS OVER RISER PIPES.
2. PROVIDE PIPE CLAMPS TO SECURE ALL PIPES LOCATED ON BASE OF VAULT TO CONCRETE. SECURE AT MAXIMUM SPACING OF 5 FEET AND WITHIN 9 INCHES OF PIPE ELBOWS AND JUNCTIONS. SECURE PIPE TO VAULT BASE.
3. PERFORATE ALL HORIZONTAL PIPE AROUND OUTSIDE OF VAULT AND ALL 9.5-FT LONG SECTIONS OF PIPE ON INSIDE BASE OF VAULT. ALL OTHER HORIZONTAL SECTIONS OF PIPE AND ALL VERTICAL SECTIONS OF PIPE SHALL BE SOLID WALL.

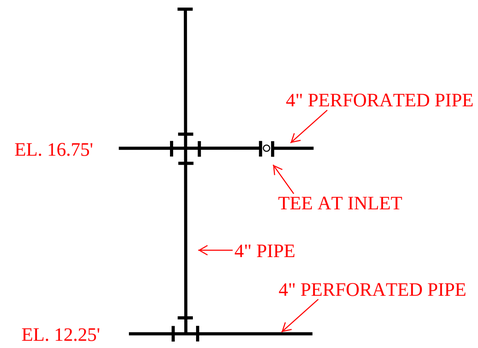
DETAIL 1/6 **PIPE DETAIL**
N.T.S.



VAULT AND PIPING PLAN
SCALE: 1" = 4'

KEYNOTES:

1. 4" Ø SOLID WALL HDPE RISER PIPE. ALL PIPES BETWEEN CHAMBERS I.E. 16.75'
2. PROVIDE END CAPS ON OPEN ENDS OF PERFORATED PIPES
3. 1.5" Ø SCHEDULE 80 PVC PIPE STRAPPED TO 8" Ø SOLID WALL HDPE RISER PIPE
4. HORIZONTAL PIPE LENGTHS:
   CHAMBERS 1, 3 & 4 -- 8' - 10"
   CHAMBERS 2 & 5 -- 8' - 9"
   CHAMBER 6 -- 8' - 5"



VAULT COLLECTION PIPE DETAIL
AT CHAMBER 1 INLET

ROGER B NORTH
STATE OF WASHINGTON
43593
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 4' 8'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

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-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

SCALE: AS SHOWN

DATE: 10/26/2011

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REACTOR VAULT PLAN & DETAIL 1

DRAWING NO. 6 OF 8

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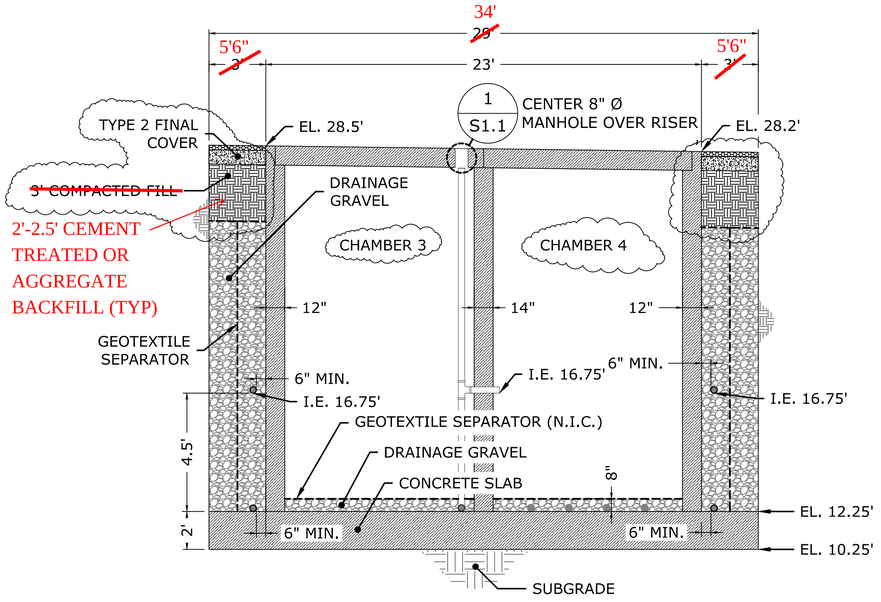
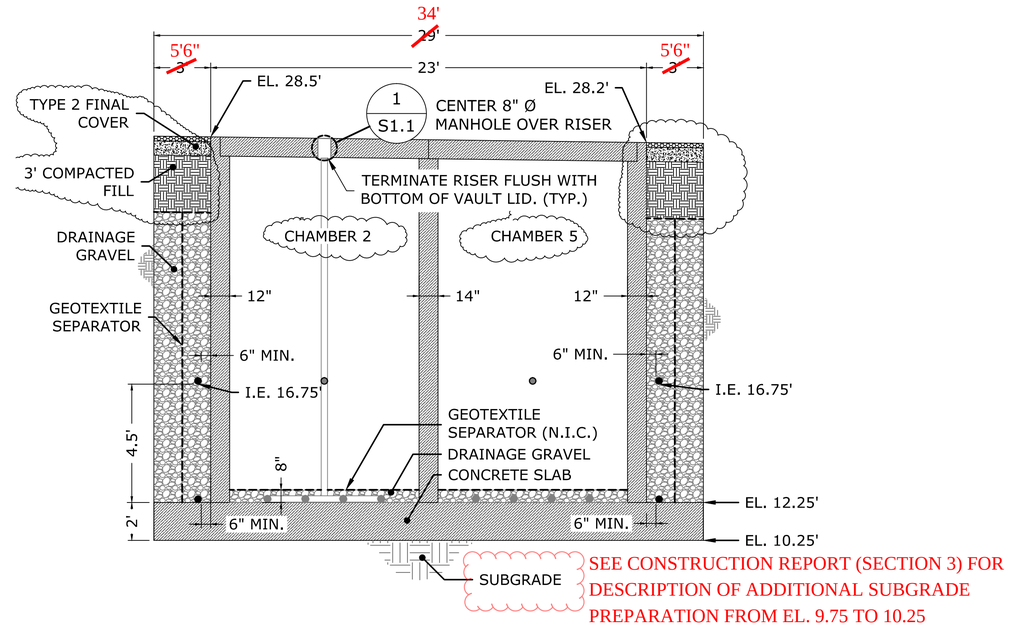
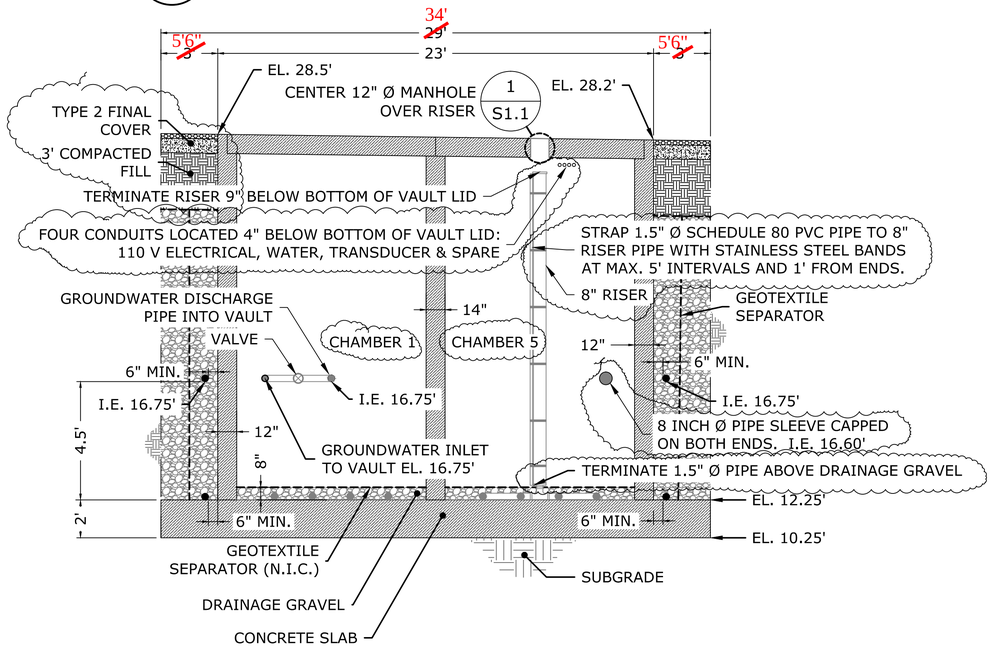


SECTION 1" = 4' — A/6 — ***TRANSVERSE SECTION***



SECTION 1" = 4' — B/6 — ***TRANSVERSE SECTION***



SECTION 1" = 4' — C/6 — ***TRANSVERSE SECTION***

REDUCTION SCALE CHECK

1"

0 4' 8'

GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
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FINAL CLEANUP ACTION
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REACTOR VAULT SECTIONS A-C

DRAWING NO. 7

OF 8

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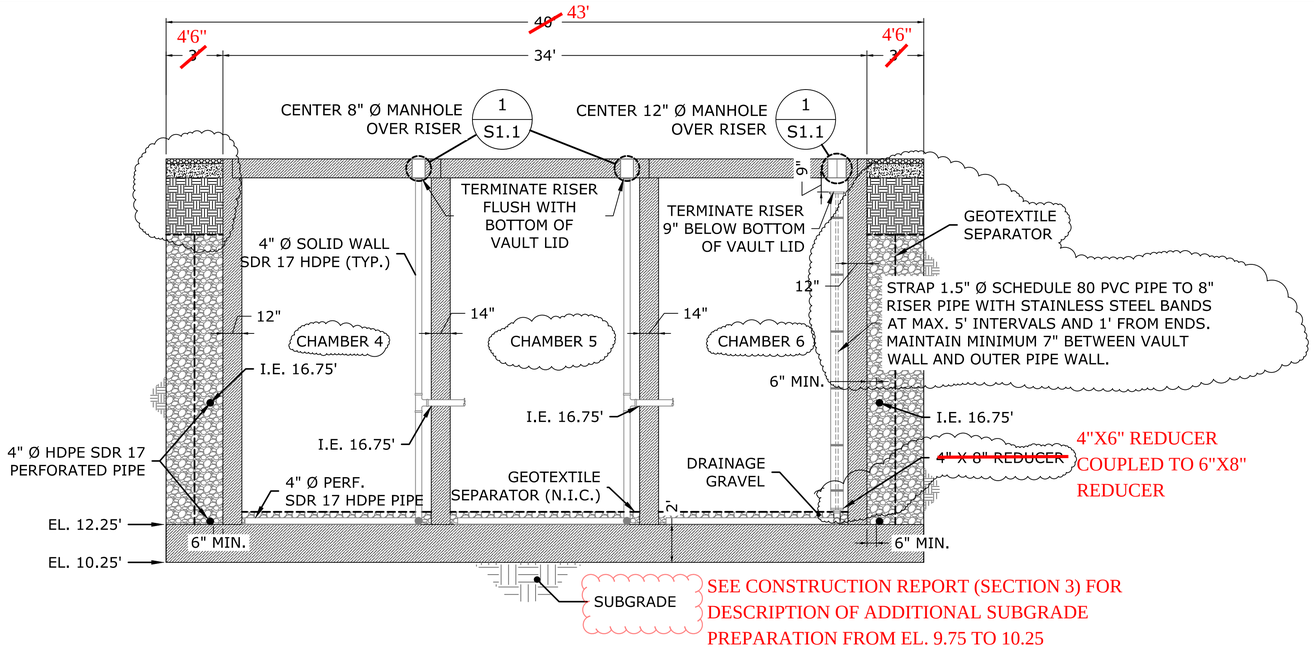
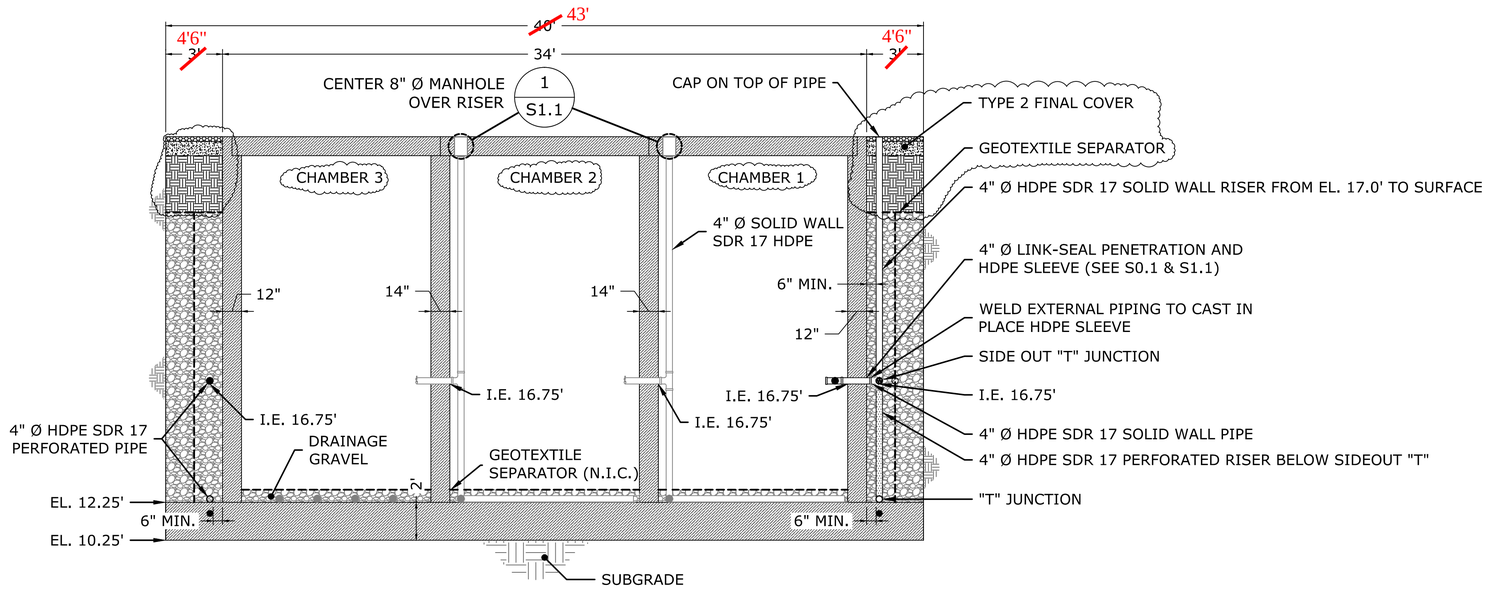


SECTION D/6 **VAULT LOGITUDINAL SECTION**
1" = 4'



SECTION E/6 **VAULT LOGITUDINAL SECTION**
1" = 4'

REDUCTION SCALE CHECK
1"
0 4' 8'
GRAPHICAL SCALE

ROGER B NORTH
STATE OF WASHINGTON
43597
REGISTERED
PROFESSIONAL ENGINEER

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
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PROJECT NO. 11-12

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-	-	-	-	-	-

SCALE: AS SHOWN

DATE: 10/26/2011

FINAL CLEANUP ACTION
FINAL CLEANUP DRAWINGS
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

REACTOR VAULT SECTIONS D-E

DRAWING NO. 8 OF 8

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CODE

STATE OF WASHINGTON STRUCTURAL SPECIALTY CODE, 2010 EDITION

CONCRETE

1. MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS
   - FOUNDATIONS 4000 PSI
   - SLABS 4000 PSI
   - WALLS 4000 PSI
2. CONCRETE TO HAVE MAXIMUM WATER/CEMENT RATIOS PER ACI 318 TABLE 4.2.2 (PROPORTIONING ON THE BASIS OF FIELD EXPERIENCE AND/OR TRIAL MIXTURES). THESE MAXIMUMS MAY BE EXCEEDED IF TEST RECORDS PER SECTION 5.3 OF ACI 318 ARE SUBMITTED TO AND APPROVED BY THE ENGINEER.
3. MAXIMUM SLUMP 3" PLUS OR MINUS 1".
4. CONCRETE AND REINFORCING TO HAVE SPECIAL INSPECTION IN ACCORDANCE WITH IBC CHAPTER 17.
5. MECHANICALLY VIBRATE ALL CONCRETE WHEN PLACED.

REINFORCING

1. DEFORMED BARS ASTM A615, GRADE 60. WELDED BARS ASTM A706, GRADE 60.
2. UNLESS NOTED OTHERWISE, LAP SPLICES SHALL BE CLASS 'B' TENSION LAP SPLICES IN ACCORDANCE WITH ACI 318, CHAPTER 12.
3. PROVIDE BENT CORNER BARS TO MATCH AND LAP WITH HORIZONTAL BARS AT CORNERS AND INTERSECTIONS OF FOOTING AND WALLS. REINFORCING BAR SPACING GIVEN ARE MAXIMUM ON CENTERS. ALL BARS PER CRSI SPECIFICATIONS AND HANDBOOK. DOWEL ALL VERTICAL REINFORCING TO FOUNDATION. SECURELY TIE ALL BARS IN LOCATION BEFORE PLACING CONCRETE.
4. CLEAR CONCRETE COVERAGE AS FOLLOWS FOR CAST-IN-PLACE
   - CAST AGAINST & PERMANENTLY EXPOSED TO EARTH: 3"
   - EXPOSED TO EARTH OR WEATHER & #6 OR LARGER: 2"
   - EXPOSED TO EARTH OR WEATHER & #5 OR SMALLER: 1 1/2

   ALL OTHERS PER LATEST EDITION OF ACI 318.

METALS

1. MISCELLANEOUS STRUCTURAL STEEL TO BE ASTM A36, FY = 36 KSI, UNLESS NOTED OTHERWISE.
2. WELDING TO BE BY CERTIFIED WELDERS USING E70XX ELECTRODES IN ACCORDANCE WITH AWS STANDARDS.
3. ALL STEEL TO GALVANIZED.
4. STEEL FABRICATOR TO SUBMIT SHOP DRAWINGS TO A/E FOR REVIEW PRIOR TO FABRICATION.
5. LATEST AISC, SJI AND AWS CODES APPLY. ALL CONSTRUCTION PER LATEST AISC HANDBOOK.
6. ALL EXPANSION ANCHORS SHALL BE SIMPSON WEDGE-ALL ANCHORS OR APPROVED EQUAL WITH CURRENT I.C.B.O. RATING FOR MATERIAL INTO WHICH INSTALLATION TAKES PLACE.
7. ALL ADHESIVE ANCHORS TO BE SIMPSON SET ADHESIVE ANCHORS.
8. ALL REFERENCE TO HEADED STUDS (HWS) SHALL BE INDICATE AUTOMATIC WELDED HEADED STUDS (NELSON OR EQUIVALENT).

LINK-SEAL

1. FURNISH AND INSTALL COMPLETE LINK-SEAL MODULAR SEAL ASSEMBLY.
2. WALL OPENINGS-THE WALL OPENING SIZE AND/OR TYPE SHALL BE SELECTED ACCORDING TO RECOMMENDATIONS FOUND IN THE MOST RECENT LINK-SEAL MODULAR SEAL CATALOG.
3. PROVIDE SUFFICIENT QUANTITY AND TYPE OF LINK-SEAL MODULAR SEALS REQUIRED TO EFFECTIVELY PROVIDE A HYDROSTATIC AND/OR FIRE-RATED SEAL.
4. EACH INDIVIDUAL LINK SHALL CONSPICUOUSLY AND PERMANENTLY IDENTIFIED WITH THE NAME OF THE MANUFACTURER AND MODEL NUMBER. MANUFACTURERS OTHER THAN THE ABOVE-NAMED COMPANY WISHING TO QUOTE EQUIPMENT IN THIS SECTION SHALL SUBMIT DETAIL DRAWINGS OF THEIR PROPOSED EQUIPMENT AND SUITABLE EVIDENCE OF A MINIMUM 25 YEARS EXPERIENCE AND RESULTS TO THE ENGINEER TO OBTAIN WRITTEN APPROVAL TO QUOTE AT LEAST (10) DAYS PRIOR TO BID OPENING.

VAULT LID ACCESS HATCHES

1. THE FLOOR ACCESS DOOR SHALL BE MODEL W-AHS AS MANUFACTURED BY ACUDOR PRODUCTS, INC., WITH THE SIZE SPECIFIED ON THE PLANS.
2. DOOR LEAF SHALL BE 1/4" THICK STEEL DIAMOND PLATE REINFORCED FOR AN AASHTO H-20-44 WHEEL LOAD.
3. UPON REQUEST, MANUFACTURER SHALL PROVIDE STRUCTURAL CALCULATIONS SHOWING THE DOOR DESIGN MEET THE LOADING REQUIREMENTS OF AASHTO H-20-44.
4. THE FRAME SHALL BE 1/4" THICK STEEL ANGLE WITH ANCHORS WELDED TO THE FRAME FOR CASTING INTO CONCRETE.
5. THE COVER SHALL BE ATTACHED TO THE FRAME WITH 316 STAINLESS STEEL BOLTS (THE BOLTS MUST BE SECURELY FASTENED WHENEVER THE COVER IS CLOSED TO INSURE SAFE AND PROPER PERFORMANCE OF THE DOOR).
6. THE FLOOR ACCESS DOOR SHALL BE EQUIPPED WITH A FLUSH STEEL LIFTING HANDLE THAT DOES NOT PROTRUDE OVER THE COVER, AND A 316 STAINLESS STEEL HOLD OPEN ARM WITH RED VINYL GRIP THAT AUTOMATICALLY LOCKS THE COVER IN ITS UPRIGHT POSITION. A STEEL SKIRT SHALL BE WELDED TO THE FRAME TO PROVIDE A COMBINED HEIGHT EQUAL TO THE DEPTH OF THE CONCRETE. THE DOOR SHALL HAVE TAMPER RESISTANT HINGES WITH RECESSED STAINLESS STEEL PINS AND LUGS. THE DOOR SHALL HAVE OPEN, STAINLESS STEEL, HORIZONTAL, COMPRESSION SPRINGS TO ASSIST IN OPENING THE COVER AND REDUCING THE FORCE DURING CLOSING. THE FLOOR ACCESS DOOR SHALL HAVE A HOT DIPPED GALVANIZED FINISH.
7. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS ATTACHED INSTRUCTIONS.
8. THE ENTIRE FRAME, INCLUDING THE SEAT ON WHICH THE REINFORCING RESTS, SHALL BE SUPPORTED BY CONCRETE OR OTHER MATERIAL DESIGNED TO SUPPORT THE SPECIFIED LOAD.
9. THE DOOR SHALL BE MANUFACTURED IN THE UNITED STATES.
10. MANUFACTURER SHALL GUARANTEE THE DOOR AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR FIVE YEARS.

BEARING PADS

1. ALL BEARING PADS ARE TO BE APS SUPPLY CO. BRAND NEOPRENE COMMERCIAL GRADE PADS OR EQUIVALENT.
2. PADS USED ARE TO BE COMPOSED OF DENSE NEOPRENE/NITRILE BLEND POLYMERS AVAILABLE IN DUROMETERS OF 40-70.
3. PADS USED ARE INTENDED FOR ISOLATION FOR CONCRETE TO CONCRETE INTERFACES ONLY.

MANHOLE STEPS

1. MANHOLE LADDER RUNGS ARE TO BE BOWCO PRESS FIT TYPE-R STEPS.
2. LADDER RUNGS ARE TO HAVE COPOLYMER POLYPROPYLENE COATING.

WATER-TIGHT MANHOLES

1. ALL WATER-TIGHT MANHOLES TO BE EAST JORDAN IRONWORKS WATERTIGHT MANHOLES (CATALOGUE #V2610-1) OR APPROVED EQNVALENT.
2. ALL MANUFACTURERS SHALL BE APPROVED SUPPLIERS AND BE ABLE TO DEMONSTRATE THAT THERE IS AN ACCEPTABLE QUALITY CONTROL PROGRAM AT THE PRODUCING FOUNDRY, PRIOR TO SUPPLYING CASTINGS.
3. DUCTILE IRON CASTINGS SHALL CONFORM TO ASTM A536. THE IRON MATERIAL USED IN PRODUCTS PROVIDED SHALL HAVE A MINIMUM RECYCLED MATERIAL CONTENT OF 75%. THE RECYCLED MATERIALS SHALL CONSIST OF POST-CONSUMER MATERIAL.
4. CASTINGS SHALL BE OF UNIFORM QUALITY, FREE FROM SAND HOLES, GAS HOLES, SHRINKAGE, CRACKS AND OTHER SURFACE DEFECTS. CASTINGS SHALL BE GROUND SMOOTH AND WELL CLEANED BY SHOT BLASTING. FOR TRAFFIC SERVICE CASTINGS, BEARING SURFACES BETWEEN MANHOLE RINGS AND COVERS OR GRATES AND FRAMES SHALL BE CAST OR MACHINED WITH SUCH PRECISION TO PREVENT ROCKING.
5. TRAFFIC SERVICE CASTINGS SHALL HAVE A FIRST ARTICLE PROOF LOAD TEST CONDUCTED AND THE RESULTS OF THAT PROOF LOAD SHALL BE MADE AVAILABLE TO THE PURCHASER UPON REQUEST. THE PROOF LOAD SHALL BE CONDUCTED IN ACCORDANCE AASHTO M306, SECTION 7.0, PROOF LOAD TESTING. THE CASTING SHALL BE TESTED ON A SUITABLE AND CALIBRATED LOAD TESTING MACHINE AND THE CASTING SHALL HOLD A 40 KIP POUND PROOF LOAD FOR ONE MINUTE WITHOUT EXPERIENCING AND CRACKS OR DETRIMENTAL PERMANENT DEFORMATION.
6. INSPECTION'S SHALL BE IN ACCORDANCE WITH 9.1.1 OR 9.1.2 OF AASHTO M306. RESULTS SHALL BE FURNISHED TO THE PURCHASER UPON REQUEST. THE HEAT OR PRODUCTION DATE AND PRODUCT NUMBERS, AS CAST ON THE CASTING SHALL BE THE BASIS OF TRACIBILTY AND RECORDING OF THE TESTS.
7. EACH CASTING SHALL BE IDENTIFIED AND SHOW A MINIMUM, THE FOLLOWING:
   A) NAME OF THE PRODUCING FOUNDRY
   B) COUNTRY OF MANUFACTURER (SUCH AS MADE IN THE U.S.A.)
   C) ASTM MATERIAL DESIGNATION
   D) RECYCLE SYMBOL
   E) INDIVIDUAL PART NUMBER
   F) CAST OR HEAT DATE

GENERAL

1. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE BUT NOT BE LIMITED TO BRACING, SHORING OR LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC. OBSERVATIONS VISITS TO THE SITE BY THE ENGINEER OF RECORD SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS WITH DRAWINGS PRIOR TO START OF CONSTRUCTION AND RESOLVE ANY DISCREPANCY WITH THE ENGINEER OF RECORD.
3. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDUM.
4. WHERE ANY DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL STRUCTURAL NOTES OR SPECIFICATIONS, THE GREATER REQUIREMENTS SHALL GOVERN.
5. OPTIONS ARE FOR CONTRACTOR'S CONVENIENCE. HE/SHE SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY. IF HE/SHE CHOOSES AN OPTION, THAN HE/SHE SHALL COORDINATE ALL DETAILS.
6. ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL OF A CIVIL OR STRUCTURAL ENGINEER REGISTERED IN THE STATE OF WASHINGTON.

DEFERRED SUBMITTAL/SHOP DRAWINGS

PURSUANT TO THE IBC, SUBMITTAL DOCUMENTS FOR DEFERRED ITEMS SHALL BE PROVIDED TO THE ARCHITECT/ENGINEER OF RECORD FOR REVIEW AND APPROVAL.

ITEM	SUBMIT ITEM TO: A/E OF RECORD	BUILDING OFFICIAL	NOTE
STRUCTURAL STEEL SHOP DRAWINGS	REQUIRED		1
CONCRETE MIX DESIGN	REQUIRED		
STRUCTURAL STEEL MILL CERTS	REQUIRED		
REINF. STEEL SHOP DRAWINGS	REQUIRED		1
WELDING PROCED. SPECS (AWS D1.1)	REQUIRED		

NOTE:
1. CONSTRUCTION DOCUMENTS BY LIVERMORE ASSOCIATES ARE THE SOLE PROPERTY OF LIVERMORE ASSOCIATES AND SHALL NOT BE DUPLICATED FOR THE USE IN SHOP DRAWING SUBMITTALS.

STRUCTURAL OBSERVATIONS

CONTRACTOR TO NOTIFY STRUCTURAL ENGINEER TO ARRANGE FOR A STRUCTURAL OBSERVATION 48 HOURS PRIOR TO COVERING UP THE FOLLOWING:
- WALL REINFORCING

(NOTE, STRUCTURAL OBSERVATIONS ARE NOT IN LIEU OF SPECIAL INSPECTION BY AN INDEPENDENT AGENCY)

MIN. REINF. BAR SPLICE LENGTHS IN CONCRETE

ESTABLISHED PER ACI 318 SECTION 12.2 & 12.3.

BAR SIZE	GR	TENSION BARS f'c = 4,000 PSI REGULAR CLASS	TOP CLASS
#3	60	19"	24"
#4	60	25"	33"
#5	60	31"	40"
#6	60	37"	48"
#7	60	54"	71"
#8	60	62"	81"
#9	60	70"	91"

NOTES:
1. TOP BARS ARE ANY HORIZONTAL BARS PLACED SO THAT MORE THAN 12" OF FRESH CONCRETE IS CAST ON THE MEMBER BELOW THE REINFORCEMENT.
2. UNLESS NOTED OTHERWISE, LAP SPLICES IN CONCRETE BEAMS, SLABS AND WALLS SHALL BE CLASS 'B' TENSION LAP SPLICES AND LAP SPLICES IN CONCRETE COLUMNS SHALL BE COMPRESSION LAP SPLICES.
3. ALL REINFORCING SHALL BE UNCOATED.
4. VALUES SHOWN ABOVE ARE FOR CLEAR COVER OF 1 BAR DIAMETER MINIMUM AND CLEAR BAR SPACING OF 2 BAR DIAMETERS MINIMUM. WHERE COVER OF BAR SPACING IS LESS THAT THIS INCREASE LAP LENGHT BY 50%.
5. NO BUNDLE BARS.
6. ALL CONCRETE SHALL BE NORMAL WEIGHT AGGREGATE.

SPECIAL INSPECTION & TESTING PROGRAM

(ESTABLISHED PER 2006 IBC SECTION 109 & CHAPTER 17)
- THE ITEM CHECKED WITH AND 'X' SHALL BE INSPECTED IN ACCORDANCE WITH THE IBC CHAPTER 17 BY A CERTIFIED SPECIAL INSPECTOR FROM AN ESTABLISHED TESTING AGENCY. FOR MATERIAL SAMPLING AND TESTING REQUIREMENTS, REFER TO THE MATERIAL SAMPLING AND TESTING SECTION, THE PROJECT SPECIFICATIONS AND THE SPECIFIC GENERAL NOTES SECTIONS. THE TESTING AGENCY SHALL SEND COPIES OF ALL STRUCTURAL TESTING AND INSPECTION REPORTS DIRECTLY TO THE ENGINEER, CONTRACTORS AND BUILDING OFFICIAL ANY MATERIALS WHICH FAIL TO MEET THE PROJECT SPECIFICATIONS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER. SPECIAL TESTING REQUIREMENTS APPLY EQUALLY TO ALL BIDDER DESIGNED COMPONENTS.
- CONTINUOUS SPECIAL INSPECTION MEANS THAT THE SPECIAL INSPECTOR IS ON THE SITE AT ALL TIMES OBSERVING THE WORK REQUIRING SPECIAL INSPECTION (IBC 1702). PERIODIC SPECIAL INSPECTION MEANS THAT THE SPECIAL INSPECTOR IS ON SITE AT TIME INTERVALS NECESSARY TO CONFIRM THAT ALL WORK REQUIRING SPECIAL INSPECTION IS IN COMPLIANCE (IBC 1702).
- SPECIAL INSPECTION IS NOT REQUIRED FOR WORK PERFORMED BY AN APPROVED FABRICATOR PER IBC SECTION 1704.2.2.

LEGEND

EOR ENGINEER OF RECORD
MT MAGNETIC PARTICLE TESTING
NDT NON-DESTRUCTIVE TESTING
UT ULTRASONIC TESTING
WPS WELDING PROCEDURE QUALIFICTIONS

CONCRETE CONSTRUCTION (TABLE 1704.4)

VERIFICATION AND INSPECTION	INSPECTION CONTINUOUS	PERIODIC	COMMENTS	TESTING TYPE	FREQUENCY
REINFORCING STEEL					
INSPECTION		X			
PLACEMENT		X			
MATERIAL VERIFICATION		X	C1		
BOLTS					
INSPECTION	X	X	C2		
PLACEMENT	X	X	C2		
MIX					
VERIFICATION OF APPROVED MIX DESIGN		X			
CONCRETE PLACEMENT					
VERIFICATION OF STRENGTH	X			STRENGTH	C3
VERIFICATION OF SLUMP	X			SLUMP	C3
VERIFICATION OF AIR CONTENT	X			AIR CONTENT	C3
VERIFICATION OF TEMPERATURE	X			TEMPERATURE	C3
CONCRETE CURING					
MAINTENANCE INSPECTION OF TEMPERATURE		X			
MAINTENANCE INSPECTION OF TECHNIQUE		X			
VERIFICATION OF CONCRETE STRENGTH PRIOR TO REMOVAL OF FORMS		X			

COMMENTS:
C1. APPLIES TO REINFORCING STEEL OTHER THAN ASTM A 706.
C2. CONTINUOUS INSPECTION AT EPOXY ANCHORS AND PERIODIC AT ALL OTHERS.
C3. ONCE EACH SHIFT BUT NOT LESS THEN ONE SAMPLE FOR EACH 50 CUBIC YARDS

WELDING

TYPE OF WORK	INSPECTION CONTINUOUS	PERIODIC	COMMENTS	TESTING TYPE	FREQUENCY
WELDING					
MATERIAL VERIFICATION		X			
MANUFACTURERS CERTIFIED MILL TEST REPORTS		X			
VERIFY USE OF PROPER WPS'S		X			
VERIFY WELDER QUALIFICATIONS		X			
MANUFACTURERS CERTIFIED MILL TEST REPORTS		X			
PARTIAL PENETRATION GROOVE WELDS	X				
SINGLE-PASS FILLET WELDS < 5/16		X			
WELDING STUDS	X	X	WD1	PRE-PROD. TESTING	WD2

COMMENTS:
WD1. CONTINUOUS INSPECTION REQUIRED AT STRUCTURAL DIAPHRAGM.
WD2. EACH SIZE AND TYPE OF STUD, EACH DAY PER SHIFT.

#	DATE	DESC.
5	07.15.11	C.O. #8 UPDATE
4	06.10.11	C.O. #8
3	06.03.11	PERMIT ISSUE
2	08.14.09	ISSUED FOR CONST.
1	07.20.09	ISSUE FOR BID

DEAN MICHAEL LIVERMORE — STATE OF WASHINGTON — 19765 — REGISTERED PROFESSIONAL ENGINEER

LIVERMORE architecture & engineering, inc.
leadership + vision
140 SW Arthur Street, Suite 200
Portland, Oregon 97201
Phone: 503-892-3002
Fax: 503-892-3003

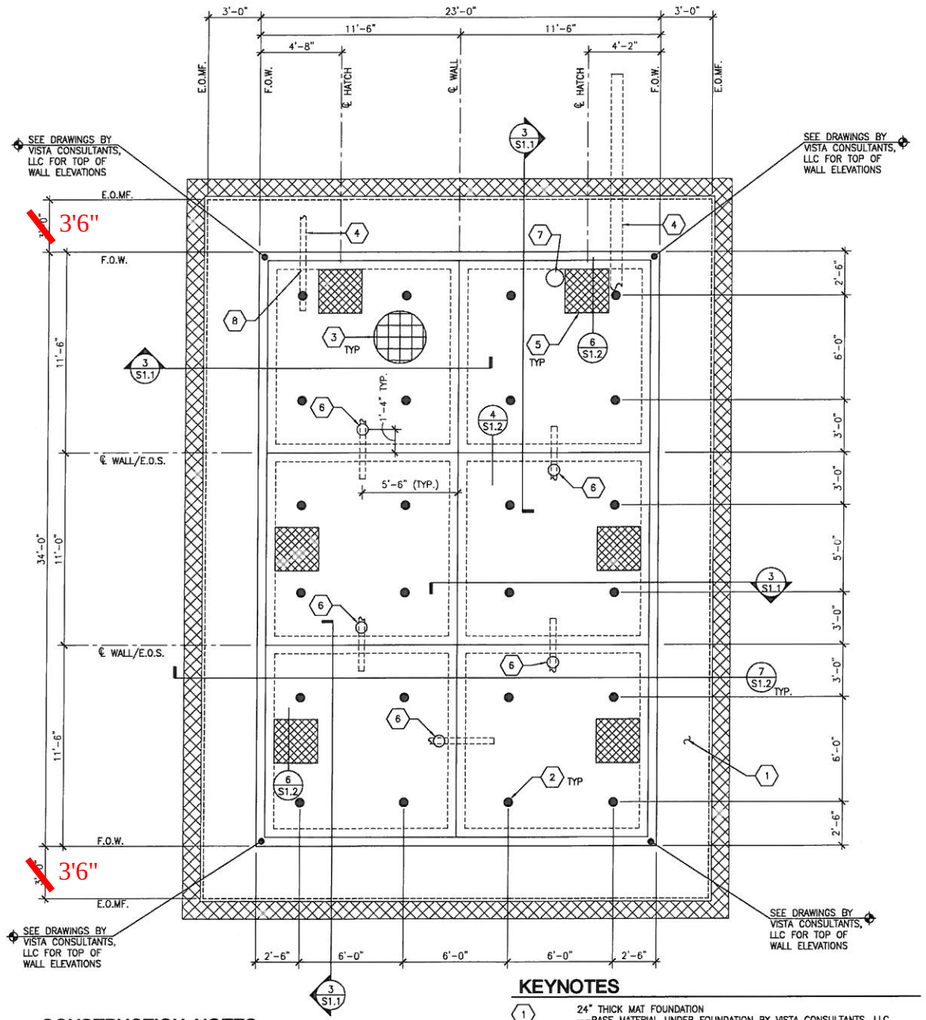
FINAL CLEAN UP ACTION PHASE 1 FOR
BSB DIVERSIFIED, INC. PROPERTY
KENT (KING COUNTY), WASHINGTON

Livermore A&E
JOB NO: 208009.00

DRAWING TITLE:
STRUCTURAL GENERAL NOTES
DRAWN BY: CSN
CHECKED BY: GML

S0.1

SEE FINAL SHOP DRAWINGS FOR POSITIONS OF MANHOLES, ASSESS HATCHES, AND PICK POINTS



CONSTRUCTION NOTES

1. DEWATERING TO REMAIN BELOW MAT FOUNDATION UNTIL BACKFILL AGAINST EXTRIOR WALLS FULLY PLACED & LIDS INSTALLED
2. VERIFY LOCATIONS OF ALL WALL AND LID PENETRATIONS WITH DRAWING 1-8 BY VISTA CONSULTANTS, LLC.
3. ALL ELEVATION INFORMATION PROVIDED BY VISTA CONSULTANTS, LLC. VERIFY ALL ELEVATIONS SHOWN.
4. ALL PIPING AND VALVE ANCHORAGE AS PER SPECIFICATIONS BY VISTA CONSULTANTS, LLC.

LEGEND

F.O.W. FACE OF WALL

E.O.MF. EDGE OF MAT FOUNDATION

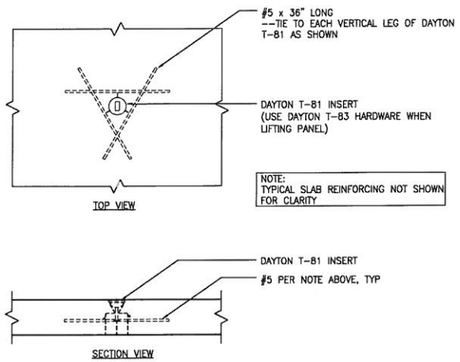
INDICATES WALL SHORING BY OTHERS

KEYNOTES

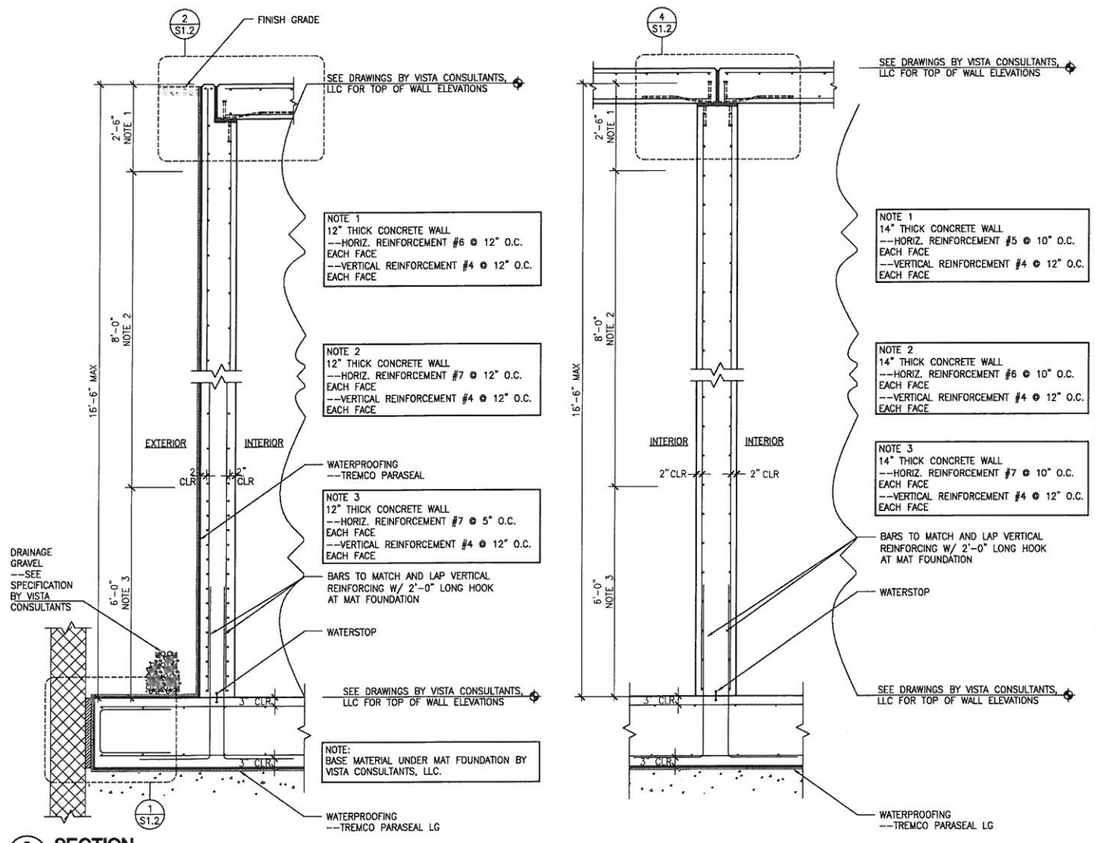
1. 24" THICK MAT FOUNDATION
   --BASE MATERIAL UNDER FOUNDATION BY VISTA CONSULTANTS, LLC.
   --REINFORCE W/ #6 @ 10" O.C. E.W. TOP AND BOTTOM
2. INDICATES PICK POINT INSERT (24 TOTAL)
   --SEE 2/S1.1
   --USE ALL PICK POINTS WHEN LIFTING PANELS
3. 12" THICK PRECAST LID (6) TOTAL
   --REINFORCE W/ #6 @ 8" O.C. E.W. TOP & BOTTOM
4. AT PIPE PENETRATION THROUGH WALL, INSTALL LINK SEAL LS-300-0 AT 4" DIA. PIPE, LS-475-0 AT 8" DIA. PIPE
5. VAULT LID ACCESS HATCHES
   --30"x30" ACUDOR W-AHS ACUDOR CHANNEL FRAME, HEAVY DUTY, SINGLE DOOR FLOOR HATCH W/ BOWCO PRESS FIT TYP-R 12" WIDE STEPS (APPROX. 13 TOTAL).
   --SEE DETAIL 6/S1.2 FOR MORE INFORMATION
6. WATER-TIGHT MANHOLES
   --7 5/8" DIA. (CLR. OPENING) EAST JORDAN IRONWORKS WATERTIGHT MANHOLE (CATALOGUE #V2610-1)
7. WATER-TIGHT MANHOLES
   --12" DIA. (CLR. OPENING) EAST JORDAN IRONWORKS WATERTIGHT MANHOLE

NORTH

1 S1.1 **FOUNDATION PLAN**
1/4" = 1'-0"



2 S1.1 **PICK POINT INSERT DETAIL**
3/4" = 1'-0"



3 S1.1 **SECTION**
1/2" = 1'-0"

#	DATE	DESC.
5	07.15.11	C.O. #8 UPDATE
4	06.10.11	C.O. #8
3	06.01.11	PRMT ISSUE
2	08.12.09	ISSUED FOR CONST.
1	07.20.09	ISSUE FOR BID

ADAM MICHAEL LIVERMORE — STATE OF WASHINGTON — 36765 — REGISTERED PROFESSIONAL ENGINEER

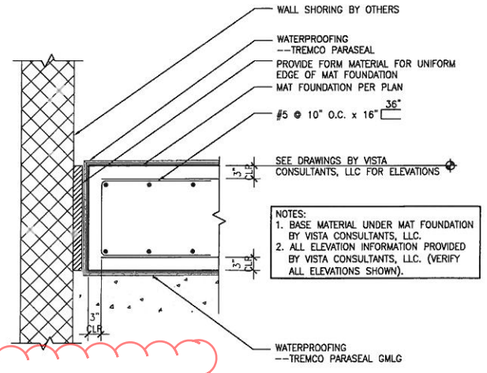
LIVERMORE architecture & engineering, inc.
140 SW Arthur Street, Suite 200
Portland, Oregon 97201
Phone: 503-892-2002
Fax: 503-892-2003

FINAL CLEAN UP ACTION PHASE 1 FOR
BSB DIVERSIFIED, INC. PROPERTY
KENT (KING COUNTY), WASHINGTON

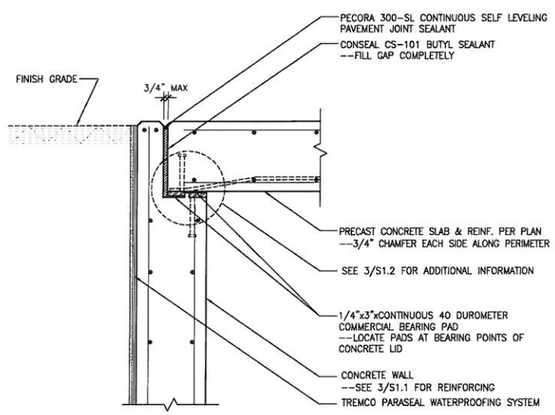
Livermore A&E JOB NO: 208009.00

DRAWING TITLE: FOUNDATION PLAN AND DETAILS
DRAWN BY: CSN
CHECKED BY: GML

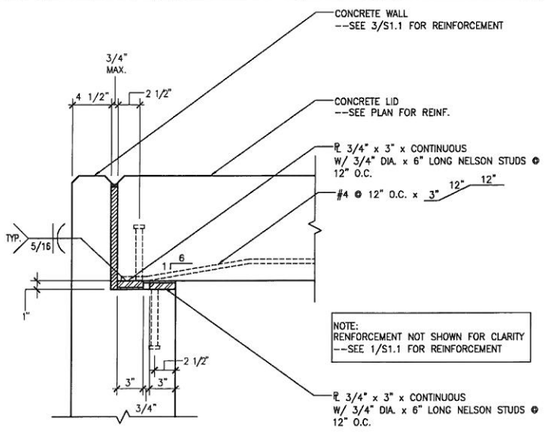
S1.1



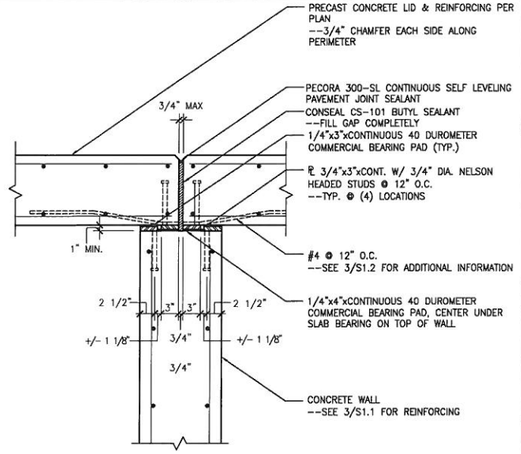
1 S12 **EDGE DETAIL**
3/4" = 1'-0"



2 S12 **CURB DETAIL (EXTERIOR)**
3/4" = 1'-0"



3 S12 **ENLARGED CURB DETAIL**
1 1/2" = 1'-0"



4 S12 **CURB DETAIL (INTERIOR)**
3/4" = 1'-0"

SEE CONSTRUCTION REPORT (SECTION 3) FOR DISCUSSION REGARDING WATERPROOFING INSTALLATION AROUND FACE OF BOTTOM SLAB

5 S12 **NOT USED**
3/4" = 1'-0"

6 S12 **VAULT LID ACCESS HATCH DETAIL**
1" = 1'-0"

#	DATE	DESC.
5	07.15.11	C.O. #8 UPDATE
4	05.10.11	C.O. #6
3	08.03.11	PERMIT ISSUE
2	08.14.09	ISSUED FOR CONST.
1	07.20.09	ISSUE FOR BID

LIVERMORE architecture & engineering, inc.
140 SW Arthur Street, Suite 200
Portland, Oregon 97201
Phone: 503-802-2000
Fax: 503-802-2003

FINAL CLEAN UP ACTION PHASE 1 FOR
BSB DIVERSIFIED, INC. PROPERTY
KENT (KING COUNTY), WASHINGTON

Livermore A&E
JOB NO: 208009.00

DRAWING TITLE:
DETAILS

DRAWN BY: CSN
CHECKED BY: GML

S1.2

AS-BUILT REDLINES
10/16/13

CONSTRUCTION DRAWINGS
FINAL CLEANUP ACTION PHASE II

FOR

BSB DIVERSIFIED, INC. PROPERTY
8202 S. 200TH STREET, KENT, WASHINGTON

AUGUST 2011

PREPARED FOR:

BSB DIVERSIFIED, INC.

C/O BURT GEOLOGY AND ENVIRONMENTAL APPLICATIONS PLLC
902 GRAPEVINE LANE
NASHVILLE, TENNESSEE 37221
PH. (615) 828-6126
RON BURT (OWNER'S REPRESENTATIVE)

ENVIRONMENTAL ENGINEER:

PES Environmental, Inc.
Engineering & Environmental Services

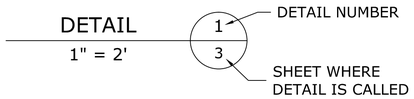
1215 4TH AVENUE - SUITE 1350
SEATTLE, WASHINGTON 98161
PH. 206-529-3980
FX. 206-529-3985
BRIAN O'NEAL P.E. (PROJECT MANAGER)

CIVIL ENGINEER:

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
PH. (503) 922-2522
ROGER NORTH P.E. (PROJECT MANAGER)

DETAIL INDICATOR:

SHEET WHERE DETAIL IS SHOWN:



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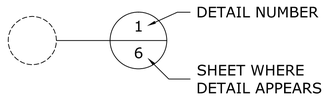
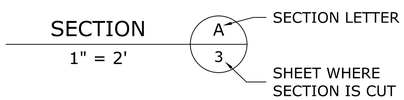
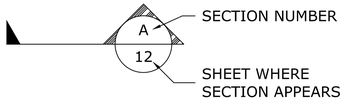


SECTION INDICATOR:

SHEET WHERE SECTION IS SHOWN:

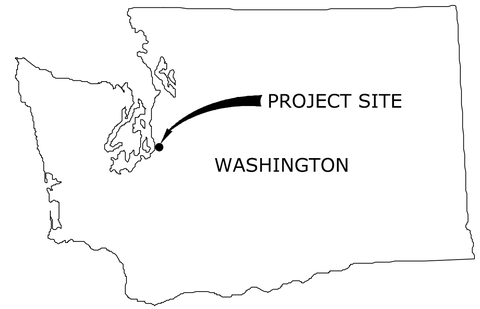


SHEET WHERE SECTION IS CUT:

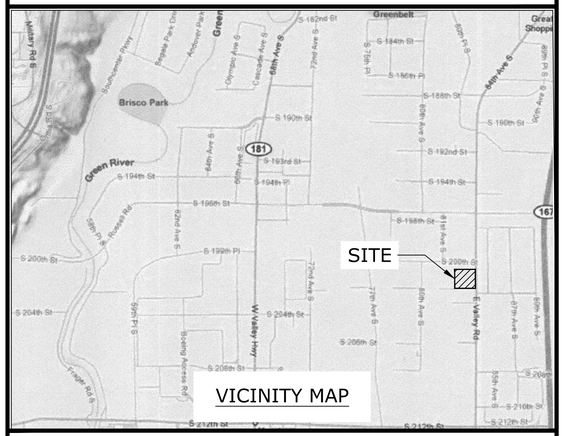


ABBREVIATIONS:

AC	ACRES	X	EXISTING
ADS	ADVANCED DRAINAGE SYSTEM	FT	FEET
BLDG	BUILDING	G.B.	GRADE BREAK
℄	CENTERLINE	GALV	GALVANIZED
CO	CLEANOUT	HORIZ	HORIZONTAL
DIA or Ø	DIAMETER	HP	HIGH POINT
DWG	DRAWING	ID	INSIDE DIAMETER
E	EAST	I.E.	INVERT ELEVATION
EL or ELEV	ELEVATION	L	LENGTH
FT	FEET	L.F.	LINEAR FEET
H or h	HEIGHT	N	NORTH
HDPE	HIGH DENSITY POLYETHYLENE	N.I.C.	NOT IN CONTRACT
E	EAST	OD	OUTSIDE DIAMETER
EL OR ELEV	ELEVATION	℄	PROPERTY LINE
		S	SLOPE IN FEET/FOOT
		TYP	TYPICAL



REGIONAL MAP



VICINITY MAP

Sheet List Table

Sheet Number	Sheet Title
1	TITLE PAGE
2	NOTES
3	SITE PLAN
4	EROSION CONTROL AND DEMO PLAN
5	CUTOFF WALL PLAN
6	CUTOFF WALL PLAN AND PROFILE 1
7	CUTOFF WALL PLAN AND PROFILE 2
8	CUTOFF WALL PLAN AND PROFILE 3
9	CUTOFF WALL PLAN AND PROFILE 4
10	COVER GRADING
11	VAULT AREA DETAILS
12	FINAL COVER
13	DETAILS

TETRA TECH/INCA RECORD SURVEY

APPROVED:

ENGINEER OF RECORD - ROGER B. NORTH, P.E.

8-26-11
DATE

GENERAL NOTES:

1. CONTRACTOR SHALL PROCURE AND CONFORM TO ALL CONSTRUCTION PERMITS REQUIRED BY THE CITY. OWNER TO PAY ALL PROJECT PERMIT COSTS. CONTRACTOR SHALL PROVIDE OWNER 48 HOURS NOTICE PRIOR TO REQUIRING PAYMENT FOR PERMITS.

2. THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO COMPLETE THE PROJECT IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DRAWINGS INCLUDING SUCH INCIDENTALS AS MAY BE NECESSARY TO MEET APPLICABLE AGENCY REQUIREMENTS AND PROVIDE A COMPLETED PROJECT.

3. ANY INSPECTION BY THE CITY OR OTHER AGENCIES SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM THE WORK IN STRICT COMPLIANCE WITH THE CONTRACT DOCUMENTS, APPLICABLE CODES AND AGENCY REQUIREMENTS.

4. CONTRACTOR SHALL ERECT AND MAINTAIN BARRICADES, WARNING SINGS, TRAFFIC CONES PER CITY REQUIREMENTS IN ACCORDANCE WITH THE MUTCD (INCLUDING WASHINGTON AMENDMENTS). ACCESS TO DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES. ALL TRAFFIC CONTROL MEASURES SHALL BE APPROVED AND IN PLACE PRIOR TO ANY CONSTRUCTION ACTIVITY.

5. CONTRACTOR SHALL BE LICENSED WITH THE CONSTRUCTION CONTRACTOR BOARD.

6. ELEVATIONS ARE BASED ON NAVD 1988 DATUM.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MANAGING CONSTRUCTION ACTIVITIES TO ENSURE THAT PUBLIC STREETS AND RIGHT-OF-WAYS ARE KEPT CLEAN OF MUD, DUST OR DEBRIS. DUST ABATEMENT SHALL BE MAINTAINED BY ADEQUATE WATERING OF THE SITE BY THE CONTRACTOR.

EXISTING UTILITIES & FACILITIES:

1. CONTRACTOR SHALL PROTECT EXISTING GROUNDWATER TREATMENT EQUIPMENT UNTIL OWNER INDICATES IT MAY BE DECOMMISSIONED. ANY DAMAGE TO SAME WILL BE REPAIRED BY CONTRACTOR AT CONTRACTOR'S EXPENSE.

2. THE CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF APPROVED DRAWINGS ON THE CONSTRUCTION SITE AT ALL TIMES WHEREON HE WILL RECORD ANY APPROVED DEVIATIONS IN CONSTRUCTION FROM THE APPROVED DRAWINGS, AS WELL AS THE LOCATIONS AND DEPTHS OF ALL EXISTING UTILITIES ENCOUNTERED. THESE FIELD RECORD DRAWINGS SHALL BE KEPT UP TO DATE AT ALL TIMES AND SHALL BE AVAILABLE FOR INSPECTION BY THE OWNER UPON REQUEST. FAILURE TO CONFORM TO THIS REQUIREMENT MAY RESULT IN DELAY OF PAYMENT AND/OR FINAL ACCEPTANCE OF THE PROJECT.

3. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL SUBMIT A CLEAN SET OF FIELD RECORD DRAWINGS TO THE OWNER. ALL INFORMATION SHOWN ON THE CONTRACTOR'S RECORD DRAWINGS SHALL BE SUBJECT TO VERIFICATION BY THE ENGINEER. IF SIGNIFICANT ERRORS OR DEVIATIONS ARE NOTED BY THE ENGINEER, A RECORD SURVEY PREPARED AND STAMPED BY A REGISTERED PROFESSIONAL LAND SURVEYOR AND/OR QUALIFIED ENGINEER SHALL BE COMPETED AT THE CONTRACTOR'S EXPENSE.

4. THE LOCATION AND DESCRIPTIONS OF EXISTING UTILITIES SHOWN ON THE DRAWING, ARE COMPILED FROM AVAILABLE RECORDS AND/OR FIELD SURVEYS. THE ENGINEER OR UTILITY COMPANIES DO NOT GUARANTEE THE ACCURACY OR THE COMPLETENESS OF SUCH RECORDS. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND SIZES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. THE CONTRACTOR SHALL LOCATE AND MARK ALL EXISTING PROPERTY AND STREET MONUMENTS PRIOR TO CONSTRUCTION. ANY MONUMENTS DISTURBED DURING CONSTRUCTION OF THE PROJECT SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR AT THE CONTRACTORS EXPENSE.

6. CONTRACTOR SHALL FIELD VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES WHERE NEW FACILITIES CROSS. CONTRACTOR SHALL BE RESPONSIBLE FOR EXPOSING POTENTIAL UTILITY CONFLICTS FAR ENOUGH AHEAD OF CONSTRUCTION TO MAKE NECESSARY CONSTRUCTION MODIFICATIONS WITHOUT DELAYING THE WORK.

7. ALL FACILITIES SHALL BE MAINTAINED IN-PLACE BY THE CONTRACTOR UNLESS OTHERWISE SHOWN OR DIRECTED. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO SUPPORT, MAINTAIN, OR OTHERWISE PROTECT EXISTING UTILITIES AND OTHER FACILITIES AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR TO LEAVE EXISTING FACILITIES IN AN EQUAL OR BETTER-THAN-ORIGINAL CONDITION AND TO THE SATISFACTION OF THE OWNER.

8. UTILITIES OR INTERFERING PORTIONS OF UTILITIES THAT ARE ABANDONED IN PLACE SHALL BE REMOVED BY THE CONTRACTOR TO THE EXTENT NECESSARY TO ACCOMPLISH THE WORK. THE CONTRACTOR SHALL PLUG THE REMAINING EXPOSED ENDS OF ABANDONED UTILITIES.

9. UTILITIES OR INTERFERING PORTIONS OF UTILITIES THAT ARE ABANDONED IN PLACE SHALL BE REMOVED BY THE CONTRACTOR TO THE EXTENT NECESSARY TO ACCOMPLISH THE WORK. THE CONTRACTOR SHALL PLUG THE REMAINING EXPOSED ENDS OF ABANDONED UTILITIES.

10. ALL PIPED UTILITIES ABANDONED IN PLACE SHALL HAVE ALL OPENINGS CLOSED WITH CONCRETE PLUGS WITH A MINIMUM LENGTH EQUAL TO 2 TIMES THE DIAMETER OF THE ABANDONED PIPE.

11. ANY WELLS TO BE DECOMISSIONED SHALL BE ABANDONED PER STATE REQUIREMENTS.

TESTING AND INSPECTION:

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THAT ALL REQUIRED OR NECESSARY INSPECTIONS ARE COMPLETED BY THE OWNER'S AUTHORIZED INSPECTORS PRIOR TO PROCEEDING WITH SUBSEQUENT WORK, WHICH COVERS OR THAT IS DEPENDENT ON THE WORK TO BE INSPECTED. FAILURE TO OBTAIN NECESSARY INSPECTION(S) AND APPROVAL(S) SHALL RESULT IN THE CONTRACTOR BEING FULLY RESPONSIBLE FOR ALL PROBLEMS ARISING FROM UNINSPECTED WORK.

GRADING, & DRAINAGE:

1. CLEAR AND GRUB WITHIN WORK LIMITS ALL SURFACE VEGETATION, TREES, STUMPS, BRUSH, ETC.

2. ALL TREES, BRUSH AND DEBRIS ASSOCIATED WITH CLEARING, STRIPPING OR GRADING SHALL BE REMOVED AND DISPOSED OF OFF-SITE.

3. FINISH PAVEMENT GRADES AT TRANSITION IN EXISTING PAVEMENT SHALL MATCH EXISTING PAVEMENT GRADES OR BE FEATHERED PAST JOINTS WITH EXISTING PAVEMENT AS REQUIRED TO PROVIDE A SMOOTH, FREE DRAINING SURFACE.

4. ALL EXISTING OR CONSTRUCTED MANHOLES, CLEANOUTS, MONUMENTS, GAS VALVES, WATER VALVES AND SIMILAR STRUCTURES SHALL BE ADJUSTED TO MATCH FINISH GRADES OF THE PAVEMENT, SIDEWALK, LANDSCAPED AREA OR MEDIAN STRIP WHEREIN THEY LIE.

5. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, NO CUT OR FILL SLOPES SHALL BE CONSTRUCTED STEEPER THAN 2H:1V.

UTILITIES:

1. THE END OF ALL UTILITY STUBS SHALL BE MARKED WITH A 2X4 COLOR CODED TAG WIRED TO THE PIPE STUB.

2. ALL NON-METALLIC WATER, SANITARY AND STORM SEWER PIPING SHALL HAVE 14 GAUGE COLOR CODED TRACER WIRE INSTALLED AS PER CITY OF KENT DETAILS

SANITARY SEWER NOTES:

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE CITY OF KENT STANDARD SPECIFICATIONS, AND WSDOT/APWA STANDARD SPECIFICATIONS, LATEST EDITION.

2. PRIOR TO ANY CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL SCHEDULE AND ATTEND A PRE-CONSTRUCTION CONFERENCE WITH THE CITY OF KENT CONSTRUCTION INSPECTION PERSONNEL BY PHONING 253-856-5500.

3. A COPY OF THESE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.

4. ALL SANITARY SEWER IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE APPROVED PLANS. ANY DEVIATION FROM THESE PLANS WILL REQUIRE APPROVAL FROM THE OWNER, ENGINEER AND APPROPRIATE PUBLIC AGENCIES.

5. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN STREET USE AND ANY OTHER RELATED PERMITS PRIOR TO ANY CONSTRUCTION ACTIVITY.

6. ALL LOCATIONS OF EXISTING UTILITIES SHOWN HEREON HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN. THE CONTRACTOR SHALL CONTACT THE UNDERGROUND UTILITIES LOCATION SERVICE (1-800-424-5555) AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE OWNER OR HIS REPRESENTATIVE AND THE ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.

7. ALL SEWER PIPE SHALL CONFORM TO ONE OF THE FOLLOWING SPECIFICATIONS:

   - DUCTILE IRON - CLASS 50 (ONLY WHERE SPECIFIED ON THE PLANS).
   - PVC - CONFORMING TO ASTM D-3034 OR 3035, SDR 35, WITH FITTINGS AND GASKETS CONFORMING TO CITY OF KENT STANDARDS.

8. ALL DUCTILE IRON PIPE SHALL HAVE AN APWA CLASS "B" PIPE BEDDING. ALL PVC PIPE SHALL HAVE AN APWA CLASS "F" (5/8 INCH MINUS CRUSHED ROCK) FLEXIBLE PIPE BEDDING.

9. PIPE TRENCH BACKFILL FOR THE LATERAL SHALL BE ONE AND ONE QUARTER (1-1/4) INCH MINUS CRUSHED ROCK IN CONFORMANCE WITH SECTION 9.03.9(3) OF THE CITY OF KENT STANDARD SPECIFICATIONS.

10. SIDE SEWER STUB SHALL BE A MINIMUM SIX (6) INCH DIAMETER AND HAVE A MINIMUM SLOPE OF 1.0 PERCENT. SIDE SEWER TEE STATIONS ARE REFERENCED FROM THE NEAREST DOWNSTREAM MANHOLE.

11. THE CONTRACTOR SHALL PROVIDE THE CITY OF KENT WITH ACCURATE AS-BUILT RECORDS OF ALL SIDE SEWER LOCATIONS.

12. WHERE A WATER MAIN CROSSES ABOVE THE SANITARY SEWER, AND LESS THAN 1.5 FEET OF VERTICAL CLEARANCE EXISTS BETWEEN THE TOP OF SEWER AND BOTTOM OF WATER MAIN, THE SEWER SHALL BE CONSTRUCTED OR RECONSTRUCTED WITH DUCTILE IRON PIPE (CLASS 50) FOR A MINIMUM HORIZONTAL DISTANCE OF ONE CONTINUOUS EIGHTEEN (18) FEET NOMINAL PIPE ACROSS THE WATER MAIN CROSSING WITH NO JOINTS.

13. ANY OPEN CUTS OF EXISTENT PUBLIC ROADWAYS SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH CITY OF KENT STANDARDS. ALL CUTS INTO EXISTING ASPHALT SHALL BE ALONG NEAT, CONTINUOUS, SAW CUT LINE. A TEMPORARY COLD MIX PATCH MUST BE PLACED IMMEDIATELY AFTER BACKFILL AND COMPACTIONS. IN PAVED AREAS THE MATERIAL USED SHALL MATCH THE EXISTING STREET SECTION UNLESS OTHERWISE DIRECTED BY THE ENGINEER. IN NO CASE SHALL THE THICKNESS OF THE ASPHALT CONCRETE BE LESS THAN THREE (3) INCH OF CLASS B ASPHALT CONCRETE. TRENCH BACKFILL AND COMPACTION SHALL BE COMPLETED PRIOR TO TESTING LINES FOR LEAKAGE. THE CONTRACTOR SHALL CLOSELY FOLLOW REQUIREMENTS OF THE RIGHT-OF-WAY PERMIT; SPECIFICALLY, WORKING HOURS, DETOUR AND WARNING SIGNS AND NOTIFICATION OF ROAD ALTERATIONS TO THE POLICE AND/OR OTHER EMERGENCY SERVICES.

14. NEW CONNECTIONS TO EXISTING FACILITIES SHALL BE SEALED OFF UNTIL UPSTREAM CONSTRUCTION IS FINISHED, TESTED, CLEANED AND ACCEPTED. ALL CONSTRUCTION DEBRIS AND WATER SHALL BE REMOVED PRIOR TO OPENING THE SEAL. ALL TV INSPECTION AND PRESSURE TESTING SHALL BE IN THE PRESENCE OF A CITY OF KENT INSPECTOR.

ROGER B NORTH
STATE OF WASHINGTON
43593
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE:

DATE: 8/26/2011

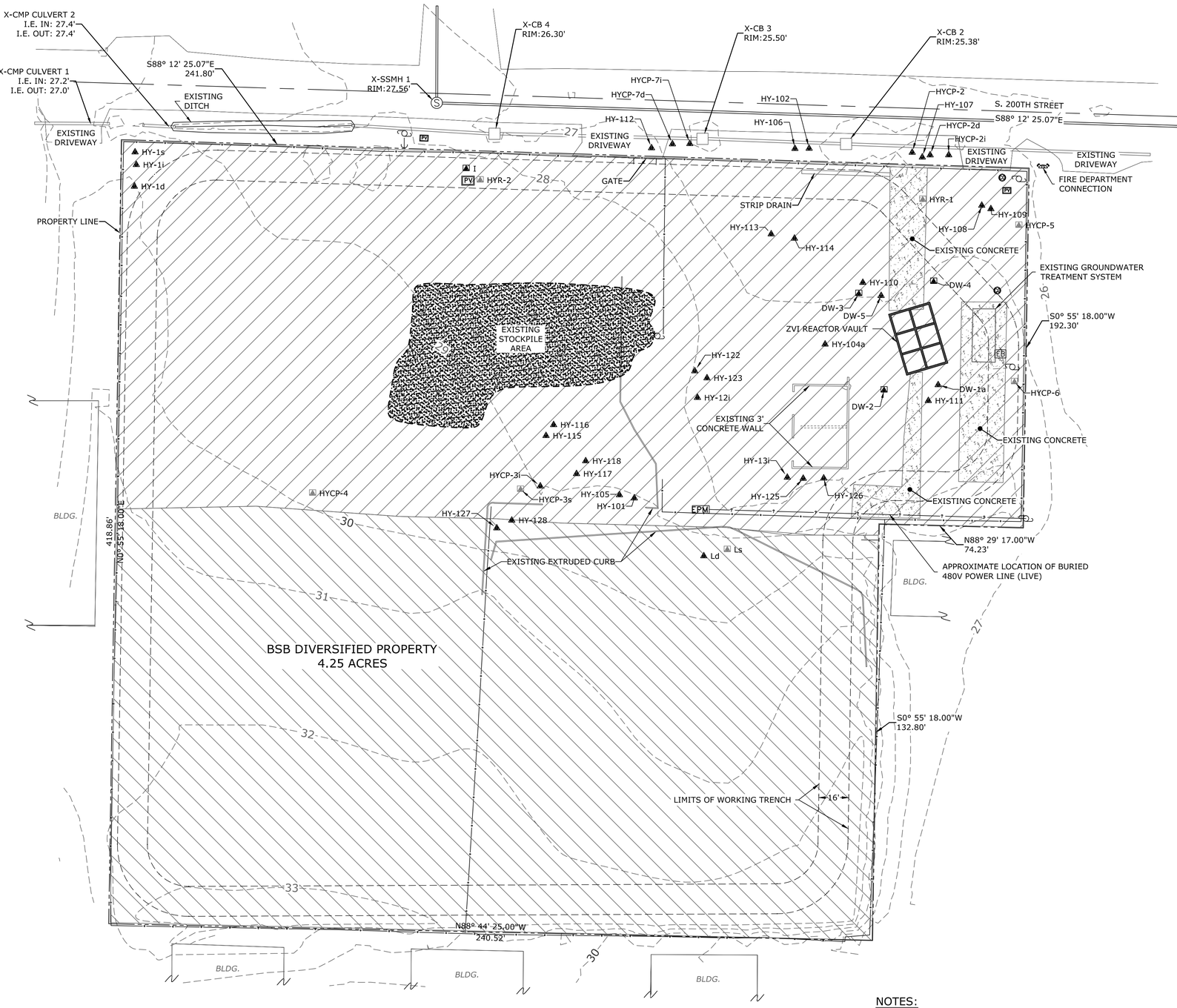
FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

NOTES

DRAWING NO. 2

OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\LEGEND AND NOTES.DWG PLOTTED: 8/26/2011 6:44 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)



LEGEND:

- EXISTING ASPHALT PAVED PRIOR TO 1980
- EXISTING ASPHALT PAVED IN 2002
- SP-29 — SOIL BORING OR SOIL PROBE
- HY-123 — MONITORING WELL (PROTECT)
- HYCP-3s — MONITORING WELL (DECOMMISSION BY OTHERS)
- SANITARY SEWER MANHOLE AND SEWER
- UTILITY POLE
- GUY WIRE
- EXISTING CATCH BASIN AND PIPE
- BENCHMARK
- FENCE
- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- POWER LINE 480V
- EPM — ELECTRIC POWER METER
- EB — ELECTRICAL BOX
- CO — CLEANOUT
- PV — POWER VAULT

NOTES:

1. TOPOGRAPHICAL DATA PROVIDED BY CRAMER NORTHWEST, INC.
2. HORIZONTAL DATUM NAD 83/91. BEARINGS SHOWN ARE BASED ON THE EAST LINE OF S.E. 1/4 SEC. 1, TWN. 22N., R 4E, BEING NORTH 00°55'18" EAST, PER CITY OF KENT.
3. VERTICAL DATUM: NAVD 1988 FROM BENCH MARK #939: ELEVATION = 27.20; CITY OF KENT, WASHINGTON.
4. VISTA CONSULTANTS, LLC, ASSUMES NO RESPONSIBILITY FOR TOPOGRAPHIC DATA PRESENTED IN THIS DRAWING.

ROGER B NORTH
STATE OF WASHINGTON
13597
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 30' 60'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 30'

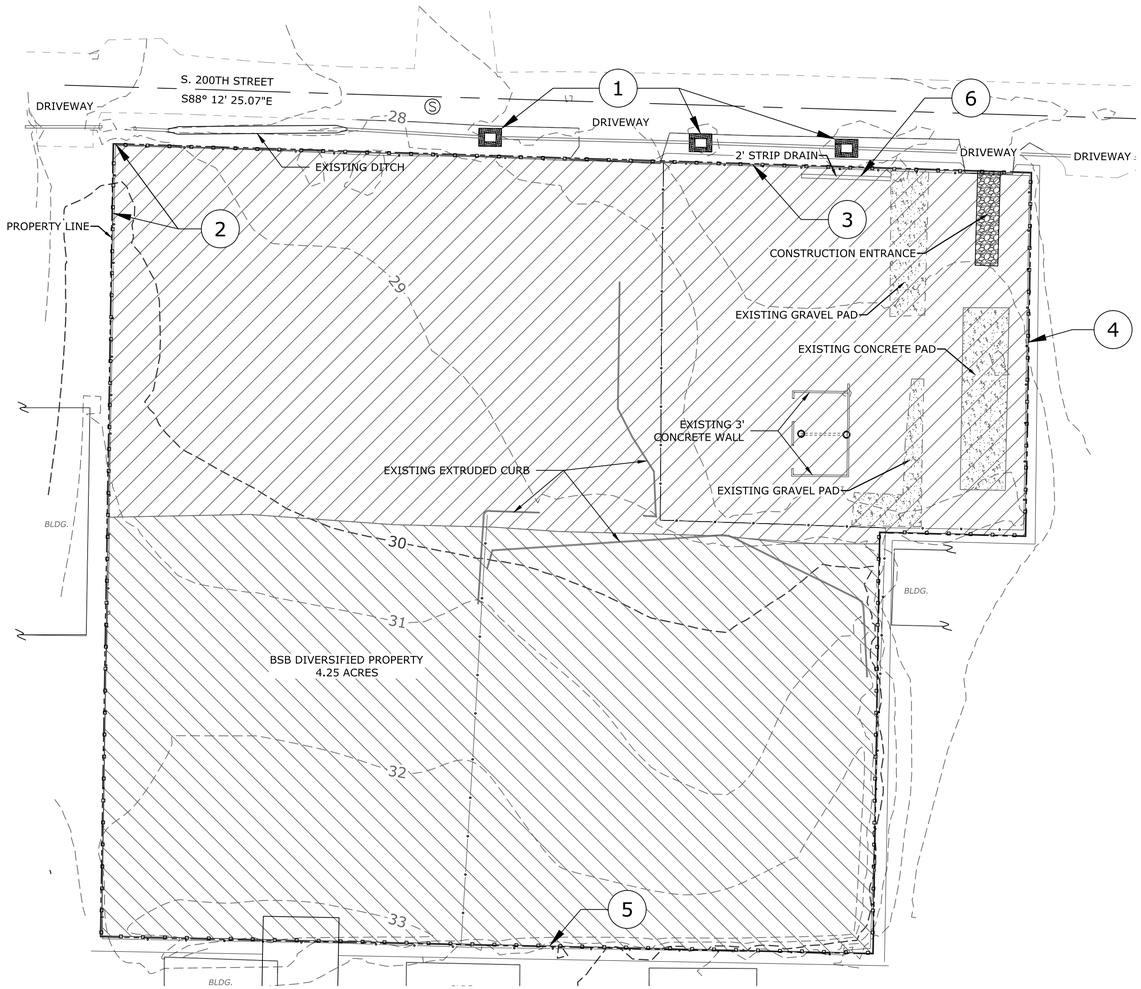
DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

SITE PLAN

DRAWING NO. 3 OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\SITE PLAN.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

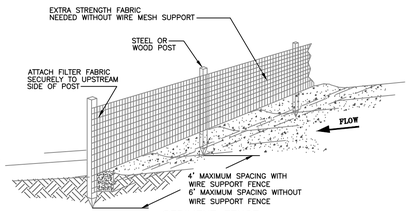


EROSION CONTROL NOTES:

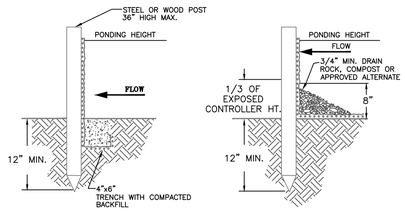
1. SILT FABRIC SHALL BE PLACED OVER THE CATCH BASIN INLETS SO THAT NO SEDIMENT WILL ACCUMULATE IN THE CATCH BASINS.
2. THE CONTRACTOR SHALL INSPECT SITE AND ENTRANCE DRIVEWAY DAILY AND WASH AS NEEDED SO THAT NO SEDIMENT IS WASHED OR CARRIED OFF-SITE.
3. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED.
4. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING, GRADING AND CONSTRUCTION ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
5. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
6. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY.
7. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

NOTES FOR SEDIMENT FENCES:

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND SHALL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST, OR OVERLAP 2"X 2" POSTS AND ATTACHED AS SHOWN ON DETAIL.
2. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS WHERE FEASIBLE. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 18 INCHES.
3. THE FILTER FABRIC SHALL HAVE A MINIMUM VERTICAL BURIAL OF 6 INCHES. ALL EXCAVATED MATERIAL FROM FILTER FABRIC FENCE INSTALLATION SHALL BE BACKFILLED AND COMPACTED ALONG THE ENTIRE DISTURBED AREA.
4. STANDARD OR HEAVY DUTY FILTER FABRIC FENCE SHALL HAVE MANUFACTURED STITCHED LOOPS FOR 2"X 2" POST INSTALLATION. STITCHED LOOPS SHALL BE INSTALLED ON THE UPHILL SIDE OF THE SLOPED AREA.
5. FILTER FABRIC FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED.
6. FILTER FABRIC FENCES SHALL BE INSPECTED BY APPLICANT/CONTRACTOR IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.



SEDIMENT FENCE



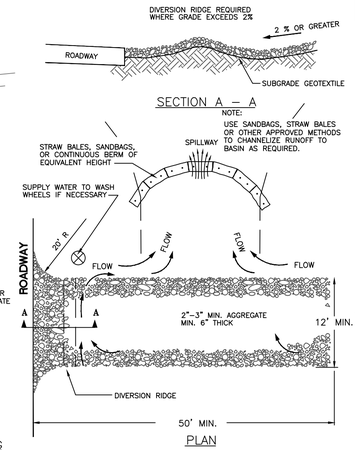
INSTALLATION WITHOUT TRENCHING

TRENCH DETAIL

NOTES:

1. SEDIMENT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
2. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN IT EXCEEDS 1/3 THE EXPOSED HEIGHT OF CONTROLLER STORAGE DEPTH.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

SILT FENCE STANDARD DETAILS



PLAN

NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT–OF–WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

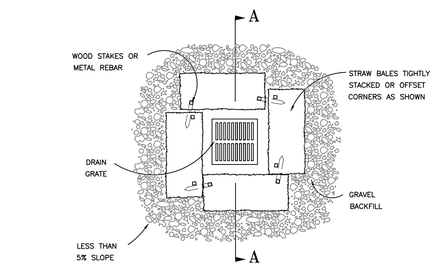
GRAVEL CONSTRUCTION ENTRANCE DETAIL

KEYNOTES NOTES:

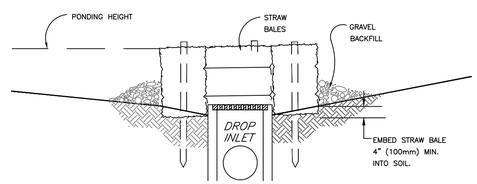
1. INSTALL STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER
2. INSTALL 685 LF SILT FENCE
3. INSTALL 165 LF SILT FENCE
4. INSTALL 515 LF SILT FENCE
5. INSTALL 420 LF SILT FENCE
6. ABANDON EXISTING 2' STRIP DRAIN

OTHER NOTES:

1. CLEAR AND GRUB ALL VEGETATION
2. REMOVE CURBS, WALLS AND CONCRETE PADS



PLAN VIEW



SECTION A–A

NOTES:

1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%).
2. EMBED THE BALES 4" (100mm) INTO THE SOIL AND OFFSET CORNERS OR PLACE BALES WITH ENDS TIGHTLY ABUTTING. GRAVEL BACKFILL WILL PREVENT EROSION OR FLOW AROUND THE BALES. STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION. DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. EXCAVATION OF A BASIN ADJACENT TO THE DROP INLET OR A TEMPORARY DIKE ON THE DOWNSLOPE OF THE STRUCTURE MAY BE NECESSARY.

ROGER B. NORTH
STATE OF WASHINGTON
13591
REGISTERED
PROFESSIONAL ENGINEER

N

REDUCTION SCALE CHECK
1"
0 40' 80'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE:
1" = 40'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

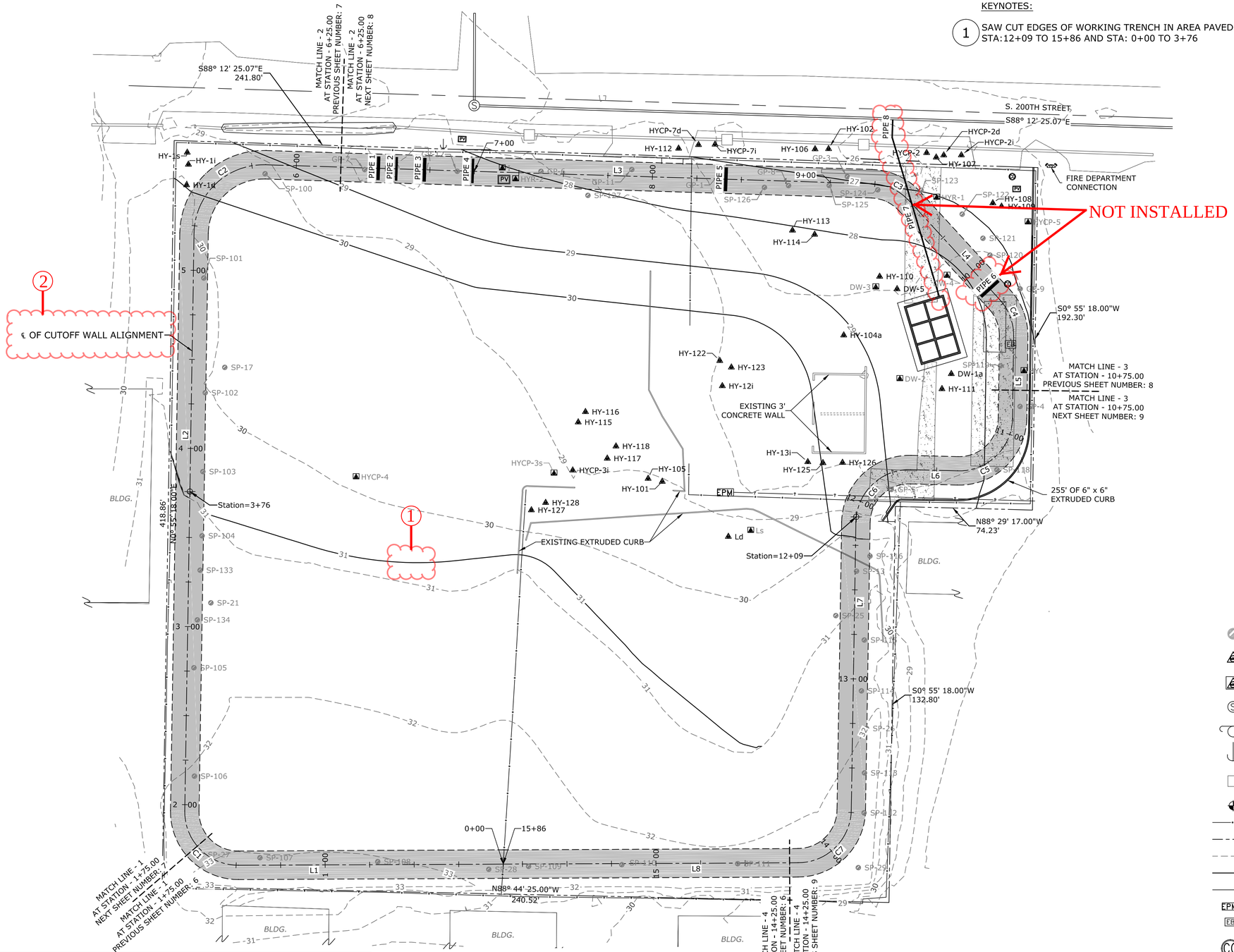
EROSION CONTROL AND DEMO PLAN

DRAWING NO.
4
OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\EROSION CONTROL AND DEMO PLAN.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

KEYNOTES:

1. SAW CUT EDGES OF WORKING TRENCH IN AREA PAVED IN 2002 STA:12+09 TO 15+86 AND STA: 0+00 TO 3+76



CUTOFF WALL				
Number	LENGTH/ CHORD LENGTH	BEARING/ CHORD BEARING	RADIUS	START STATION
L1	148.70	S89° 44' 42"W		0+00.00
C1	42.86	N44° 40' 00"W	30.0	1+48.70
L2	324.47	N0° 55' 18"E		1+96.44
C2	55.57	N46° 21' 26"E	39.0	5+20.91
L3	340.43	S88° 12' 25"E		5+82.76
C3	23.30	S65° 21' 33"E	30.0	9+23.19
L4	74.95	S42° 30' 42"E		9+47.11
C4	22.13	S20° 52' 15"E	30.0	10+22.06
L5	45.97	S0° 46' 11"W		10+44.73
C5	42.70	S46° 08' 27"W	30.0	10+90.69
L6	26.37	N88° 29' 17"W		11+38.21
C6	42.64	S46° 13' 00"W	30.0	11+64.58
L7	161.72	S0° 55' 18"W		12+12.01
C7	41.99	S45° 20' 00"W	30.0	13+73.73
L8	165.55	S89° 44' 42"W		14+20.24

LEGEND:

SP-29	SOIL BORING OR SOIL PROBE
HY-123	MONITORING WELL (PROTECT)
HYCP-3s	MONITORING WELL (DECOMMISSION BY OTHERS)
	SANITARY SEWER MANHOLE AND SEWER
	UTILITY POLE
	GUY WIRE
	EXISTING CATCH BASIN AND PIPE
	BENCHMARK
	FENCE
	PROPERTY LINE
	EXISTING CONTOUR
	PROPOSED CONTOUR
?	POWER LINE 480V
EPM	ELECTRIC POWER METER
EB	ELECTRICAL BOX
CO	CLEANOUT
PV	POWER VAULT

UTILITY SLEEVES							
NAME	LENGTH	DIA.	TYPE	STA:	INVERT	SLOPE	DESC.
PIPE 1	13'	18"	N-12	6+46	23.00'	0.00%	DRY UTILITY SLEEVE
PIPE 2	13'	12"	N-12	6+56	22.00'	0.00%	WATER SLEEVE
PIPE 3	13'	18"	N-12	6+72	24.50'	0.00%	RAIN DRAIN SLEEVE
PIPE 4	13'	12"	N-12	6+99	22.00'	0.00%	SANITARY SEWER SLEEVE
PIPE 5	13'	18"	N-12	8+41	23.80'	0.00%	RAIN DRAIN SLEEVE 2
~~PIPE 6~~	~~13'~~	~~18"~~	~~N-12~~	~~10+14~~	~~24.10'~~	~~0.00%~~	~~STORM WATER SLEEVE~~

~~VAULT SS~~						
NAME	LENGTH	DIA.	TYPE	SLOPE	INVERT	INVERT LOCATION
PIPE 7	93'	4" & 6"	PVC	1.00%	16.75'	AT VAULT
PIPE 8	10'	6"	PVC	UNKNOWN	15.82'	AT PIPE 7/8 JOINT

NOTE: LENGTHS OF PIPES 7 AND 8 MAY HAVE TO BE ADJUSTED DEPENDING ON PIPE 8 CONNECTION TO SANITARY SEWER.

NOTES:
1. SEE TETRA TECH/INCA DRAWINGS FOR RECORD FINAL GRADE
2. SEE DRAWINGS 6,7,8, AND 9 FOR RECORD ALIGNMENT

OTHER NOTES:

PERFORM THE FOLLOWING ALONG THE ALIGNMENT OF THE CUTOFF WALL PRIOR TO PERFORMING ANY EXCAVATION ACTIVITIES FOR THE CUTOFF WALL IN THE FORMER SLUDGE DRYING BED AREAS, TO EXPLORE FOR THE PRESENCE OF UNSTABILIZED SLUDGE AND/OR THE PRESENCE OF PVC COVER MATERIALS:

- FROM STATION 12+25 TO STATION 1+75 EXCAVATE A CONTINUOUS 6-FOOT DEEP TRENCH APPROXIMATELY 1-FOOT WIDE.
- FROM STATION 1+75 TO STATION 3+75 EXCAVATE 6-FOOT DEEP POTHOLES AT 50-FOOT INTERVALS.

REDUCTION SCALE CHECK
1"
0 30' 60'
GRAPHICAL SCALE

ROGER B NORTH STATE OF WASHINGTON 43597 REGISTERED PROFESSIONAL ENGINEER

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 30'

DATE: 8/26/2011

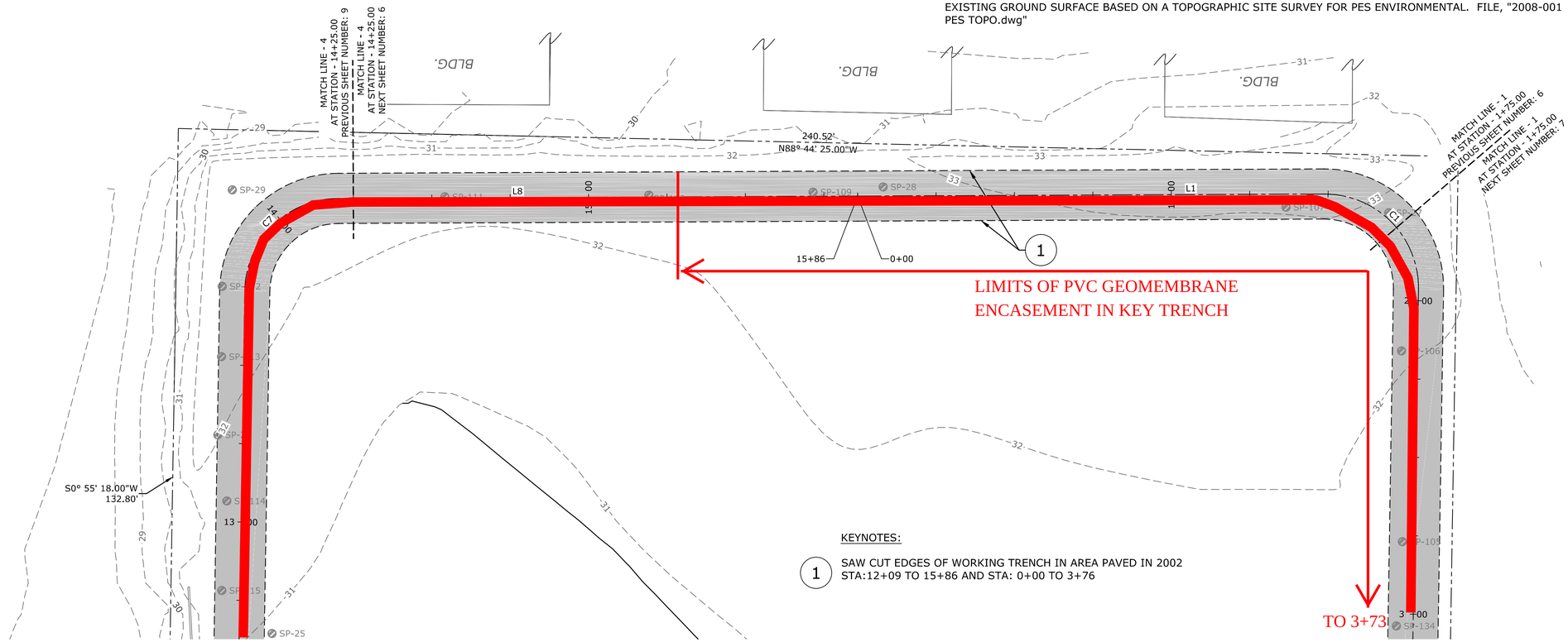
FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

CUTOFF WALL PLAN

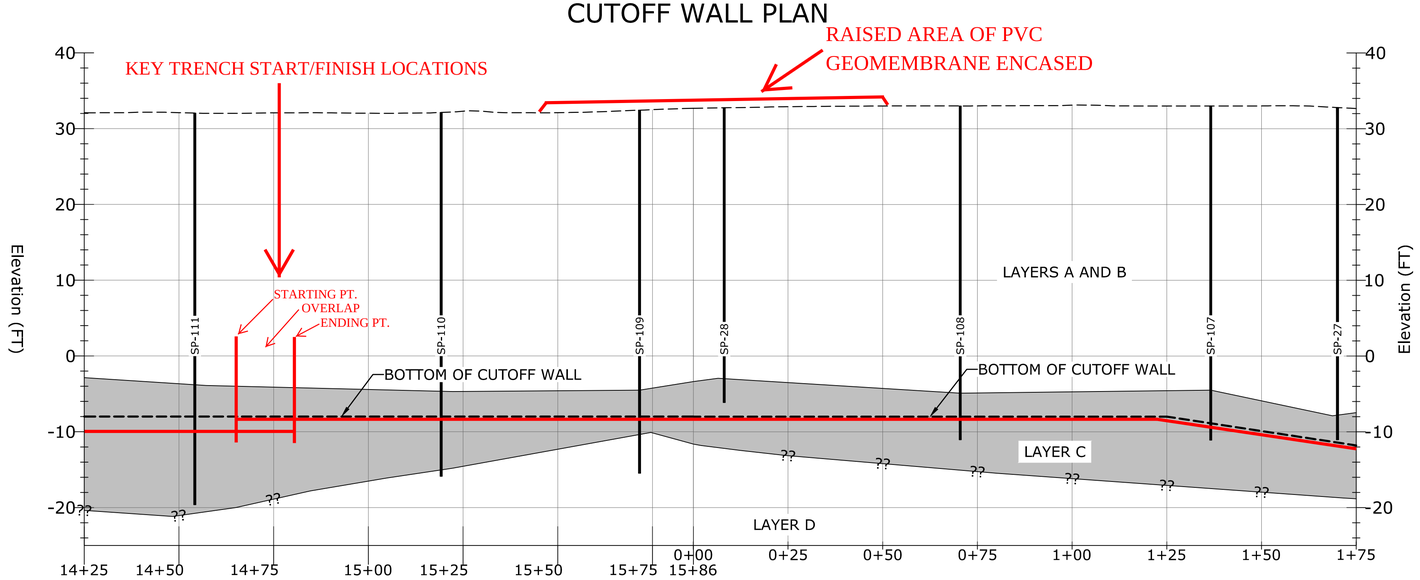
DRAWING NO. 5 OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\CUTOFF WALL.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

EXISTING GROUND SURFACE BASED ON A TOPOGRAPHIC SITE SURVEY FOR PES ENVIRONMENTAL. FILE, "2008-001 PES TOPO.dwg"

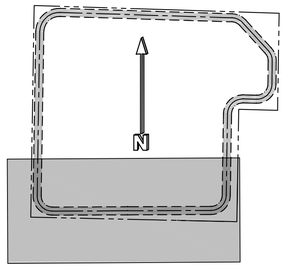


CUTOFF WALL PLAN



14+25	14+50	14+75	15+00	15+25	15+50	15+75	15+86	0+00	0+25	0+50	0+75	1+00	1+25	1+50	1+75
32.1'	32.1'	32.0'	32.3'	32.1'	32.5'		32.9'	33.0'	33.0'	33.1'	33.0'	33.0'	32.7'	EXISTING GROUND ELEVATION (FT)
-3.7'	-4.1'	-4.4'	-4.7'	-4.6'	-4.2'		-3.5'	-4.3'	-4.9'	-4.7'	-4.6'	-5.9'	-7.5'	TOP OF LAYER C ELEVATION (FT)
-8.0'	-8.0'	-8.0'	-8.0'	-8.0'	-8.0'		-8.0'	-8.0'	-8.0'	-8.0'	-8.0'	-9.9'	-11.8'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
40.1'	40.1'	40.0'	40.3'	40.1'	40.5'		40.9'	41.0'	41.0'	41.1'	41.0'	42.9'	44.5'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE



REDUCTION SCALE CHECK
1"
0 20' 40'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 20'

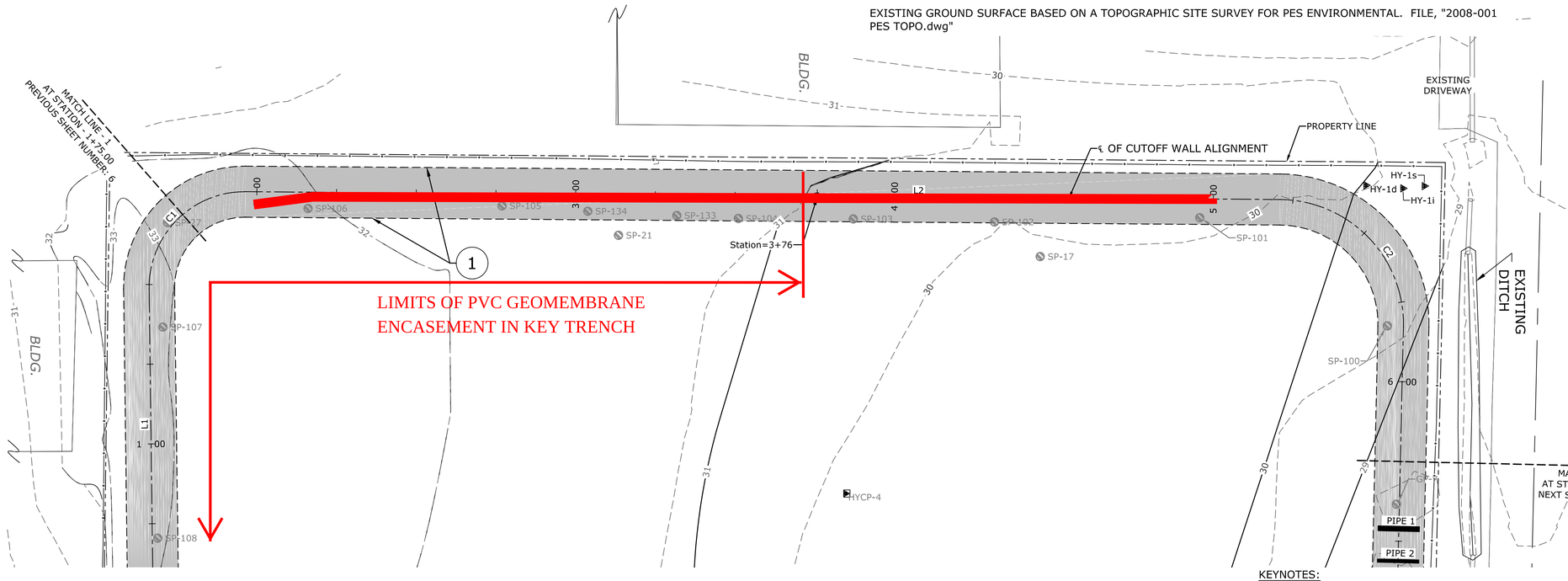
DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 1

DRAWING NO. 6 OF 13

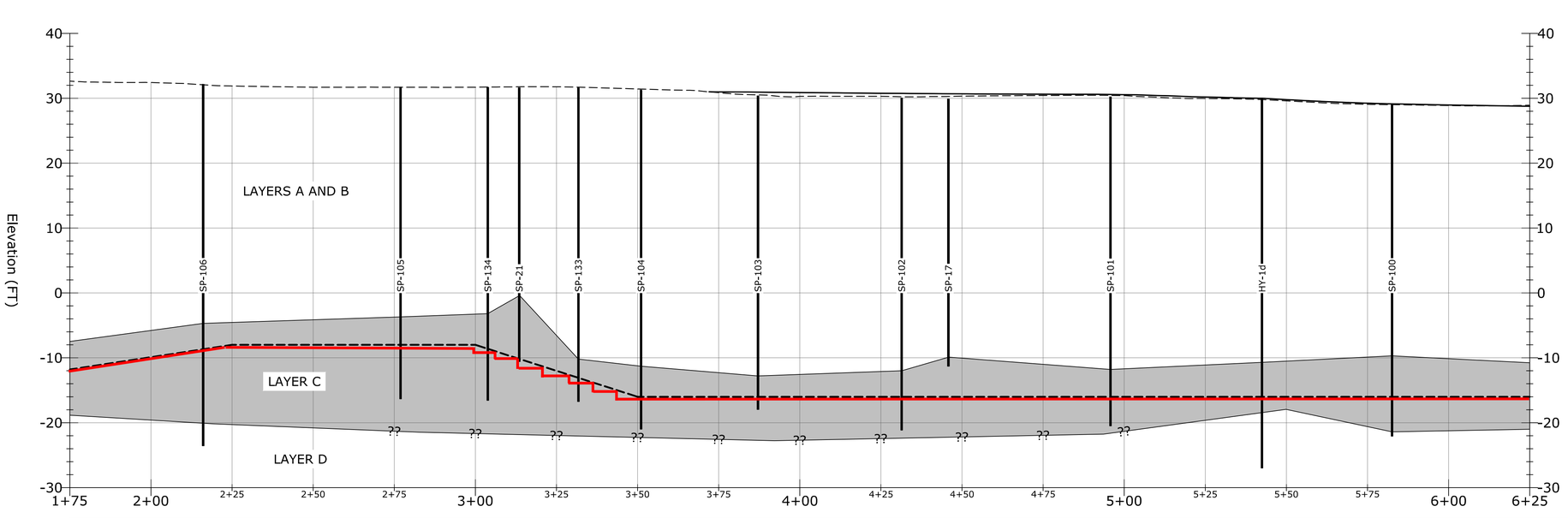
C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\CUTOFF WALL.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

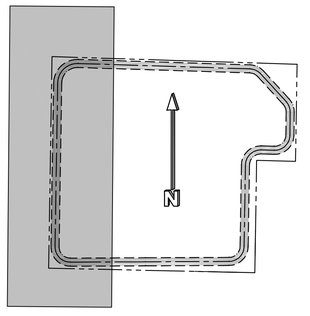


CUTOFF WALL PLAN

KEYNOTES:

1 SAW CUT EDGES OF WORKING TRENCH IN AREA PAVED IN 2002 STA:12+09 TO 15+86 AND STA: 0+00 TO 3+76





32.4'	31.9'	31.7'	31.7'	31.7'	31.8'	31.4'	30.9'	30.3'	30.3'	30.3'	30.4'	30.4'	30.0'	29.6'	29.1'	28.9'	28.9'	EXISTING GROUND ELEVATION (FT)
-5.8'	-4.6'	-4.1'	-3.7'	-3.3'	-6.5'	-11.2'	-12.3'	-12.6'	-12.1'	-10.0'	-11.0'	-11.7'	-11.1'	-10.5'	-9.9'	-10.1'	-10.8'	TOP OF LAYER C ELEVATION (FT)
-9.9'	-8.0'	-8.0'	-8.0'	-8.0'	-12.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
42.3'	39.9'	39.7'	39.7'	39.7'	43.8'	47.4'	46.9'	46.3'	46.3'	46.3'	46.4'	46.4'	46.0'	45.6'	45.1'	44.9'	44.9'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE

REDUCTION SCALE CHECK
1"
0 20' 40'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 20'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 2

DRAWING NO. 7 OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\CUTOFF WALL.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

EXISTING GROUND SURFACE BASED ON A TOPOGRAPHIC SITE SURVEY FOR PES ENVIRONMENTAL.
FILE, "2008-001 PES TOPO.dwg"

NOT INSTALLED

MATCH LINE - 2
AT STATION - 6+25
PREVIOUS SHEET NUM

MATCH LINE - 3
AT STATION - 10+75.00
NEXT SHEET NUMBER: 9

S. 200TH STREET
S88° 12' 25.07"E

EXISTING DRIVEWAY

PROPERTY LINE

WALL ALIGNMENT

EXISTING CONCRETE

STRIP DRAIN

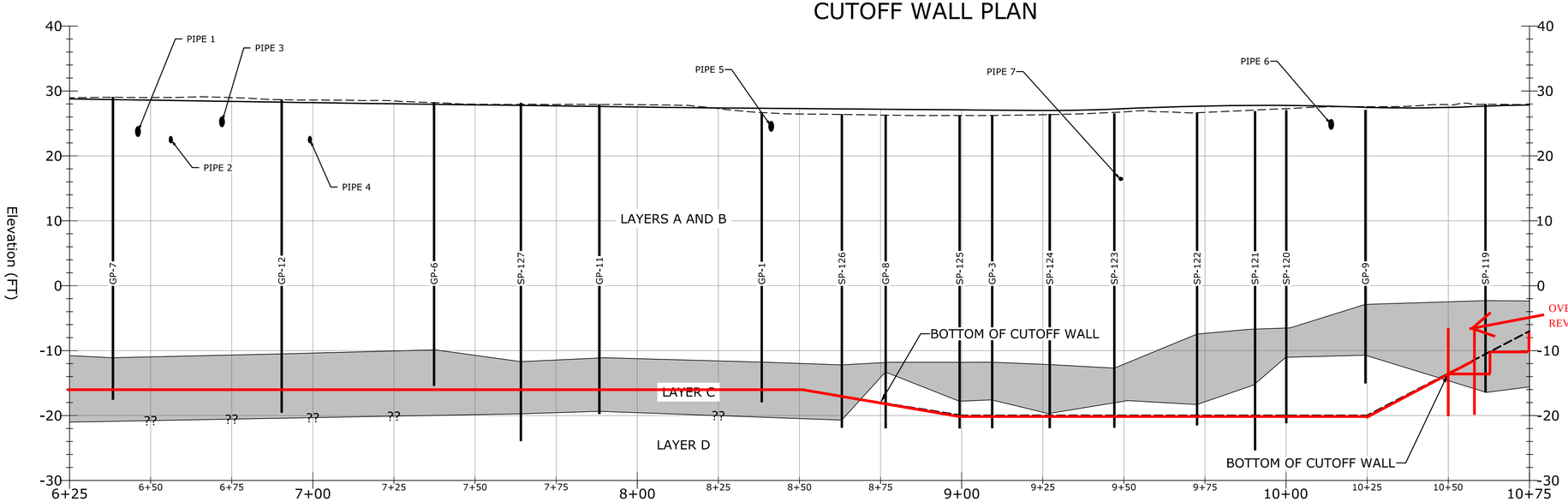
GATE

PV

EB

N

CUTOFF WALL PLAN



29.0'	29.0'	28.6'	28.5'	28.0'	27.9'	27.9'	27.3'	26.5'	26.3'	26.2'	26.3'	26.8'	26.7'	27.3'	27.6'	27.9'	27.9'	EXISTING GROUND ELEVATION (FT)
-11.0'	-10.7'	-10.4'	-10.1'	-10.7'	-11.4'	-11.2'	-11.6'	-12.0'	-11.9'	-11.8'	-12.1'	-12.1'	-7.3'	-6.5'	-2.9'	-2.5'	-2.3'	TOP OF LAYER C ELEVATION (FT)
-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-18.0'	-20.0'	-20.0'	-20.0'	-20.0'	-20.0'	-20.0'	-13.5'	-7.0'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
45.0'	45.0'	44.6'	44.5'	44.0'	43.9'	43.9'	43.3'	42.5'	44.3'	46.2'	46.3'	46.8'	46.7'	47.3'	47.6'	41.4'	34.9'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE

REDUCTION SCALE CHECK
1"
0 20' 40'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE:
1" = 20'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 3

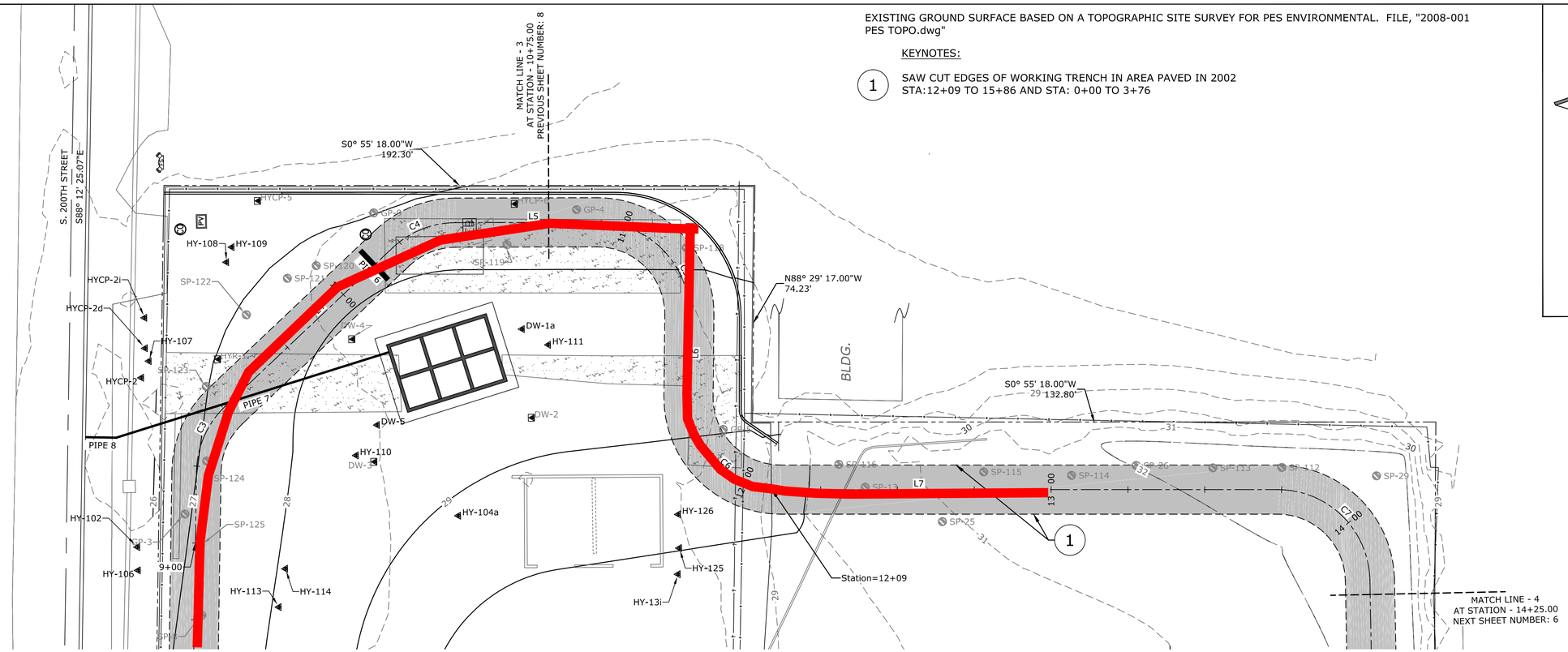
DRAWING NO.
8
OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\CUTOFF WALL.DWG PLOTTED: 8/26/2011 6:46 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

EXISTING GROUND SURFACE BASED ON A TOPOGRAPHIC SITE SURVEY FOR PES ENVIRONMENTAL. FILE, "2008-001 PES TOPO.dwg"

KEYNOTES:

1 SAW CUT EDGES OF WORKING TRENCH IN AREA PAVED IN 2002 STA:12+09 TO 15+86 AND STA: 0+00 TO 3+76



REDUCTION SCALE CHECK

1"

0 20' 40'

GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

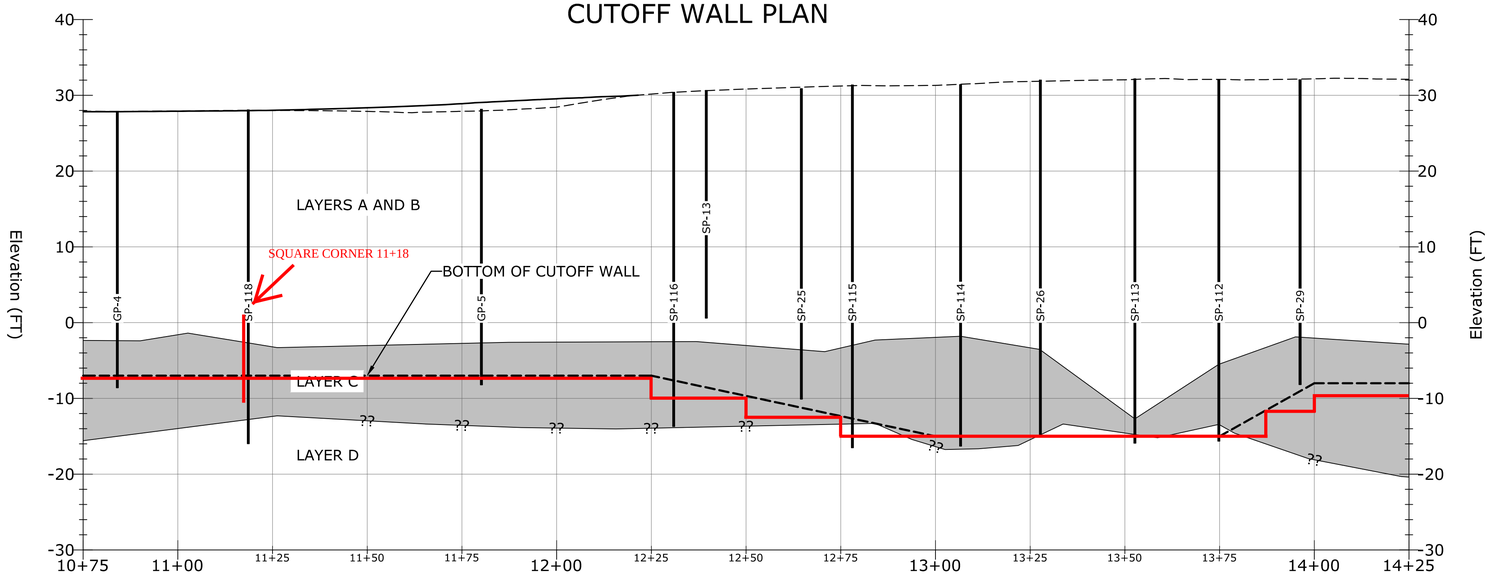
PROJECT NO. 11-12

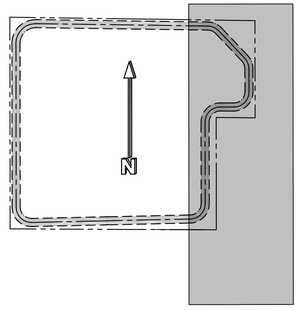
REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 20'

DATE: 8/26/2011

CUTOFF WALL PLAN





27.9'	28.0'	27.9'	27.9'	28.4'	30.2'	30.8'	31.2'	31.3'	31.8'	32.0'	32.1'	32.2'	EXISTING GROUND ELEVATION (FT)
-1.6'	-3.2'	-3.0'	-2.7'	-2.6'	-2.5'	-3.0'	-3.3'	-1.9'	-3.3'	-11.7'	-5.5'	-2.0'	TOP OF LAYER C ELEVATION (FT)
-7.0'	-7.0'	-7.0'	-7.0'	-7.0'	-7.0'	-9.7'	-12.3'	-15.0'	-15.0'	-15.0'	-15.0'	-8.0'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
34.9'	35.0'	34.9'	34.9'	35.4'	37.2'	40.5'	43.6'	46.3'	46.8'	47.0'	47.1'	40.2'	DEPTH OF CUTOFF WALL (FT)

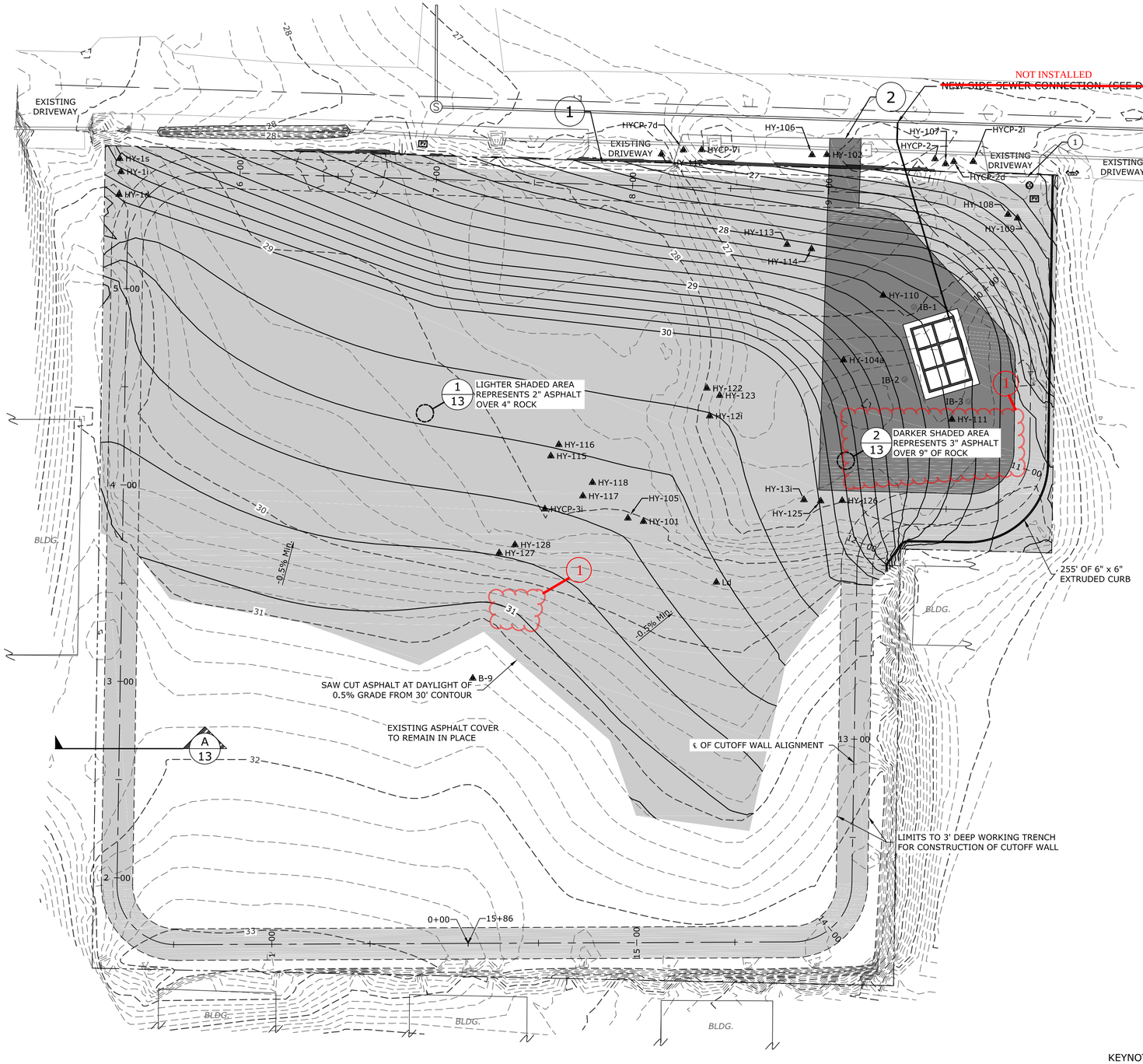
CUTOFF WALL PROFILE

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 4

DRAWING NO. 9 OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\CUTOFF WALL.DWG PLOTTED: 8/26/2011 6:46 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)



NOTES:

1. SEE TETRA TECH/INCA DRAWING FOR RECORD FINAL CONTOURS.

LEGEND:

IB-1	INTERCONNECT BORING
SP-29	SOIL BORING OR SOIL PROBE
HY-123	MONITORING WELL (PROTECT)
HYCP-3s	MONITORING WELL (DECOMMISSION BY OTHERS)
	SANITARY SEWER MANHOLE AND SEWER
	UTILITY POLE
	GUY WIRE
	EXISTING CATCH BASIN AND PIPE
	BENCHMARK
	FENCE
	PROPERTY LINE
	EXISTING CONTOUR
	PROPOSED CONTOUR (TOP OF ASPHALT)
?	POWER LINE 480V
EPM	ELECTRIC POWER METER
EB	ELECTRICAL BOX
CO	CLEANOUT
PV	POWER VAULT

KEYNOTES:

1. ABANDON SITE ENTRANCE. REMOVE GATES AND INSTALL NEW FENCE.
2. INSTALL NEW 16 FOOT WIDE ENTRANCE WITH GATES.

REDUCTION SCALE CHECK

1"

0 30' 60'

GRAPHICAL SCALE

ROGER B NORTH STATE OF WASHINGTON 43597 REGISTERED PROFESSIONAL ENGINEER

N

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 30'

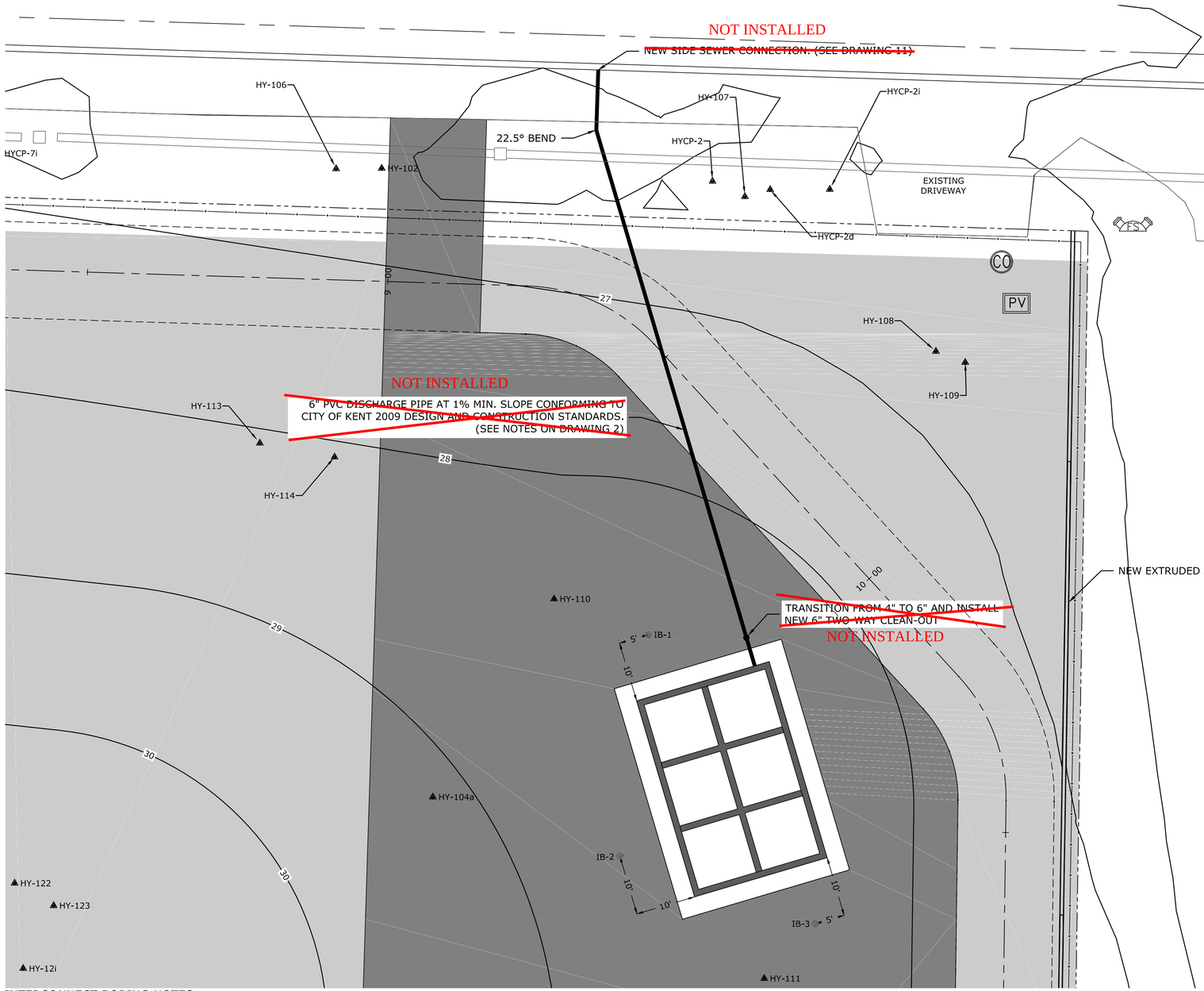
DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

COVER GRADING

DRAWING NO. 10 OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\FINAL COVER PLAN.DWG PLOTTED: 8/26/2011 6:46 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)



INTERCONNECT BORING NOTES:

1. BORINGS TO BE DRILLED USING A DRILL RIG EQUIPPED WITH NOMINAL 12-INCH INSIDE-DIAMETER HOLLOW STEM AUGERS.
2. AUGERS TO BE ADVANCED TO THE BOTTOM DEPTH/ELEVATION WITH A WOOD PLUG SEALING THE BOTTOM OF THE LEAD AUGER.
3. WHEN FINAL DEPTH IS REACHED, AUGERS TO BE FILLED WITH POTABLE WATER, THE WOOD PLUG KNOCKED OUT, AND 10X20 COLORADO SILICA SAND® POURED IN THE INTERIOR OF THE AUGERS.
4. SAND TO BE KEPT UP IN THE AUGERS AS THE AUGERS ARE WITHDRAWN.
5. SAND TO FILL EACH BORING FROM THE BOTTOM DEPTH TO A DEPTH 5 FEET BELOW PROPOSED FINAL GRADE ELEVATION.
6. EACH BORING TO BE FILLED FROM A DEPTH OF 5 FEET BELOW PROPOSED GRADE ELEVATION TO THE BOTTOM OF THE SURFACE PAVING WITH CONCRETE.
7. EACH BORING TO BE SURVEYED FOR HORIZONTAL LOCATION PRIOR TO PAVING OVER THE LOCATION.
8. SOIL GENERATED DURING DRILLING TO BE STOCKPILED WITH OTHER EXCAVATED SOILS.

Interconnect Boring Reference	Bottom of Boring Depth Below Existing Grade (ft)	Approximate Proposed Final Grade Elevation (ft)	Approximate Existing Grade Elevation (ft)	Proposed Bottom of Boring Elevation (ft)
IB-1	30	28.3	27.0	-3.0
IB-2	25	28.7	27.7	2.7
IB-3	27	28.2	27.7	0.7

LEGEND:

- IB-1 — INTERCONNECT BORING
- SP-29 — SOIL BORING OR SOIL PROBE
- HY-123 — MONITORING WELL (PROTECT)
- HYCP-3s — MONITORING WELL (DECOMMISSION BY OTHERS)
- S — SANITARY SEWER MANHOLE AND SEWER
- UTILITY POLE
- GUY WIRE
- EXISTING CATCH BASIN AND PIPE
- BENCHMARK
- FENCE
- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR (TOP OF ASPHALT)
- POWER LINE 480V
- EPM — ELECTRIC POWER METER
- EB — ELECTRICAL BOX
- CO — CLEANOUT
- PV — POWER VAULT

REDUCTION SCALE CHECK
1"
0 10' 20'
GRAPHICAL SCALE

ROGER B NORTH STATE OF WASHINGTON 43593 REGISTERED PROFESSIONAL ENGINEER

N

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 10'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

VAULT AREA DETAILS

DRAWING NO. 11 OF 13

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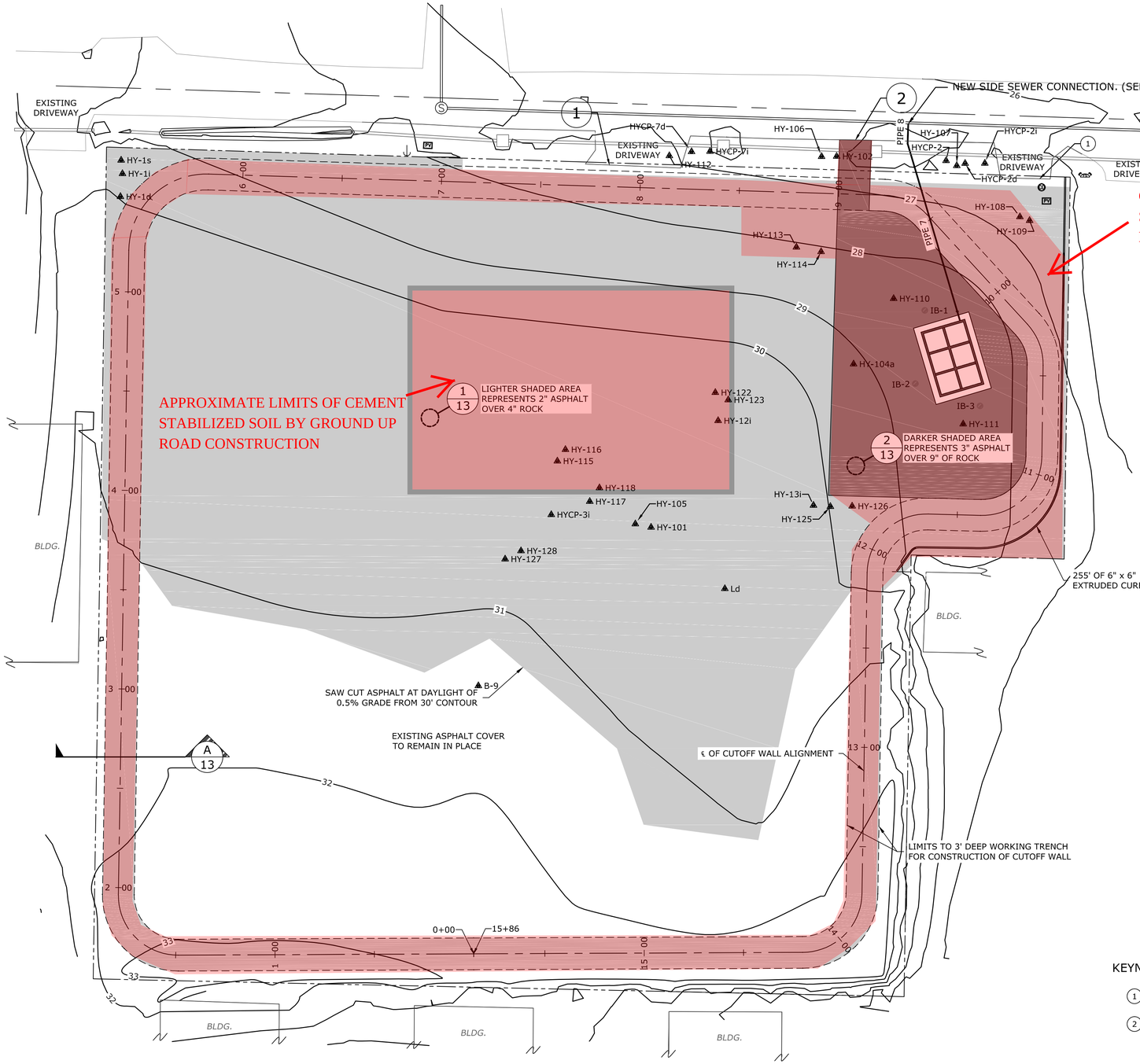


LEGEND:

IB-1	INTERCONNECT BORING
SP-29	SOIL BORING OR SOIL PROBE
HY-123	MONITORING WELL (PROTECT)
HYCP-3s	MONITORING WELL (DECOMMISSION BY OTHERS)
	SANITARY SEWER MANHOLE AND SEWER
	UTILITY POLE
	GUY WIRE
	EXISTING CATCH BASIN AND PIPE
	BENCHMARK
	FENCE
	PROPERTY LINE
	EXISTING CONTOUR
	PROPOSED CONTOUR (TOP OF ASPHALT)
?	POWER LINE 480V
EPM	ELECTRIC POWER METER
EB	ELECTRICAL BOX
CO	CLEANOUT
PV	POWER VAULT

KEYNOTES:

1. ABANDON SITE ENTRANCE. REMOVE GATES AND INSTALL NEW FENCE.
2. INSTALL NEW 16 FOOT WIDE ENTRANCE WITH GATES

ROGER B. NORTH
STATE OF WASHINGTON
43597
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 30' 60'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 30'

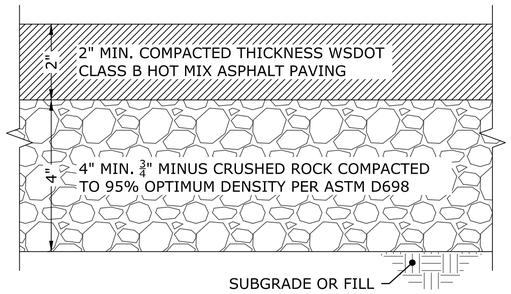
DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

FINAL COVER

DRAWING NO. 12 OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\FINAL COVER PLAN.DWG PLOTTED: 8/26/2011 6:46 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)



DETAIL 1/10 **TYPE 1 FINAL COVER SYSTEM**
N.T.S.

NOTES:

EXISTING MONITORING WELLS

1. PROTECT EXISTING MONITORING WELLS DURING GRADING AND PAVING ACTIVITIES.
2. SURVEY AND PLACE STEEL PLATE OVER EACH WELL SO LOCATIONS CAN BE DETERMINED AFTER GRADING AND PAVING BY SURVEY AND METAL DETECTOR.
3. NOTIFY OWNER IF ANTICIPATED FINISHED PAVED SURFACE WILL BE LESS THAN 1 FT ABOVE EXISTING MONITORING WELL COVER.
4. PERFORM GRADING AND PAVING OVER PROTECTED MONITORING WELLS.

COVER SYSTEM FILL

1. USE SOIL EXCAVATED FROM WORKING TRENCH AND REACTOR VAULT.
2. PLACE IN 6-INCH THICK MAXIMUM LIFTS.
3. COMPACT TO A MINIMUM OF 90 PERCENT OF MODIFIED PROCTOR (ASTM D1557) MAXIMUM DRY DENSITY.

ROGER B NORTH
STATE OF WASHINGTON
43593
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"

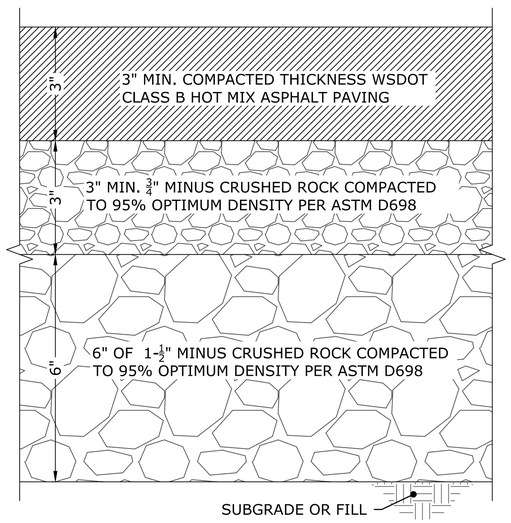
VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

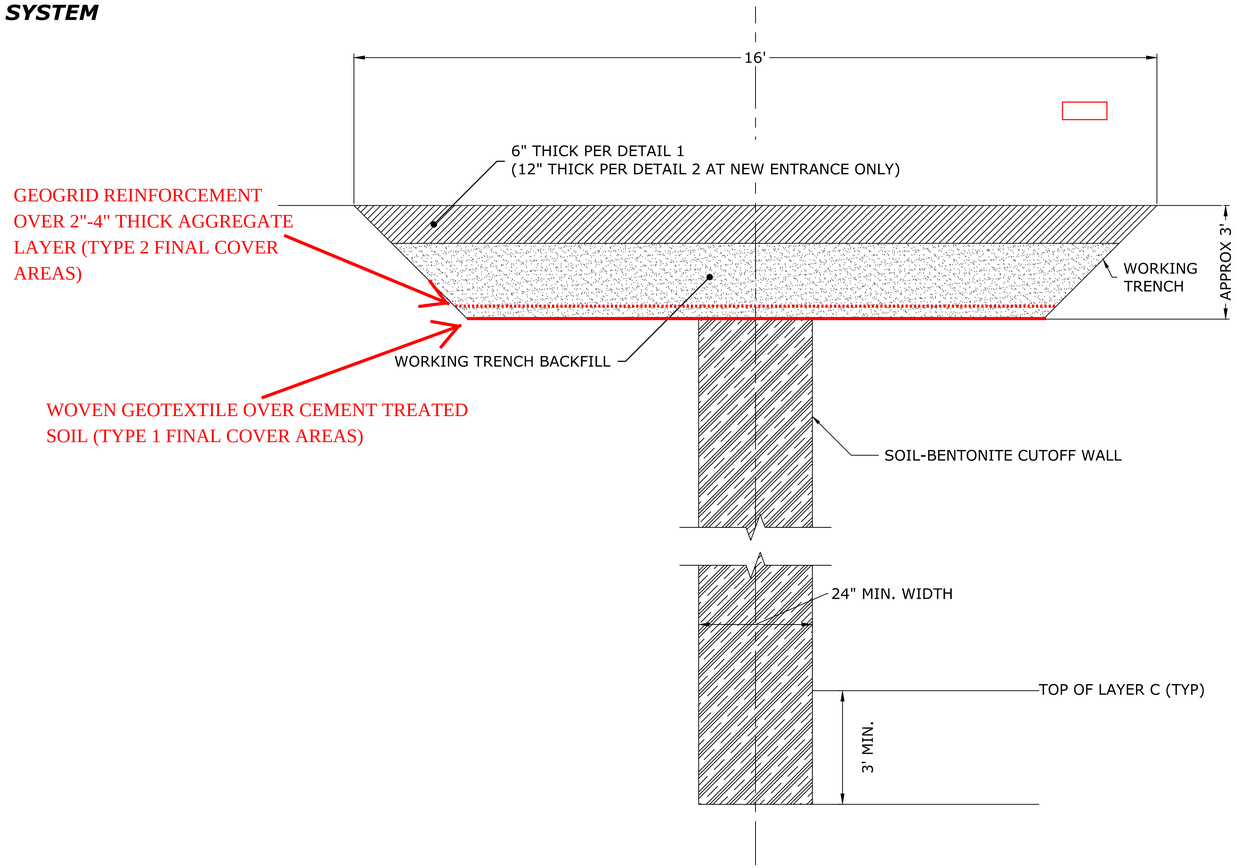
REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: N.T.S.

DATE: 8/26/2011



DETAIL 2/10 **TYPE 2 FINAL COVER SYSTEM**
N.T.S.



SECTION A/10 **WORKING TRENCH SECTION**
N.T.S.

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON
DETAILS

DRAWING NO. 13 OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\DETAILS 1.DWG PLOTTED: 8/26/2011 6:47 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

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Point Table			
Point #	Northing	Easting	Elevation
1001	157130.66	1294419.28	31.00
1002	157096.59	1294434.09	31.00
1003	157175.20	1294201.80	31.00
1004	157077.65	1294469.28	30.80
1005	157075.85	1294494.39	30.60
1006	157082.81	1294515.07	30.40
1007	157109.01	1294526.45	30.20
1008	157350.91	1294204.62	29.50
1009	157132.53	1294539.28	30.00
1010	157150.78	1294554.60	29.80
1011	157267.57	1294533.93	29.50
1012	157377.28	1294195.04	29.49
1013	157364.59	1294281.02	29.00
1014	157236.13	1294598.21	29.00
1015	157287.92	1294582.89	29.00
1016	157295.00	1294576.33	29.00
1017	157182.01	1294594.36	29.00
1018	157284.00	1294604.91	28.59
1019	157290.52	1294626.96	28.16
1020	157360.08	1294425.08	28.00
1021	157319.98	1294614.93	28.00
1022	157302.95	1294633.71	28.00
1023	157251.17	1294649.03	28.00
1024	157180.36	1294657.05	28.00
1025	157344.95	1294653.53	27.00
1026	157299.02	1294669.02	27.00
1027	157355.74	1294563.47	27.00
1028	157352.56	1294665.29	26.55
1029	157352.41	1294669.88	26.53
1030	157362.10	1294680.04	26.22
1031	157170.47	1294201.78	31.29
1032	157131.86	1294231.80	31.25
1033	157108.93	1294349.15	31.21
1034	157108.99	1294359.47	31.21
1035	157101.20	1294409.28	31.21
1036	157121.30	1294389.06	31.21
1037	157161.48	1294573.57	29.60
1038	157215.29	1294559.76	29.50
1039	157364.72	1294564.44	26.15

NOTES:
1. AREA OF ASPHALT REPAIR
2-6. APPROXIMATE LOCATION OF ADDITIONAL DRAINAGE DIVERSION BERMS.
7. LOCATION OF DRAINAGE DIVERSION AROUND SOUTH, WEST SIDES OF VAULT.
8. FOR RECORD FINAL CONTOURS SEE TETRA TECH/INCA DRAWING.

LEGEND:

- IB-1 — INTERCONNECT BORING
- SP-29 — SOIL BORING OR SOIL PROBE
- HY-123 — MONITORING WELL (PROTECT)
- HYCP-3s — MONITORING WELL (DECOMMISSION BY OTHERS)
- SANITARY SEWER MANHOLE AND SEWER
- UTILITY POLE
- GUY WIRE
- EXISTING CATCH BASIN AND PIPE
- BENCHMARK
- FENCE
- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR (TOP OF ASPHALT)
- POWER LINE 480V
- EPM — ELECTRIC POWER METER
- EB — ELECTRICAL BOX
- CO — CLEANOUT
- PV — POWER VAULT

KEYNOTES:

(1) ABANDON SITE ENTRANCE. REMOVE GATES AND INSTALL NEW FENCE.

(2) INSTALL NEW 16 FOOT WIDE ENTRANCE WITH GATES.

ROGER B NORTH
STATE OF WASHINGTON
43597
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 30' 60'
GRAPHICAL SCALE

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-13

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN
1	10/25/11	REVISED GRADES	RN	STM	RN

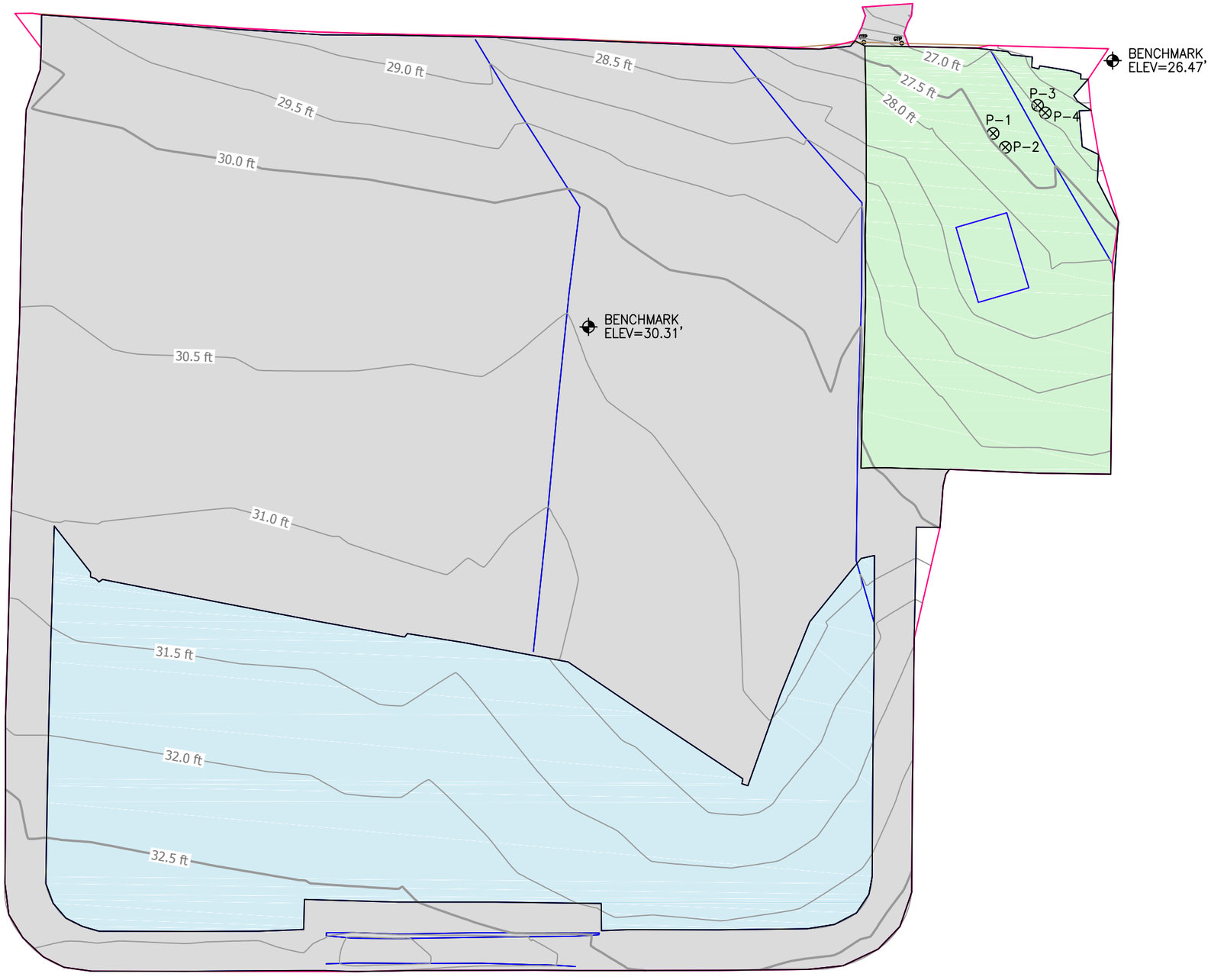
SCALE: 1" = 30'

DATE: 10/27/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

FINAL COVER GRADE

DRAWING NO. 10 OF 13



Explanation

- 28.0 ft — Elevation Contour
- Stormwater Drainage Curb
- Pre-Existing Asphalt
- New 6-in. thick Type I Cover (2-in. Asphalt over 4-in. Rock)
- New 12-in. thick Type II Cover (3-in. Asphalt over 9-in. Rock)
- P–4 — Monitoring Well

N

0 50

SCALE IN FEET

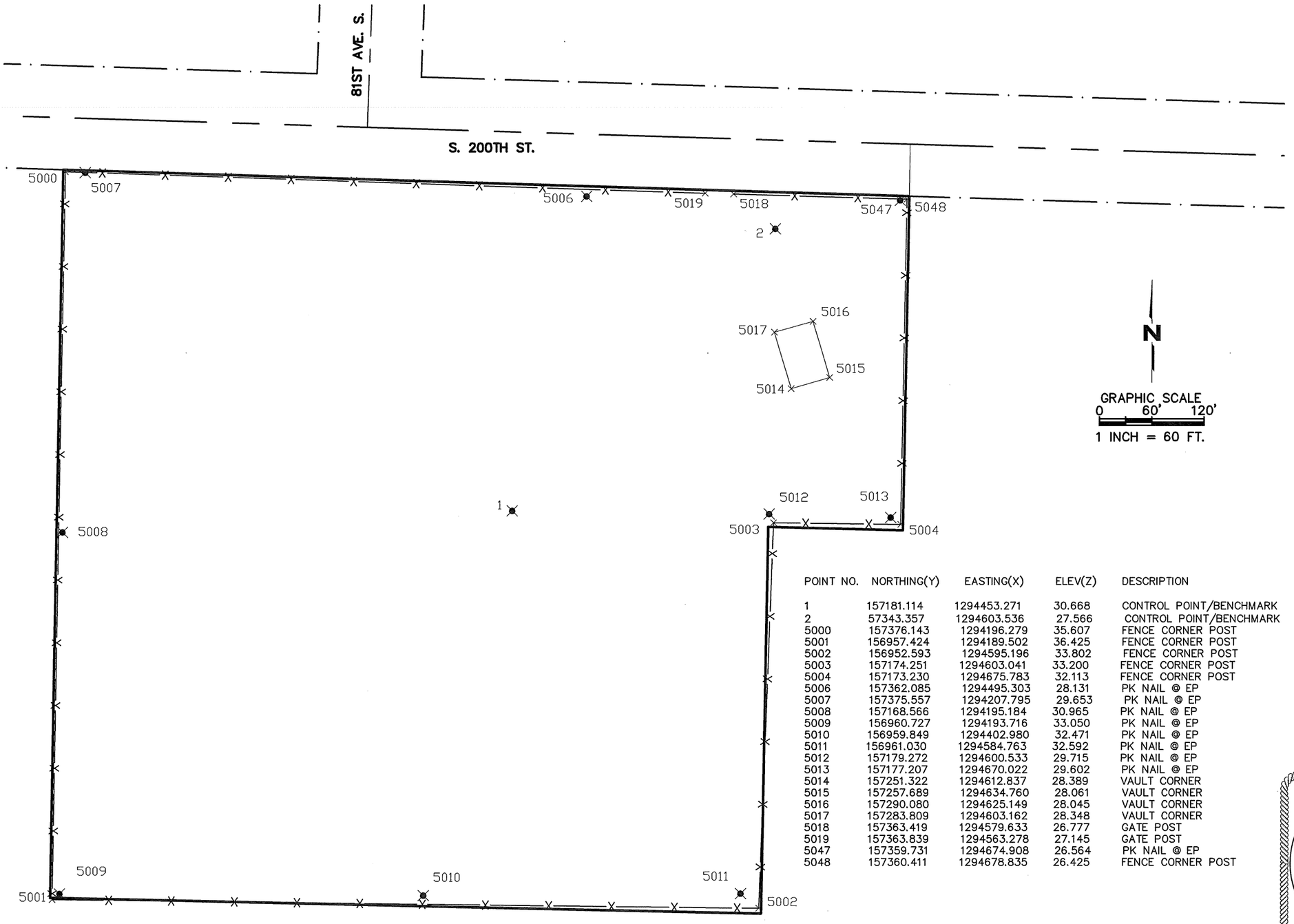
Topographic Contour Basemap by TetraTech/INCA

PES Environmental, Inc.
Engineering & Environmental Services

Final Site Topography
BSB Property
Kent, Washington

FIGURE
1

827.001.28.003	82700128003_1	DRAFT	10/13
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



N

GRAPHIC SCALE
0 60' 120'
1 INCH = 60 FT.

POINT NO.	NORTHING(Y)	EASTING(X)	ELEV(Z)	DESCRIPTION
1	157181.114	1294453.271	30.668	CONTROL POINT/BENCHMARK
2	57343.357	1294603.536	27.566	CONTROL POINT/BENCHMARK
5000	157376.143	1294196.279	35.607	FENCE CORNER POST
5001	156957.424	1294189.502	36.425	FENCE CORNER POST
5002	156952.593	1294595.196	33.802	FENCE CORNER POST
5003	157174.251	1294603.041	33.200	FENCE CORNER POST
5004	157173.230	1294675.783	32.113	FENCE CORNER POST
5006	157362.085	1294495.303	28.131	PK NAIL @ EP
5007	157375.557	1294207.795	29.653	PK NAIL @ EP
5008	157168.566	1294195.184	30.965	PK NAIL @ EP
5009	156960.727	1294193.716	33.050	PK NAIL @ EP
5010	156959.849	1294402.980	32.471	PK NAIL @ EP
5011	156961.030	1294584.763	32.592	PK NAIL @ EP
5012	157179.272	1294600.533	29.715	PK NAIL @ EP
5013	157177.207	1294670.022	29.602	PK NAIL @ EP
5014	157251.322	1294612.837	28.389	VAULT CORNER
5015	157257.689	1294634.760	28.061	VAULT CORNER
5016	157290.080	1294625.149	28.045	VAULT CORNER
5017	157283.809	1294603.162	28.348	VAULT CORNER
5018	157363.419	1294579.633	26.777	GATE POST
5019	157363.839	1294563.278	27.145	GATE POST
5047	157359.731	1294674.908	26.564	PK NAIL @ EP
5048	157360.411	1294678.835	26.425	FENCE CORNER POST

12/08/11

STEPHEN J. SCHREI
STATE OF WASHINGTON
37855
REGISTERED
PROFESSIONAL LAND SURVEYOR

BSB DIVERSIFIED
8202 S. 200TH ST.
KENT, WA. 98032
KING CO. PARCEL NO. 0122049117

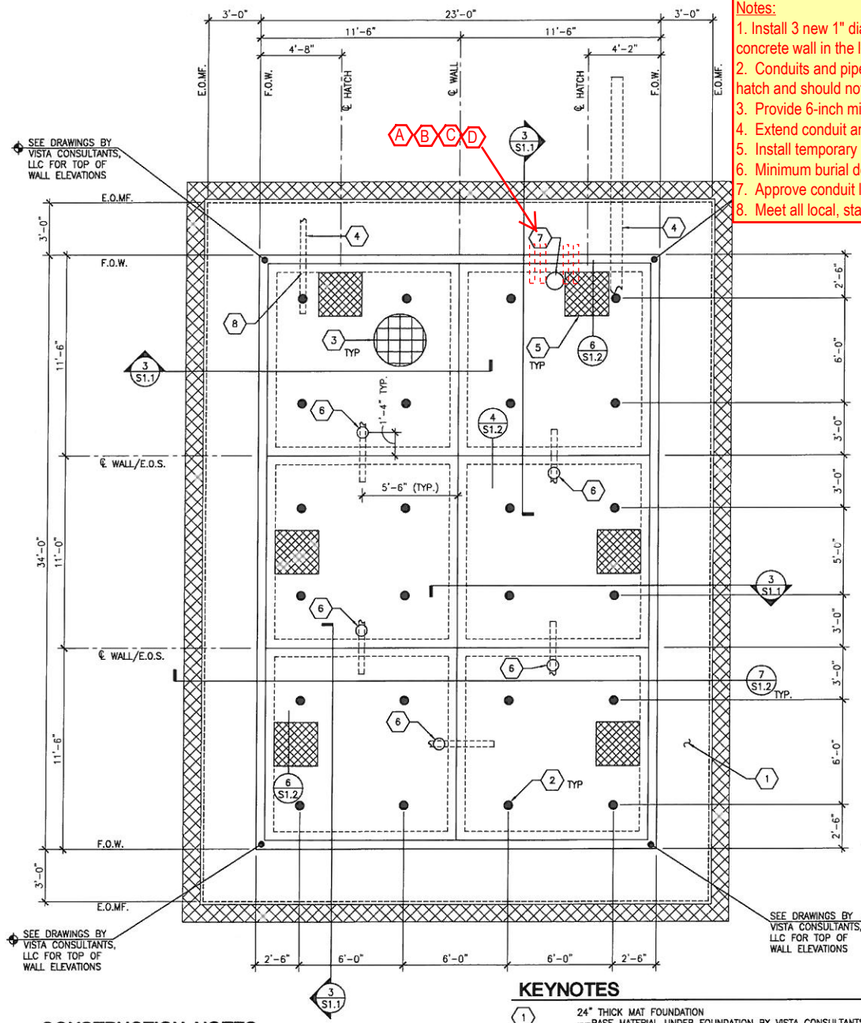
DRS
D.R. STRONG
CONSULTING ENGINEERS
ENGINEERS PLANNERS SURVEYORS
10604 NE 38th PLACE, SUITE 101
KIRKLAND, WA 98033
425.827.3063 OFFICE
800.962.1402 TOLL FREE
425.827.2423 FAX
www.drstrong.com

PROJECT SURVEYOR: SJS
DRAFTED BY: SJS
FIELD BOOK: 696
DATE: 12/08/11
PROJECT NO.: 11089
SHEET 1 OF 1

New electrical conduits (09/28/2011)
A - 1" PVC (for low voltage shielded cable)
B - 1" PVC (for 120/240 VAC)
C - 1" PVC (for spare)

New Schedule 80 PVC pipe (10/5/2011)
D - 1" Schedule 80 PVC pipe

Notes:
1. Install 3 new 1" diameter rigid non-metallic (PVC) electrical conduits and 1" Schedule 80 PVC pipe through the concrete wall in the last chamber of the reactor vault.
2. Conduits and pipe shall be oriented such that they are reasonably accessible from the 30" X 30" vault access lid hatch and should not be obstructed by riser pipes or other features.
3. Provide 6-inch minimum distance between each conduit and pipe.
4. Extend conduit and pipe at least 6 inches on either side of the concrete vault wall for future connections.
5. Install temporary caps on the ends of each conduit and pipe.
6. Minimum burial depth of 24 inches below grade outside of the vault.
7. Approve conduit locations after installation and prior to pouring concrete wall.
8. Meet all local, state, and federal codes.



CONSTRUCTION NOTES

1. DEWATERING TO REMAIN BELOW MAT FOUNDATION UNTIL BACKFILL AGAINST EXTRIOR WALLS FULLY PLACED & LIDS INSTALLED
2. VERIFY LOCATIONS OF ALL WALL AND LID PENETRATIONS WITH DRAWING 1-8 BY VISTA CONSULTANTS, LLC.
3. ALL ELEVATION INFORMATION PROVIDED BY VISTA CONSULTANTS, LLC. VERIFY ALL ELEVATIONS SHOWN.
4. ALL PIPING AND VALVE ANCHORAGE AS PER SPECIFICATIONS BY VISTA CONSULTANTS, LLC.

LEGEND

F.O.W. FACE OF WALL
E.O.MF. EDGE OF MAT FOUNDATION
INDICATES WALL SHORING BY OTHERS

KEYNOTES

1. 24" THICK MAT FOUNDATION
   --BASE MATERIAL UNDER FOUNDATION BY VISTA CONSULTANTS, LLC.
   --REINFORCE W/ #6 @ 10" O.C. E.W. TOP AND BOTTOM
2. INDICATES PICK POINT INSERT (24 TOTAL)
   --SEE 2/S1.1
   --USE ALL PICK POINTS WHEN LIFTING PANELS
3. 12" THICK PRECAST LID (6) TOTAL
   --REINFORCE W/ #6 @ 8" O.C. E.W. TOP & BOTTOM
4. AT PIPE PENETRATION THROUGH WALL, INSTALL LINK SEAL LS-300-0 AT 4" DIA. PIPE, LS-475-0 AT 8" DIA. PIPE
5. VAULT LID ACCESS HATCHES
   --30"x30" ACUDOR W-AHS ACUDOR CHANNEL FRAME, HEAVY DUTY, SINGLE DOOR FLOOR HATCH W/ BOWCO PRESS FIT TYP-R 12" WIDE STEPS (APPROX. 13 TOTAL).
   --SEE DETAIL 6/S1.2 FOR MORE INFORMATION
6. WATER-TIGHT MANHOLES
   --7 5/8" DIA. (CLR. OPENING) EAST JORDAN IRONWORKS WATERTIGHT MANHOLE (CATALOGUE #V2610-1)
7. WATER-TIGHT MANHOLES
   --12" DIA. (CLR. OPENING) EAST JORDAN IRONWORKS WATERTIGHT MANHOLE

NORTH
1 S1.1 FOUNDATION PLAN
1/4" = 1'-0"

VERTICAL LEG OF DAYTON
N
SERT
-83 HARDWARE WHEN
EINFORCING NOT SHOWN
SERT
BOVE, TYP

SECTION VIEW

2 S1.1 PICK POINT INSERT DETAIL
3/4" = 1'-0"

3 S1.1 SECTION
1/2" = 1'-0"

#	DATE	DESC.
5	07.15.11	C.O. #8 UPDATE
4	06.10.11	C.O. #8
3	06.01.11	PRMT ISSUE
2	09.14.09	ISSUED FOR CONST.
1	07.20.09	ISSUE FOR BID

ADAM MICHAEL LIVERMORE STATE OF WASHINGTON 36765 REGISTERED PROFESSIONAL ENGINEER

LIVERMORE architecture & engineering, inc.
140 SW Arthur Street, Suite 200
Portland, Oregon 97201
Phone: 503-892-7532
Fax: 503-892-7533

FINAL CLEAN UP ACTION PHASE 1 FOR
BSB DIVERSIFIED, INC. PROPERTY
KENT (KING COUNTY), WASHINGTON

Livermore A&E
JOB NO: 208009.00

DRAWING TITLE:
FOUNDATION PLAN AND DETAILS
DRAWN BY: CSN
CHECKED BY: GML

S1.1

Appendix A-2

Instructions From Structural Engineer Regarding Nelson Stud Repair Work

Mike Stewart

From: Gary Livermore [GaryL@livermoreae.com]
Sent: Wednesday, October 26, 2011 4:49 PM
To: Mike Stewart
Cc: 'Roger North'; 'Brian O'Neal'
Subject: RE: Nelson Studs
Attachments: 2011-10.26_SKS-01.pdf

Mike,

It is acceptable to make repairs as you have proposed. The attached sketch shows additional repairs required in addition to the headed stud modifications.
Regarding the headed stud repairs, care must be taken during drilling of the holes at the top of the wall to not "blow-out" the face of the wall. The drilled holes shall be located behind existing horizontal reinforcing at the face of the wall.

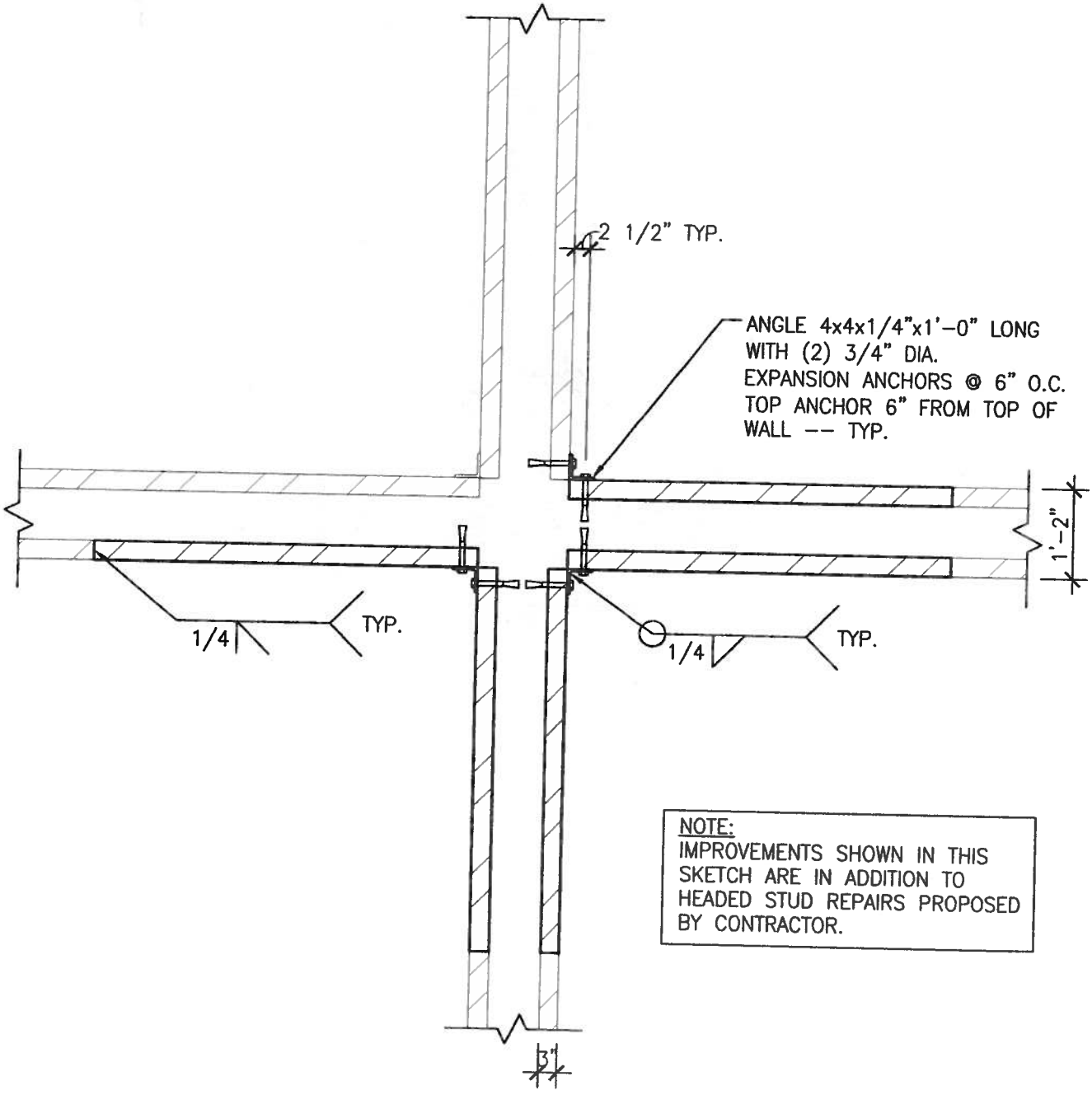
Thanks,
Gary Livermore

From: Mike Stewart [mailto:mstewart@eilllc.com]
Sent: Wednesday, October 26, 2011 2:47 PM
To: Gary Livermore
Cc: 'Roger North'; 'Brian O'Neal'
Subject: FW: Nelson Studs

Gary, can we go ahead with our proposal to install the Nelson Studs as described below.

From: Mike Stewart [mailto:mstewart@EILLLC.com]
Sent: Wednesday, October 19, 2011 1:32 PM
To: 'Gary Livermore'
Subject: FW: Nelson Studs

This is what we propose. Cut the stub ends off the vertical pieces (this is already done). Drill a vertical hole in the concrete for each stud (this is underway). Set the studs inside the holes in the concrete and grout them with a cement grout with the horizontal flat portion of the Nelson Stud set flush with the top of the concrete wall. The attached drawing shows the location of five missing Nelson Studs. (Redlines on drawing).



NOTE:
IMPROVEMENTS SHOWN IN THIS SKETCH ARE IN ADDITION TO HEADED STUD REPAIRS PROPOSED BY CONTRACTOR.

DRAWING TITLE: PLAN OF REPAIR FOR MISSING PLATES

PROJECT: BSB DIVERSIFIED, INC. PROPERTY
KENT (KING COUNTY), WASHINGTON

DRAWING: 01

JOB: 208009.10 DATE: 10/26/2011 SCALE: 1" = 1'-0"

LIVERMORE architecture & engineering, inc.
industrial • commercial

140 SW Arthur Street, Suite 200
Portland, Oregon 97201
Phone: 503-892-3002
Fax: 503-892-3003

SKS

Appendix A-3

Sketch Indicating PVC Geomembrane Encasement of Un-stabilized and Cement Stabilized Sludge

VISTA CONSULTANTS, LLC

4132 SW BARBUR BOULEVARD
PORTLAND, OREGON 97239
(503) 922 2522

MEMORANDUM

To: Brian O'Neal

From: Roger North

Date: September 23, 2011

Subject: Proposed Management of Stabilized Sludge
BSB Diversified Site
Kent, Washington

The proposed approach to manage cement-stabilized sludge that has been encountered and excavated from the alignment of the working trench for the soil-bentonite cutoff wall (SBCW) is illustrated on the attached sketch and described below. The working trench is an approximately 17-foot wide and 3-foot deep trench, which was excavated along the alignment of the SBCW for the SBCW equipment to work in and to contain excess soil-bentonite backfill material generated during the construction of the SBCW.

The possibility of encountering stabilized sludge and PVC liner materials in the southern part of the site was anticipated and an exploratory trench was excavated along the SBCW alignment in this part of the site prior to excavating the working trench and constructing the SBCW. The exploratory trench encountered up to 3 to 4 feet of stabilized sludge between PVC liners and protective geotextile. The stabilized sludge that was subsequently excavated during the construction of the working trench was stockpiled and covered in a segregated area.

Where stabilized sludge is replaced into the working trench, the following are proposed:

- Following the completion of the SBCW, clean the bottom of the working trench to remove surplus soil-bentonite material and to remove protrusions greater than approximately 0.5 inches;
- Line the working trench with the following geosynthetic materials:
  - Geotextile cushion – non-woven 16 oz/sy – to protect the outer surface of the PVC geomembrane;
  - PVC geomembrane – 30-mil thick; and

  - Geotextile cushion – non-woven 16 oz/sy – to protect the inner surface of the PVC geomembrane from the stabilized sludge that will be placed back in the working trench alignment and encapsulated by the PVC geomembrane;

- Deploy the synthetics in the bottom of the trench, to form a bottom liner for the stabilized sludge, with sufficient surplus material folded or rolled onto the surrounding asphalt to fold back over the top of the stabilized sludge after it is placed;
- Process the previously excavated stabilized sludge material to achieve a maximum particle size of approximately 4 inches, to facilitate handling and placement into the working trench;
- Place the processed stabilized sludge onto the upper geotextile cushion. The stabilized sludge material will be:
  - Worked to the sides of the trench, to ensure the geosynthetics are in intimate contact with the adjacent materials; and
  - Surface graded to achieve a relatively flat surface that slopes towards the property lines, at grades that mimic the prior PVC geomembrane grades (in those locations where a PVC liner was previously present);
- Fold the three geosynthetic layers (geotextile/PVC geomembrane/geotextile) over the stabilized sludge to completely encapsulate the material. The geotextile layers will be overlapped a minimum of 1 foot, and the PVC geomembrane will be overlapped and welded or glued; and
- Fill the remainder of the working trench with soil backfill and asphalt base and cover the working trench with hot mix asphalt to match the asphalt grades on both sides of the working trench.

There may be areas of the working trench where stabilized sludge was originally present (e.g., along the southwest section of the alignment), but where stabilized sludge will not be replaced. In these areas, the following are proposed:

- Backfill the working trench with site soil;
- Deploy a geotextile/PVC geomembrane/geotextile sandwich across the working trench to approximately match the prior PVC geomembrane profile; and

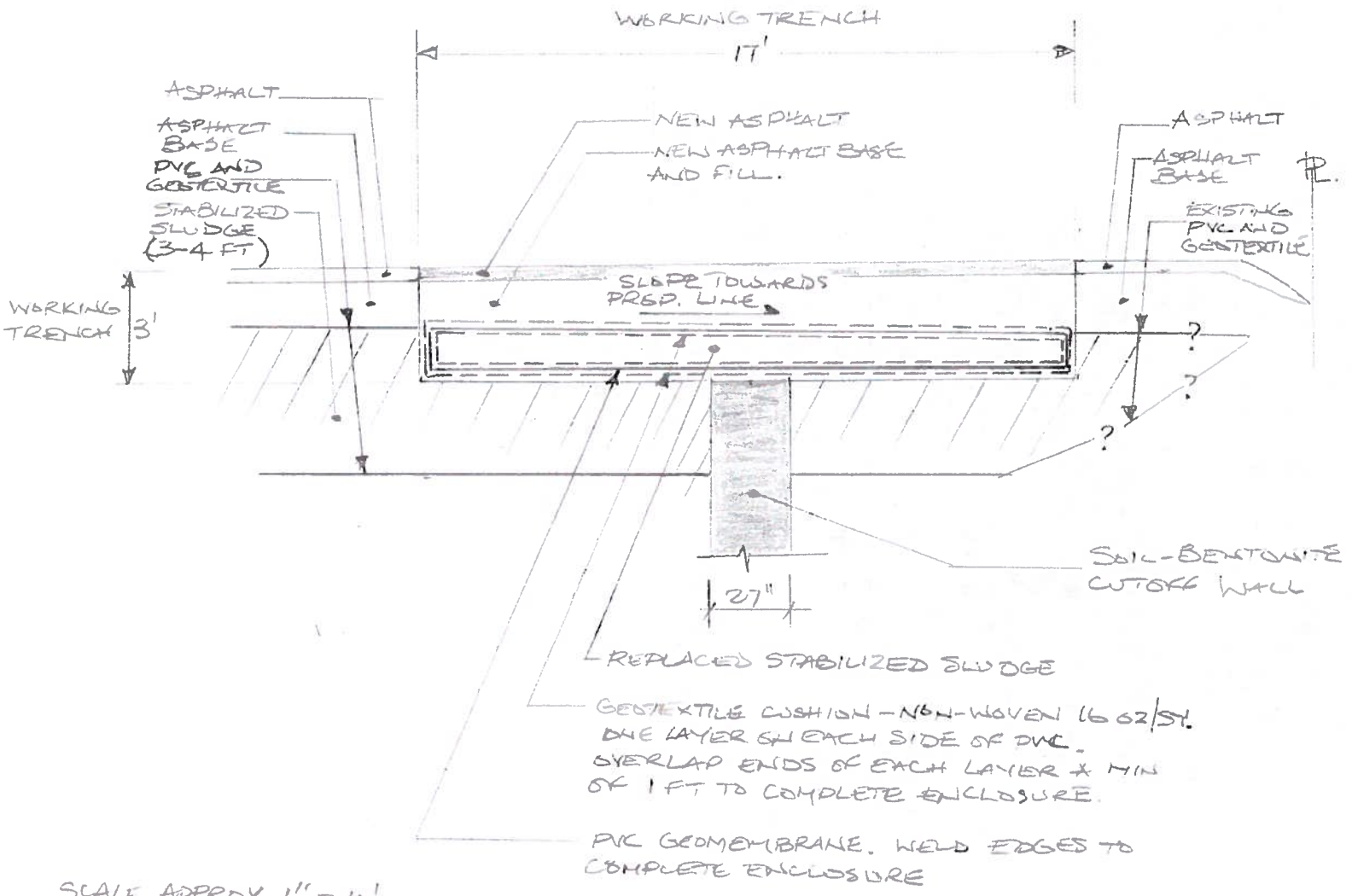
- Fill the remainder of the working trench with soil backfill and asphalt base and cover the working trench with hot mix asphalt to match the asphalt grades on both sides of the working trench.

* * * * *

Attachment: Sketch – Proposed Management of Stabilized Sludge

SEPT 23, 2011

ROGER NORTH



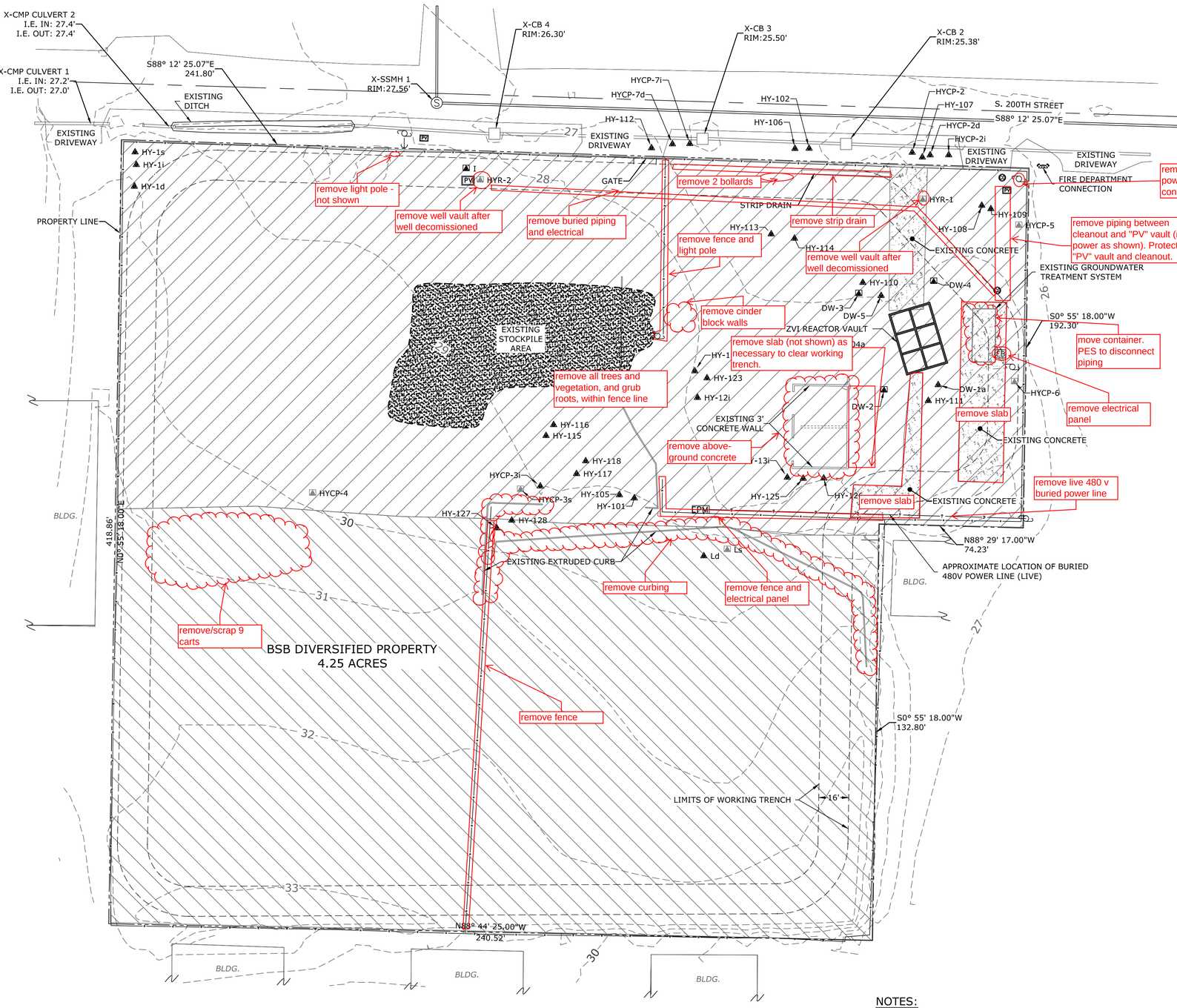
SCALE APPROX 1" = 4'

PROPOSED MANAGEMENT OF STABILIZED SLUDGE

9/23/11

Appendix A-4

Site Demolition Plan



Not a stamped drawing - for information purposes only

ROGER B. NORTH
STATE OF WASHINGTON
43593
REGISTERED
PROFESSIONAL ENGINEER

REDUCTION SCALE CHECK
1"
0 30' 60'
GRAPHICAL SCALE

LEGEND:

- EXISTING ASPHALT PAVED PRIOR TO 1980
- EXISTING ASPHALT PAVED IN 2002
- SP-29 — SOIL BORING OR SOIL PROBE
- HY-123 — MONITORING WELL (PROTECT)
- HYCP-3s — MONITORING WELL (DECOMMISSION BY OTHERS)
- SANITARY SEWER MANHOLE AND SEWER
- UTILITY POLE
- GUY WIRE
- EXISTING CATCH BASIN AND PIPE
- BENCHMARK
- FENCE
- PROPERTY LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- POWER LINE 480V
- EPM — ELECTRIC POWER METER
- EB — ELECTRICAL BOX
- CO — CLEANOUT
- PV — POWER VAULT

NOTES:

1. TOPOGRAPHICAL DATA PROVIDED BY CRAMER NORTHWEST, INC.
2. HORIZONTAL DATUM NAD 83/91. BEARINGS SHOWN ARE BASED ON THE EAST LINE OF S.E. 1/4 SEC. 1, TWN. 22N., R 4E, BEING NORTH 00°55'18" EAST, PER CITY OF KENT.
3. VERTICAL DATUM: NAVD 1988 FROM BENCH MARK #939: ELEVATION = 27.20; CITY OF KENT, WASHINGTON.
4. VISTA CONSULTANTS, LLC, ASSUMES NO RESPONSIBILITY FOR TOPOGRAPHIC DATA PRESENTED IN THIS DRAWING.

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 30'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
BSB DIVERSIFED, INC. PROPERTY
KENT, WASHINGTON

SITE PLAN

DRAWING NO. 3 OF 13

C:\CIVIL 3D PROJECTS\BSB\PRODUCTION DRAWINGS\PHASE 2 CUTOFF WALL\SITE PLAN.DWG PLOTTED: 8/26/2011 6:45 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

APPENDIX B

Permits and Permit Compliance Records

B-1 – Industrial Waste Program Construction Dewatering Request Form

B-2 – Waste Discharge Permit Number 7575-04

B-3 – Stormwater Permit WAR-125362, Water Treatment Plan, and Clearwater Reports

Appendix B-1

Industrial Waste Program Construction Dewatering Request Form

King County

Industrial Waste Program
Construction Dewatering Request Form

Submit to the King County Industrial Waste Program
130 Nickerson Street, Suite 200, Seattle, WA 98109-1658
Phone: 206-263-3000
Fax: 206-263-3001

- Submit one application for each construction site.
- Answer all questions and include ALL required exhibits. **Incomplete applications will be returned to you.**
- If you do not have an answer for the requested information, indicate so and explain why.
- Indicate "NA" if a section does not apply to your site.
- Use additional pages, if needed.
- Discharge approval will be issued to the owner of the site. As such, this form must be signed by the site owner, or their authorized representative, as defined by King County Code (KCC) 28.82.050 (KCC Web site: www.kingcounty.gov/council/legislation/kc_code.aspx).

Project Name	BSB Phase I Cleanup Action Construction	
Project Location (address, city and zip code)	8202 South 200th Street, Kent, Washington 98032	
NOTE: Site owner information must be provided. The site owner will be issued the discharge approval. Contractor or consultant will be sent a copy.		
	Site Owner	**Contractor / Consultant**
Contact Name	Ron Burt	Greg Lovinger
Company	BSB Diversified	MidMountain Contractors
Mailing Address	902 Grapevine Lane	825 Fifth Avenue
City/State/Zip Code	Nashville, TN 37221	Kirkland, WA 98033
Office Phone No.	(615) 828-6126	(425) 202-3600
Cell Phone No.	(615) 828-6126	(206) 354-2354
Fax No.	NA	(425) 202-3610
E-mail Address	raburt_pps@yahoo.com	glovinger@midmtn.com
Primary person to be contacted about this application	Greg Lovinger (see above). Also can contact Brian O'Neal, PES Environmental (Environmental consultant on project). Ph: (206) 529-3980. Cell: (425) 241-2627	

Provide detailed project description	Project is Phase I of constructing the final cleanup action at the BSB property. The primary major components of Phase I includes implementation of erosion and sediment control measures, minor site clearing and demolition, installation of an approximately 22 ft x 33 ft x 20 ft deep cast-in place concrete vault, and stockpiling of excavated soil. Dewatering from both the upper aquifer (from within the sheet-piled vault excavation) and lower aquifer (from four dewatering wells) is required. Dewatering discharge to the sanitary sewer will be through BSB's existing sewer connection used to discharge groundwater from existing remediation system.		
Start Date of Dewatering	On or about 9/8/09	**End Date of Dewatering**	On or before 10/30/09
Size of Area	Excavation will be approximately 31 ft wide by 42 ft long. Construction activity,		

	including soil stockpiling, will occur in approximately 1.5 acres of the site.
List construction activities generating wastewater	*Examples of construction activities generating wastewater include excavation dewatering, well dewatering, wheel wash, equipment cleaning, stormwater runoff.* Primary source of dewatering water will be four deep aquifer dewatering wells that are expected to pump at a combined rate of 40 to 80 gallons per minute; depending on drawdown achieved, pumping of up to 120 gallons per minute may be required. Dewatering from within the sheet-piled excavation is estimated to not more than 5 gallons per minute. Other water that may be included in the discharge to the extent it cannot be infiltrated on site includes wheel wash-water and stormwater runoff.
Maximum daily discharge volume (gallons per day)	*Use your list of construction activities generating wastewater from the previous section to calculate the projected total maximum daily discharge volume. Include documentation of the information, methods, and assumptions used in your calculations.* Deep Aquifer Dewatering Wells: 172,800 gallons per day (120 gpm) Shallow Aquifer (Excavation) Dewatering: 7,200 gallons per day (5 gpm) Wheel Wash Water: 1,000 gallons per day Stormwater Runoff: Majority anticipated to be infiltrated. Assume maximum of 20,000 gallons per day. Total Maximum Daily discharge volume: 201,000 gallons per day.

If the discharge will be greater than 25,000 gallons per day during November through April, is discharging to surface water possible? Provide explanation.
No Applicable - discharge will terminate prior to November 1

Is there known groundwater or soil contamination on site? *If known groundwater or soil contamination is present on site, additional exhibits must be submitted. (See page three of this dewatering request form)*
Yes. Construction activity is part of implementing final cleanup action. See attached exhibits.

Describe the site's temporary erosion and sediment control best management practices (BMPs) and wastewater treatment methods that will be used to minimize the amount of solids discharged into the sanitary sewer system.
See Erosion and Sediment Control Plan drawing for details on BMPs (attached as Exhibit A). Majority of dewatering water will be from deep aquifer wells and water quality is expected to be good with few solids. All water will go through 20,000 gallon Baker Tank for sedimentation prior to discharge.

King County

Industrial Waste Program
Construction Dewatering Request Form

You must contact the local sewer agency (city or sewer district) to receive instructions on discharge conditions such as maximum discharge rate, discharge point, and discharge volume reporting procedures for assessment of sewer fees.

Provide the name and phone number of the local city or sewer district personnel you contacted.

Cindy Riege - (253) 856-5301

Provide the Maximum Discharge Rate (gpm) specified by the local city or sewer district contact.

To be specified by City in side sewer permit - not to result in backup of sewer

Provide sewer account number or billing method that will be used by the local city or sewer district to assess sewer fees.

BSB currently is billed using City of Kent account #935-14640.01

Discharge to the sanitary sewer will require a temporary sewer connection that must be approved by the local city or sewer district. The approved temporary sewer connection (point of discharge) must be clearly indicated in your facility site plan. (See Required Exhibits below.)

Required Exhibit (A) for all sites:

A. Provide a site plan indicating location of activities and processes generating wastewater, settling ponds/tanks or other wastewater treatment systems, wastewater conveyance lines, point(s) of discharge (as approved by the local city or sewer utility), public streets, and public sewer lines.

Required Exhibits (B - E) for sites where known groundwater or soil contamination is present on site:

B. Description of contamination source(s) and chemical characteristics; include available water or soil quality data.

C. Engineering justification and/or scientific evidence that indicates that the discharge from the site will meet applicable permit effluent limitations.

D. Description of proposed wastewater treatment facilities including basic design data and sizing calculations of the system components (for example pumps, tanks, mixers); and

E. Flow diagram of the treatment process, illustrating the system piping, tanks, and control features.

I certify that, to the best of my knowledge and belief, the information provided in this document and all attachments is true, accurate, and complete.

William R. Haldeman — **Name (print)**

Associate Hydrogeologist — **Title (print)**

William R. Haldeman — **Signature**

8/28/09 — **Date**

This form must be signed by an authorized representative of the site owner.

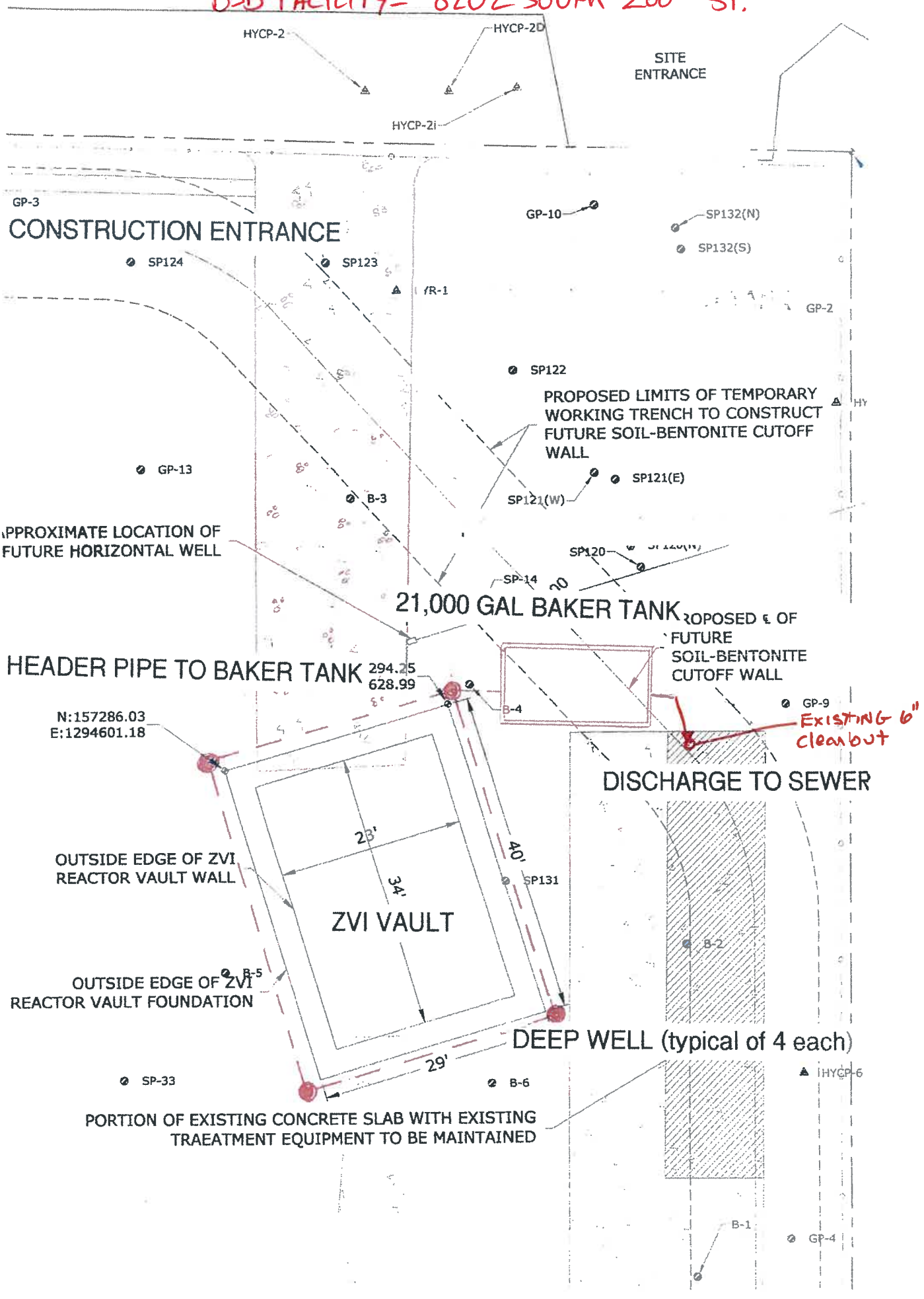
For definition of authorized representative see King County Code 28.82.050: www.kingcounty.gov/council/legislation/kc_code.aspx

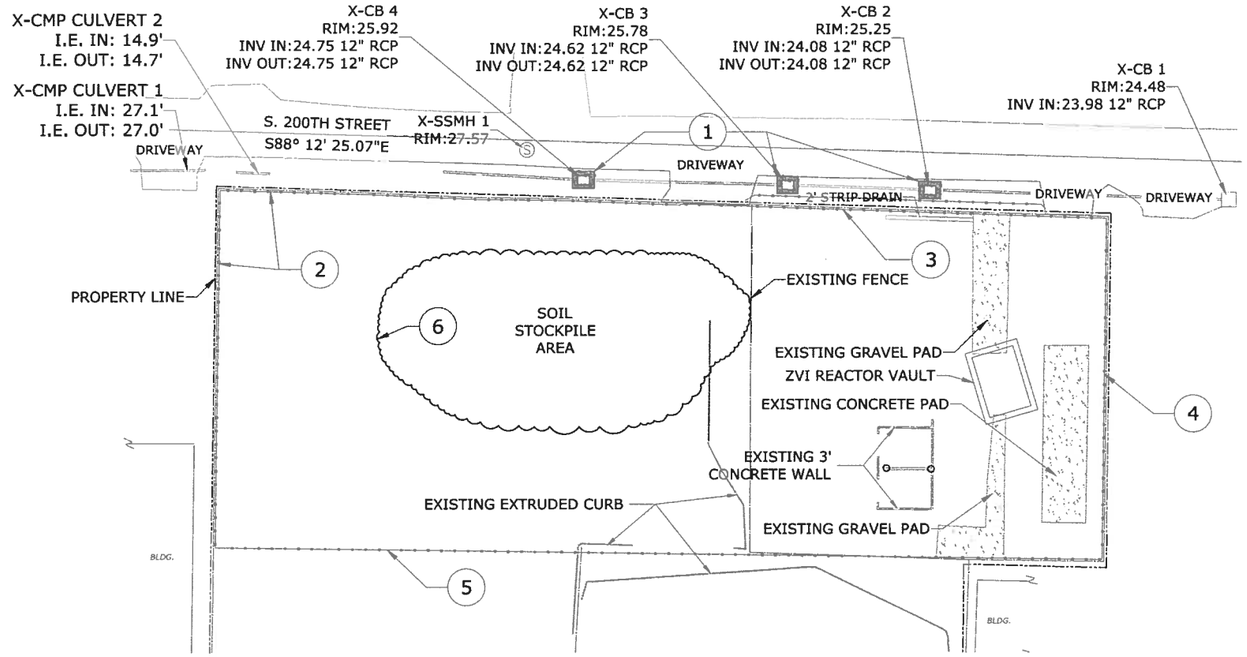
EXHIBIT A

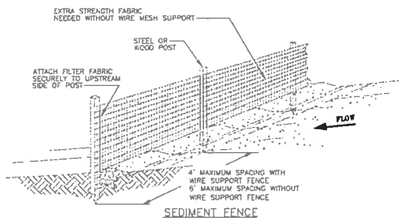
SITE PLAN

DEWATERING SITE PLAN

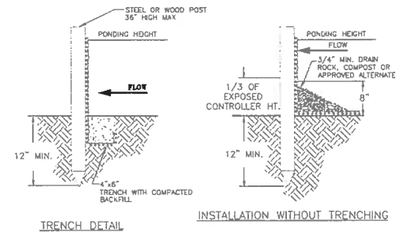
BSB FACILITY- 8202 South 200th st.







SEDIMENT FENCE

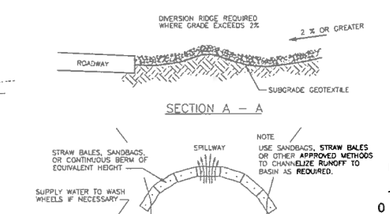


TRENCH DETAIL | INSTALLATION WITHOUT TRENCHING

NOTES:

1. SEDIMENT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
2. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN IT EXCEEDS 1/3 THE EXPOSED HEIGHT OF CONTROLLER STORAGE DEPTH.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.

SILT FENCE STANDARD DETAILS



PLAN

NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABLIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

GRAVEL CONSTRUCTION ENTRANCE DETAIL

REGISTERED PROFESSIONAL ENGINEER
19,004
OREGON
RICHARD NELSON HARRINGTON
DEC 17, 1957
PRELIMINARY
EXPIRES: 12/31/2010

REDUCTION SCALE CHECK
SCALE = 1"
0 40' 80'
GRAPHICAL SCALE

EROSION CONTROL NOTES:

1. SILT FABRIC SHALL BE PLACED OVER THE CATCH BASIN INLETS SO THAT NO SEDIMENT WILL ACCUMULATE IN THE CATCH BASINS.
2. THE CONTRACTOR SHALL INSPECT SITE AND ENTRANCE DRIVEWAY DAILY AND WASH AS NEEDED SO THAT NO SEDIMENT IS WASHED OR CARRIED OFF-SITE.
3. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE APPLICANT/CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED.
4. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
5. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
6. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE APPLICANT/CONTRACTOR AND MAINTAINED AS NECESSARY.
7. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

NOTES FOR SEDIMENT FENCES:

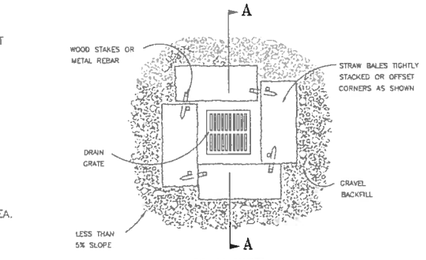
1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND SHALL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST, OR OVERLAP 2"X 2" POSTS AND ATTACHED AS SHOWN ON DETAIL.
2. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS WHERE FEASIBLE. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 18 INCHES.
3. THE FILTER FABRIC SHALL HAVE A MINIMUM VERTICAL BURIAL OF 6 INCHES. ALL EXCAVATED MATERIAL FROM FILTER FABRIC FENCE INSTALLATION SHALL BE BACKFILLED AND COMPACTED ALONG THE ENTIRE DISTURBED AREA.
4. STANDARD OR HEAVY DUTY FILTER FABRIC FENCE SHALL HAVE MANUFACTURED STITCHED LOOPS FOR 2"X 2" POST INSTALLATION. STITCHED LOOPS SHALL BE INSTALLED ON THE UPHILL SIDE OF THE SLOPED AREA.
5. FILTER FABRIC FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED.
6. FILTER FABRIC FENCES SHALL BE INSPECTED BY APPLICANT/CONTRACTOR IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

CONSTRUCTION NOTES:

1. INSTALL STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER
2. INSTALL 430 LF SILT FENCE
3. INSTALL 190 LF SILT FENCE
4. INSTALL 190 LF SILT FENCE
5. INSTALL 480 LF SILT FENCE
6. INSTALL STRAW BALES AROUND SOIL STOCKPILE AREA. ALL STOCKPILED SOILS SHALL BE COVERED DAILY.

OTHERS NOTES:

1. CLEAR AND GRUB ALL VEGETATION
2. REMOVE FENCES, CURBS, WALLS AND CONCRETE PADS



SECTION A–A

NOTES:

1. DROP INLET SEDIMENT BARRIERS ARE TO BE USED FOR SMALL, NEARLY LEVEL DRAINAGE AREAS. (LESS THAN 5%).
2. EMBED THE BALES 4" (100mm) INTO THE SOIL AND OFFSET CORNERS OR PLACE BALES WITH ENDS TIGHTLY ABUTTING. GRAVEL BACKFILL WILL PREVENT EROSION OR FLOW AROUND THE BALES. STRAW BALE/GRAVEL DROP INLET SEDIMENT BARRIER.
3. THE TOP OF THE STRUCTURE (PONDING HEIGHT) MUST BE WELL BELOW THE GROUND ELEVATION. DOWNSLOPE TO PREVENT RUNOFF FROM BYPASSING THE INLET. EXCAVATION OF A BASIN ADJACENT TO THE DROP INLET OR A TEMPORARY DIKE ON THE DOWNSLOPE OF THE STRUCTURE MAY BE NECESSARY.

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
1	6/1/09	PHASE I REVIEW	RN	STM	RN
2	7/9/09	CONST. BID DWGS	RN	STM	RN

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
PORTLAND, OREGON 97239
(503) 922-2522

PROJECT NO. 08-02

SCALE: AS SHOWN

DATE: 7/9/09

CONSTRUCTION DRAWINGS
FINAL CLEANUP ACTION PHASE I
BSB DIVERSIFIED, INC. PROPERTY
KENT, WASHINGTON

EROSION AND SEDIMENT CONTROL PLAN

DRAWING NO. 4 OF 10

C:\CIVIL 3D PROJECTS\BSB SITE SEATTLE - VISTA JOB NUMBER 08-02\KPM DRAWINGS\PRODUCTION DRAWINGS\PHASE 1 CLEANUP DRAWINGS\4 EROSION AND SEDIMENT CONTROL PLAN.DWG PLOTTED: 7/9/2009 8:23 AM ON ANSI FULL BLEED D (22.00 X 34.00 INCHES)

EXHIBIT B

DESCRIPTION OF CONTAMINANT SOURCES

MEMORANDUM

TO: **File**

FROM: **Brian O'Neal**

DATE: **August 27, 2009**

SUBJECT: **Construction Dewatering Request – Exhibit B**
Description of Contaminant Sources and Chemical Characteristics

PROJECT NO.: 827.001.17

The purpose of this memorandum is to provide the information required for Exhibit B of the Construction Dewatering Request form, specifically a description of the contamination sources and chemical characteristics for the BSB Facility in Kent, WA. The site consists of 4.2 acres located at 8202 South 200th Street in Kent. BSB has been engaged in environmental investigation and cleanup activities at the site since the mid-1980s, and significant environmental reports and data have been submitted to the Washington Department of Ecology.

Regarding the source of contamination, historical industrial operations at the facility located across 200th Street that is currently owned and operated by Hexcel Corporation generated a variety of hazardous wastes that were managed on the BSB property (they were formerly all one facility). These waste management activities included handling of drums containing spent degreasing solvents including trichloroethene (TCE). Spills and leaks from these drum handling operations resulted in the release of solvents into subsurface soil and groundwater.

Since the late 1980s, BSB has conducted significant site cleanup including excavation and removal of over 2,000 cubic yards of soil and operation of a groundwater extraction system. The groundwater extraction system has discharged to the King County sanitary sewer under permit #7575-03 since it began operations in 1992. The groundwater extraction system pumps groundwater from the shallow aquifer and discharges it to the sewer. BSB routinely monitors the discharge and provides the data to King County Industrial Waste (KCIW) in the form of monthly self-monitoring reports; KCIW has the self-monitoring data, as well as data from samples collected by KCIW staff, on file. The primary contaminants of concern for the current groundwater extraction system are TCE, vinyl chloride, and cis-1,2-dichloroethene.

The water discharged by the existing groundwater extraction system is substantially similar to what will be discharged by the proposed dewatering system. See Exhibit C for a discussion (including recent data) of the anticipated contaminant concentrations in the shallow and deep groundwater as well as the expected concentrations in the combined effluent.

EXHIBIT C

DEMONSTRATION THAT DISCHRAGE WILL MEET APPLICABLE DISCHARGE LIMITS

MEMORANDUM

TO: **File**

FROM: **Brian O'Neal**

DATE: **August 27, 2009**

SUBJECT: **Construction Dewatering Discharge**
Estimated VOC Concentrations in Combined Effluent

PROJECT NO.: 827.001.17

The purpose of this memorandum is to estimate the concentration of the primary volatile organic compounds (VOCs) anticipated being present in the wastewater generated during construction dewatering at the BSB Facility in Kent, Washington. Specifically, this memorandum demonstrates that the combined dewatering effluent will contain VOCs at concentrations below King County Industrial Waste's (KCIW) screening levels and therefore will not require additional treatment prior to discharge.

The primary component of Phase I is the installation of an approximately 22 ft x 33 ft x 20 ft deep cast-in place concrete vault. Dewatering from both the upper aquifer (from within the sheet-piled vault excavation) and lower aquifer (from four dewatering wells) is required. Estimated dewatering rates for the shallow and deep aquifers are 5 gallons per minute (gpm) and 60 gpm, respectively. The design of the dewatering system will combine the water from the shallow and deep aquifers in a 20,000 gallon tank prior to discharge to the sanitary sewer through BSB's existing side sewer connection used to discharge groundwater from existing remediation system.

As a result of historical industrial activities and waste management practices, there are VOCs present in the groundwater that will be extracted during dewatering activities. In general, the shallow aquifer is much more contaminated than the deep aquifer. Maximum detected concentrations of VOCs for 2008 and 2009 for the shallow and deep aquifers are presented in Tables 1 and 2, respectively. With the exception of vinyl chloride, cis-1,2-dichloroethene (cis-1,2 DCE), and trichloroethene, the VOCs are present at low concentrations are not a concern relative discharges to the sanitary sewer. As can be seen from these tables, the concentrations of vinyl chloride, cis-1,2 DCE, and trichloroethene in the deep aquifer are well below KCIW screening levels. For the shallow aquifer, the concentration of cis-1,2 DCE is well below the applicable screening level, while the concentrations of vinyl chloride and trichloroethene are above their respective screening levels.

Table 3 shows the estimated VOC concentrations of the combined dewatering effluent. Because over 90 percent of the dewatering water will come from the deep aquifer which has much lower VOC concentrations, the VOC concentrations of the combined effluent are below the KCIW screening levels. It should be noted that the shallow dewatering system could pump up to 19 gpm (nearly 4 times higher than estimated) before concentration of vinyl chloride would reach the screening level.

Table 1

Detected Groundwater VOC Concentrations
For Deep Well HYCP-2d in 2008 and 2009
BSB Property, Kent, Washington

Well	Date	Chloroform	Chloromethane	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl Chloride
HYCP-2d	1/29/08	**0.22 J**	< 0.14	**34**	**0.26 J**	< 0.14	**110**
	4/16/08	< 0.14	< 0.14	**38**	**0.20 J**	< 0.14	**100**
(duplicate)	4/16/08	< 0.14	< 0.14	**37**	**0.23 J**	< 0.14	**100**
	7/17/08	**0.11 JB**	< 0.053	**12**	**0.18 J**	**0.59 B**	**100**
(duplicate)	7/17/08	**0.090 JB**	< 0.053	**12**	**0.18 J**	**0.53 B**	**100**
	10/17/08	**0.58**	**0.13 J**	**7.6**	**0.10 J**	< 0.061	**73**
	4/8/09	< 0.042	< 0.053	**4.1**	**0.10 J**	**0.17 J**	**59**
Maximum Concentration:		**0.58**	**0.13 J**	**38**	**0.26 J**	**0.59 B**	**110**
KCIW Screening Level:		NA	NA	25,000	NA	500	200

Notes:
1. Analyses performed by USEPA Method 8260B, HVOC analyte list.
2. Only VOCs detected at or above the method detection limit in well HYCP-2d are shown; detections are shown in bold.
3. Results were reported to the method detection limit.
5. J = lab-assigned data qualifier indicating that the result is an estimated concentration less than the MRL but greater than or equal to the MDL.
6. The MRLs were typically at 0.5 µg/L, with a few between 2 and 5 µg/L.
7. B = data qualifier assigned during data quality review indicating that the compound was detected in either the trip blank or field blank and that the result assigned the B data qualifier is at a concentration less than 5 times the blank concentration.
8. duplicate = field duplicate sample.

Table 2
Detected Groundwater VOC Concentrations for 2007 - 2009
Shallow Groundwater Extraction Well Shallow VOCs
BSB Property, Kent, Washington

Site	Date	Note	Vinyl Chloride µg/L	trans-1,2-Dichloroethene µg/L	cis-1,2-Dichloroethene µg/L	1,1-Dichloroethene µg/L	1,1-Dichloroethane µg/L	Trichloroethene µg/L
HYR-1	02/12/07		350	21	3,600	6.7 U	5 U	1,300
HYR-1	09/11/07		270	23 U	3,500	6.5 U	5	1,600
HYR-1	07/08/08		380	28	3,600	7.8	5 U	1,600
HYR-1	07/14/09		480	35	3,400	7.7	2.3 J	1,500
Maximum Concentration:			**480**	**35**	**3600**	**7.8**	**5**	**1,600**
KCIW Screening Level			200	NA	25,000	NA	NA	500

Table 3
Weighted Average Estimated Concentrations for Vinyl Chloride, cis-1,2,-DCE, and Trichlorothene
Construction Dewatering Discharge
BSB Property, Kent, Washington

	Shallow Aquifer	Deep Aquifer	Combined Flow	KCIW Discharge Limit (ug/L)
Estimated Flow Rate (gpm)	5	60	65	
Maximum Concentration (µg/L)				
Vinyl Chloride	480	110	138	200
cis-1,2-DCE	3,600	38	312	25,000
Trichloroethene	1,600	0.6	124	500

EXHIBIT D

PROPOSED WATER TREATMENT FACILITIES

MEMORANDUM

TO: File

FROM: Brian O'Neal

DATE: August 27, 2009

SUBJECT: Construction Dewatering Request – Exhibit D
Description of Proposed Wastewater Treatment Facilities

PROJECT NO.: 827.001.17

The purpose of this memorandum is to provide the information required for Exhibit D of the Construction Dewatering Request form, specifically to provide a description of the wastewater treatment facilities to be used at the BSB Facility in Kent, WA. The primary source of dewatering water will be four deep aquifer dewatering wells that are expected to pump at a combined rate of 40 to 80 gallons per minute; depending on drawdown achieved, pumping of up to 120 gallons per minute may be required. Dewatering from within the sheet-piled excavation (shallow aquifer) is estimated to not be more than 5 gallons per minute. Other water that may be included in the discharge to the extent it cannot be infiltrated on site includes wheel wash-water and stormwater runoff.

Information presented in Exhibit B describes the nature of the contaminants that will be present in the water (e.g., volatile organic compounds), and Exhibit C provides the information needed to demonstrate the combined dewatering effluent will meet KCIW screening levels without the need for special treatment (e.g., granular activitated carbon).

Based on the information presented, BSB proposes to collect all of the dewatering wastewater streams (4 deep aquifer extraction wells and one sump in the excavation) in a 20,000 gallon "Baker" tank. At the expected maximum discharge rate of 201,000 per day, this tank will provide for 2.4 hours of retention time. This should provide adequate retention to remove sand and other settleable solids which may be present and also provide mixing so that the higher concentration shallow aquifer groundwater is well-mixed with the cleaner and higher volume deep groundwater.

The combined dewatering water will be pumped from the tank, through a meter, and into the cleanout of BSBs existing 6-inch discharge line.

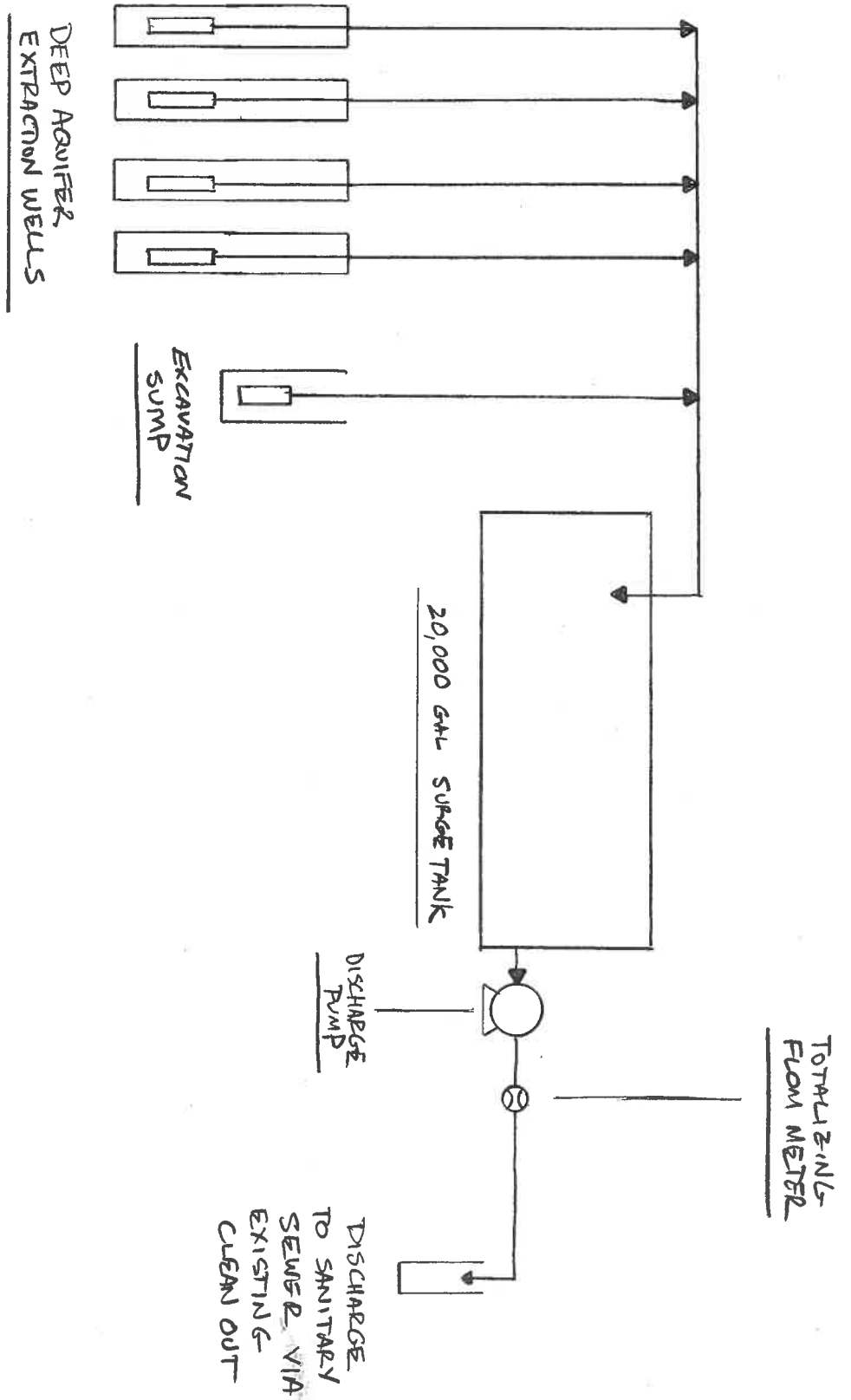
EXHIBIT E

FLOW DIAGRAM FOR TREATMENT PROCESS

PES Environmental, Inc.
Engineering & Environmental Services

SHEET 1 OF 1	
JOB NO. 827.001.17	
FILE NAME VAULT Construction	
PROJECT BSB Phase I Cleanup Action	COMPUTED BY BLD DATE 8/28/09
SUBJECT Dewatering System Process Flow Diagram	CHECKED BY DATE

BSB DEWATERING SYSTEM FLOW DIAGRAM



Appendix B-2

Waste Discharge Permit Number 7575-04

King County
Wastewater Treatment Division
Industrial Waste Program
Department of Natural Resources and Parks
130 Nickerson Street, Suite 200
Seattle, WA 98109-1658
206-263-3000 Fax 206-263-3001
TTY Relay: 711

October 15, 2010

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

John Fitzsimmons
B.S.B. Diversified Co. Inc.
c/o Dyson-Kissner-Moran Corp.
565 5th Avenue, 4th Floor
New York, NY 10017-2413

Issuance of Revised Wastewater Discharge Permit No. 7575-04 to B.S.B. Diversified Co. Inc. by the King County Department of Natural Resources and Parks

Dear Mr. Fitzsimmons:

The King County Industrial Waste Program has revised your discharge permit in accordance with Chapter 90.48 RCW as Amended, Public Law 92-500, and King County Code 28.84.060.

The enclosed revised Permit No. 7575-04 covers the wastewater discharge from the B.S.B. Diversified Co. Inc. operation located at South 200th Street and 81st Street, Kent, Washington. All discharges from this facility, and actions and reports relating thereto shall be in accordance with the terms and conditions of this permit. The enclosed Permit No. 7575-04 supersedes and cancels Permit No. 7575-03 effective October 15, 2010. No draft permit was issued and there is no fee for this King County initiated revision of your permit.

If you have any questions about this permit, or other questions about your wastewater discharge, please call Peggy Rice at 206-263-3028 or e-mail her at *peggy.rice@kingcounty.gov*. You may also wish to visit our program's Internet pages at: www.kingcounty.gov/industrialwaste.

Sincerely,

Despina Strong
Program Manager

Enclosures

cc: Bill Haldeman, PES Environmental, Inc.
Hideo Fujita, Department of Ecology
Doug Knutson, Department of Ecology
Shawn Gilbertson, City of Kent
Doug Hilderbrand, King County

Permit No.: 7575-04
Revision Date: October 15, 2010
Expiration Date: May 17, 2014

King County

WASTE DISCHARGE PERMIT

Department of Natural Resources and Parks
Industrial Waste Program
130 Nickerson Street, Suite 200
Seattle, WA 98109-1658

In accordance with the provisions of Chapter 90.48 RCW as amended, Public Law 92-500, and King County Code 28.84.060, a Waste Discharge Permit is issued to:

B.S.B. Diversified Co. Inc.

Plant Location:	S. 200th Street and 81st Street Kent, WA 98032
Business Hours Phone:	212-661-4600
Emergency (24-Hour) Phone:	425-922-0254 (Bill Haldeman cell phone)
Mailing Address:	c/o Dyson-Kissner-Moran Corp. 565 5th Avenue, 4th Floor New York, NY 10017-2413

Permission is hereby granted to discharge industrial wastewater from the above-identified facility into the King County sewerage system in accordance with the effluent limitations and monitoring requirements set forth in this permit.

This permit is based on information provided in the permit application, which together with the following conditions and requirements are considered part of the permit. All requirements and ordinances of King County pertaining to the discharge of wastes into the King County sewerage system are hereby made a condition of this permit. All discharges and activities authorized herein shall be consistent with the terms and conditions of this permit.

This permit is not transferable without authorization from the King County Industrial Waste Program. Failure to provide advance notice of a transfer renders this waste discharge permit voidable on the date of facility transfer.

By _____
Despina Strong
Program Manager
Industrial Waste Program

TABLE OF CONTENTS

S1 Emergency Contacts

S2 Permit Summary and Company Identification

S3 Special Conditions or Compliance Schedule

S4 Effluent Limitations and Self-Monitoring Requirements

S5 Sample Site Access and Identification

S6 Notification Requirements

S7 Monitoring and Record Keeping

S8 Operations and Maintenance

S9 General Conditions

S10 Washington Department of Ecology Conditions

S11 Organic Chemical Definition and Reporting Requirements

Company Fact Sheet

Glossary

King County Code – Title 28

King County Local Limits

S1. EMERGENCY CONTACTS

KING COUNTY

Industrial Waste Program (8:00 a.m.-5:00 p.m., weekdays):	206-263-3000
Peggy Rice, Industrial Waste Compliance Investigator:	206-263-3028
Despina Strong, Industrial Waste Program Manager:	206-263-3010

Your emergency contact after 5:00 p.m. weekdays and on weekends is:

South Treatment Plant:	206-684-2404

If unable to reach anyone at this number call:

West Point Treatment Plant	206-263-3801

WASHINGTON STATE DEPARTMENT OF ECOLOGY

24-Hour Emergency Spill Phone No.:	425-649-7000

S2. PERMIT SUMMARY AND COMPANY IDENTIFICATION

A. Summary Information

The following industrial waste discharge sites have been identified for this facility:

Sample Site No.	*Limit Type*	*Daily Maximum Discharge Volume (gpd)*	*Description*
A8106	KC ORGANICS KCLL GT 5000	50,000	Spigot on discharge pipe

Effluent limitations and self-monitoring requirements for this sample site are detailed in S4.A of this permit.

B. Reports

Report Name	*Section(s)*	*Due Date*
Monthly self-monitoring reports	S4.A	15th day of each month
14-Day Report: Discharge Violation or Permit Violation.	S4.D	Within 14 days after a discharge or permit violation becomes known.
5-Day Report: Slug Discharge or Spill	S6.A	Within 5 days after a slug discharge or spill.
Ecology Dangerous Waste Reports	S6.D	As requested by King County.
Installation/Upgrade of Pretreatment System Report	S6.C	Prior to installation or upgrade.
Slug/Spill Control Plan	S6.A	As requested by King County.

C. Major Changes in the Renewed Permit

This renewed permit contains the following major changes since last issuance:

1. New, lower screening levels for organics of concern: vinyl chloride, cis-1,2,-dichloroethane, and 1,1,2,-trichloroethylene. (S11.)

2. The requirement to perform additional air/water sampling at the commencement of discharges to the sewer through the new pretreatment system. (S3.)

D. Company Identification

SIC Code No.:	Not Applicable
Hazardous Waste Generator No.:	WAD 076655182
Industry Type:	Groundwater remediation for chlorinated solvents at the site of a former plating operation

S3. SPECIAL CONDITIONS

A. B.S.B. Diversified Co. Inc. (BSB) shall notify the King County Industrial Waste Program (KCIW) within 24 hours prior to when discharge to the sewer begins.

B. Upon commencement of discharges to the sewer, BSB shall collect paired air/water samples once per week for the first four weeks. The results of this sampling shall be reported to KCIW each week.

1. Water samples shall be collected from the sampling point (spigot) where the treated HYR-1 extraction well groundwater and the HYR-2 extraction well groundwater combine prior to discharge to the sanitary sewer (sample site A8106).

2. Air samples shall be collected within 15 minutes of collection of the water sample at the first manhole downstream of the BSB discharge point in the City of Kent's sanitary sewer manhole number R99, located at the intersection of 200th Street and 81st Avenue South.

3. Analytical results from the air sampling shall be provided to BSB on a 72-hour turnaround time. If results of the air sampling exceed the air contaminants limits for vinyl chloride, cis-1,2,-dichloroethylene, or 1,1,2-trichloroethylene (listed in S3.C below), BSB shall immediately cease discharge to the sewer and notify King County.

C.

Point of Compliance for Air Sampling is City of Kent Manhole R-99		
Compound	***CAS Number***	***Air Contaminants Limits (PEL) ppmV***
Vinyl Chloride	75-01-4	1.0
Cis-1,2,-dichloroethylene	156-59-2	200.0
1,1,2,-Trichloroethylene	79-01-6	50.0

D. King County will review results from this sampling and determine if current screening limits need to be revised.

S4. EFFLUENT LIMITATIONS & SELF-MONITORING REQUIREMENTS

A. Effluent Limitations and Self-Monitoring Requirements:

1. The Permittee shall comply with the following discharge limits and monitor its discharges to the King County sewerage system as specified below.

Sample Site No.	*Limit Type*	*Sample Site Description*
A8106	King County Local Limits	Spigot on discharge pipe

Parameter	*Daily Average (mg/L)*	*Instantaneous Maximum (mg/L)*	*Maximum Loading* (lb/day)*	*Sampling Frequency*	*Sample Type*
Arsenic, Total	1.0	4.0	0.42	NA	NA
Cadmium, Total	0.5	0.6	0.21	NA	NA
Chromium, Total	2.75	5.0	1.15	NA	NA
Copper, Total	3.0	8.0	1.25	NA	NA
Lead, Total	2.0	4.0	0.83	NA	NA
Mercury, Total	0.1	0.2	0.04	NA	NA
Nickel, Total	2.5	5.0	1.04	NA	NA
Silver, Total	1.0	3.0	0.42	NA	NA
Zinc, Total	5.0	10.0	2.09	NA	NA
Nonpolar FOG	100	NA	NA	NA	NA
Vinyl Chloride Cis-1,2,-Dichloroethylene 1,1,2,-Trichloroethylene	See S11 for screening levels and requirements.			Once per month	Composite

pH (s.u.)	*Daily Minimum*	*Minimum*	*Maximum*	NA	NA
	5.5	5.0	12.0		

Daily Maximum Discharge Volume (gpd)	*Contaminated Groundwater*			Continuous	In-line meter
	50,000				

* Applicable poundage limit for each parameter equals the daily average concentration in mg/L, multiplied by the flow in million gallons per day, multiplied by 8.34. A maximum loading of 0.01 is listed whenever the calculated poundage limit is 0.01 or less.

2. Self-monitoring report of all required and non-required sampling to be filed no later than the 15th day of the time period following the sample collection (i.e., the 15th day of the following month for monthly, weekly, daily samples). The Permittee shall use the King County self-monitoring form to submit results unless an alternate form is approved by King County. If no discharge has occurred during the sampling time period, the report shall be submitted notifying King County that no discharge has occurred.

3. The total volume discharged for any processing day shall be calculated by reading the volume passing through the flow meter or shall be estimated using another King County approved method. The total volume for each processing day on which metal samples are collected shall be reported on self-monitoring reports. The total monthly discharge volume shall be reported on self-monitoring reports.

4. Volume and waste type from all batch discharges shall be recorded on the self-monitoring form.

5. For self-monitoring requirements, if time-proportioned composite sampling is authorized, a composite sample shall consist of two or more grab samples of equal volume collected at least 15 minutes apart and no more than two hours apart throughout the processing day from a well-mixed effluent chamber.

6. For self-monitoring requirements, a flow-proportioned composite sample shall mean a sample composed of grab samples collected continuously or discretely, by hand or machine, in proportion to the flow at the time of collection or to the total flow since collection of the previous grab sample. The grab sample volume or frequency of grab collection may be varied in proportion to flow.

7. Should an automatic pH recording system fail, the Permittee shall manually check the pH at least four times per hour. Any discharge without a pH record shall be considered a violation of this permit.

B. Non-Required Self-Monitoring

All sampling data collected by the Permittee and analyzed using procedures approved by 40 CFR 136 or approved alternatives shall be submitted to King County whether required as part of this permit or done voluntarily by the Permittee.

C. Violation Criteria

1. Wastewater from regulated processes shall comply with the effluent limitations prior to dilution with other wastewaters unless a fixed alternative discharge limit is approved by King County. (See Section S8.C.4 and the glossary section at the end of this document for a definition of and further information about dilution.)

2. A review of any violation will include consideration of testing accuracy prior to enforcement action.

3. The more restrictive limitation (concentration or mass) shall prevail for determining violations.

4. Daily Average and Maximum Monthly Average Limits apply to composite samples and to grab samples from short-term batch discharges. (See the glossary section for a definition of composite and grab sample.)

5. Instantaneous Maximum Limits apply to grab samples, with the exception of grab samples from short-term batch discharges.

6. The instantaneous minimum pH limit is violated whenever any single grab sample or any instantaneous recording is less than pH 5.0. The daily minimum pH limit is violated whenever any continuous recording of 15 minutes or longer remains below pH 5.5 or when each pH value of four consecutive grab samples collected at 15-minute intervals or longer within a 24-hour period remains below pH 5.5.

7. The limit for nonpolar FOG (mineral origin) is violated when the arithmetic mean of the concentration of three grab samples (taken no more frequently than in five minute intervals), or when the result of a composite sample exceeds 100 mg/L.

D. Response When Violations Are Detected

1. When monitoring data shows a violation, the Permittee shall:

   a. Take immediate action to stop the violation and notify King County Industrial Waste within 24 hours of learning of the violation.
   b. Collect a sample and submit new data to King County within 14 days of becoming aware of the violation.
   c. Submit a written report within 14 days of learning of the violation (*14-Day Report*). The report should explain the cause of the violation and corrective actions taken to respond to the violation and ensure ongoing compliance.

2. In the event the Permittee is unable to comply with any of the conditions of this permit because of a breakdown of equipment or facilities, an accident caused by human error, negligence, or any other cause, such as an act of nature, the Permittee shall:

   a. Take immediate action to stop, contain, and clean up the unauthorized discharges and correct the problem.
   b. Immediately notify the emergency King County contact in Section S1 so steps can be taken to prevent damage to the sewerage system.
   c. Submit a written report within 14 days of the event (*14-Day Report*) describing the breakdown, the actual quantity and quality of resulting waste discharged, corrective action taken, and the steps taken to prevent a recurrence.

1. Whenever an effluent check shows a pH violation, as defined in King County Code 28.84.060.N "Violations," the Permittee shall take immediate steps to bring the discharge back into compliance. If this is not possible, the Permittee shall cease discharge.

2. Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the conditions of this permit or the resulting liability for failure to comply.

E. Limitations Applicable to All Sites

1. General

   The Permittee's discharge shall not interfere with the operation of the King County sewerage system, cause King County to exceed its NPDES permit limits, or endanger local utility or King County sewer workers. (See the glossary section for a definition of interference.)

   The Permittee's discharge shall not violate any discharge standard, limitation, or specific prohibition of King County Code 28.84.060 or local discharge limits applicable on the date of discharge. (See Section 28.84.060.D-F of King County Code.)

   Prohibitions previously referenced include, but are not limited to, substances causing fire or explosion hazard, flow obstruction, excess oxygen demand, and toxic vapors.

   Limitations listed in S4 include, but are not limited to, restrictions on settleable solids, organic compounds, hydrogen sulfide, and polar FOG.

2. Organic Compounds

   No person shall discharge any organic pollutants that result in the presence of toxic gases, vapors, or fumes within a public or private sewer or treatment works in a quantity that may cause acute worker health and safety problems.

   Organic pollutants subject to this restriction include, but are not limited to any organic compound listed in 40 CFR 433.11 (e) Total Toxic Organics (TTO) definition, acetone, 2-butanone (MEK), 4-methyl-2-pentanone (MIBK), and xylenes.

   Dischargers are required to implement good "housekeeping" and best management practices in order to prevent the discharge of a concentrated form of any of the preceding organic pollutants.

F. Responsibility for Compliance

It is the responsibility of the Permittee to ensure that all effluent limitations of this permit are met whether or not self-monitoring for the parameter is required.

S5. SAMPLE SITE ACCESS AND IDENTIFICATION

A. Unobstructed access to sample sites shall be available to authorized King County personnel during normal operating hours. The Permittee shall be responsible for providing alternate sample sites in the event of obstruction of access or upon evidence of tampering with the monitoring equipment.

B. The Permittee shall allow King County to permanently label the sample sites used to collect wastewater samples.

C. The Permittee shall at all reasonable times, allow authorized representatives of King County to enter, inspect, and sample as specified in King County Code 28.84.060.L, "Inspection and Sampling of Industrial Users."

S6. NOTIFICATION REQUIREMENTS

A. Spills and Slug Discharges

1. The Permittee shall notify King County Industrial Waste immediately in the event of a spill or slug discharge to the sanitary sewer. A written report regarding the cause of the spill and/or slug discharge shall be submitted to King County within five (5) days of date of occurrence. The report should explain the cause of the violation and corrective actions taken to respond to the violation and ensure ongoing compliance. (See the glossary section for a definition of slug discharge and Section S8.B for spill and slug discharge control procedures.)

2. Following a spill and/or slug discharge, King County may require the submission or modification of a spill/slug control plan.

B. Changes In Discharge Characteristics

The Permittee shall inform King County Industrial Waste prior to any facility or manufacturing changes that will result in:

1. Introduction of new wastewater pollutants.

2. Significant alteration in the volume (greater than 20 percent increase from permit application) or character of the pollutants discharged to the King County sewerage system.

3. Discharge of wastestreams not listed in the permit application.

4. Addition of a new point of discharge or a new chemical, process, product, manufacturing line, or waste processing activity.

5. Changes in the potential for spill or slug discharges.

No change shall be made until plans have been approved and either written permission or a new or modified permit has been received. In no case are any changes permitted that will cause violation of the effluent limitations specified herein.

C. Installation/Upgrade of Pretreatment System

A Professional Engineer's report per WAC 173-240 must be approved prior to installation or upgrade of pretreatment system.

D. Hazardous Wastes

Within 180 days following commencement of discharge or permit issuance, whichever is later, the Permittee must notify King County Industrial Waste, the U.S. Environmental Protection Agency, and the Washington State Department of

Ecology of any discharge of a listed or characteristic RCRA hazardous waste. Identifying the listed or characteristic RCRA hazardous wastes on the Permittee's wastewater discharge permit application serves as notice to King County. This is a one-time notification requirement. The contents of the notification may vary according to the quantity of waste discharged. (See "Notification of the Discharge of Hazardous Wastes" in King County Code 28.84.060.)

Whenever the U.S. Environmental Protection Agency publishes new RCRA rules identifying additional hazardous wastes or new characteristics of hazardous wastes, the Permittee must notify King County Industrial Waste, the U.S. Environmental Protection Agency, and the Washington State Department of Ecology if any of these wastes are discharged to the King County sewerage system. Notification must occur within 90 days of the effective date of the published regulation. (See the glossary section for a definition of hazardous wastes.)

E. Continuing Discharge After Permit Expiration Date

This permit does not authorize discharge after its expiration date. If the Permittee wishes to continue discharge after the expiration date, an application must be filed for reissuance of this permit at least 180 days prior to the expiration date. If the Permittee submits its reapplication in the time specified herein, the Permittee shall be deemed to have an effective waste discharge permit or authorization until King County issues or denies the new waste discharge permit. If the Permittee fails to file its reapplication in the time period specified herein, the Permittee will be deemed to be discharging without a discharge permit after the current permit's expiration date.

S7. MONITORING AND RECORD KEEPING

A. Record Keeping and Retention

The Permittee shall maintain records relating to all permitted discharges to the King County sewerage system including routine maintenance, waste disposal dates, manifests, self-monitoring reports, analytical lab results, pH monitoring records, and flow records.

All records required by the permit shall be available for review at reasonable times by authorized representatives of King County.

Records of all such testing shall be retained for a period of three (3) years unless litigation or the direction of the King County Industrial Waste Program requires an extension of that time.

B. Recording of Results

For each measurement or sample taken to comply with this permit, the Permittee shall record the following information:

1. Date, exact place, and time of sampling;
2. Dates the analyses were performed;
3. Person who performed the analyses;
4. Analytical techniques or methods used; and
5. Results of all analyses.

C. Representative Sampling

Samples and measurements taken to meet the requirements of this condition shall be representative of the volume and nature of the monitored discharge.

D. Test Procedures

All analyses shall be performed in accordance with procedures established by the Administrator of the U.S. Environmental Protection Agency pursuant to Section 304(g) of the Federal Clean Water Act and contained in 40 CFR Part 136 and amendments thereto or with any other test procedure approved in writing by the EPA Administrator, and/or King County. In all cases, except total dissolved sulfide, the detection limit shall be well below the discharge limit. Where 40 CFR Part 136 does not include a sampling or analytical technique for the pollutant in question, sampling and analysis shall be performed in accordance with the procedures set forth in the EPA publication entitled "Sampling and Analysis Procedures for Screening of Industrial Effluents or Priority Pollutants, April 1977" or "Standard Methods," Latest Edition and amendments thereto, or with any other sampling and analytical procedures approved by the EPA.

E. Lab Accreditation

All self-monitoring data submitted to King County that required a laboratory analysis must have been performed by a laboratory accredited by the Washington State Department of Ecology for each parameter tested. This does not apply to field measurements performed by the Permittee such as pH, temperature, flow, atmospheric hydrogen sulfide, total dissolved sulfides, settleable solids by Imhoff cone, or process control information.

F. Falsifying Information

The act of knowingly falsifying, tampering with, or knowingly rendering inaccurate any monitoring device, report, or method required pursuant to the federal pretreatment standards, King County Code 28.84.060, or special conditions of this permit shall constitute a violation of this permit, and shall be subject to the legal remedies available under "Revocation of Permit or Authorization" and "Penalties and Enforcements" in King County Code 28.84.060.

G. Toxicity Testing

If King County is required by the Washington State Department of Ecology to determine the source of a pattern of acute toxicity pursuant to its Treatment Plant NPDES permit, the Permittee may be required to test its effluent for toxicity according to procedures to be determined by King County.

H. Signatory Requirements for Industrial User Reports

Any report required by this permit shall meet the signatory and certification requirements listed in King County Code 28.84.060 and King County Code 28.82.

S8. OPERATIONS AND MAINTENANCE

The Permittee shall use waste preventative practices to reduce or eliminate contaminant loading to the King County sewerage system. These practices shall include proper chemical storage, spill prevention and notification, and maintenance and operation of any required pretreatment equipment.

A. Chemical Storage

Chemical solutions, solid chemicals, waste materials, oils, and solvents shall be stored in a manner that will prevent the entry of these materials into the King County sewerage system.

1. Non-compatible chemicals shall be segregated and securely stored in separate containment areas that prevent mixing of incompatible or reactive materials.

2. The Permittee shall install shut-off devices to all drains in any hazardous waste storage areas.

3. Chemicals shall be dispensed only in roofed and bermed areas that eliminate potential spills to the King County sewerage system.

4. All empty barrels that have not been cleaned (steam-cleaned or triple-rinsed) shall be adequately stoppered and stored in an upright position.

5. Process tanks shall be located in a bermed, roofed, secured area capable of containing 110 percent of the volume of the largest tank. The Permittee shall ensure that process solutions are used and stored in such a manner as to minimize spills of concentrated solutions to the sanitary sewer.

B. Spill or Slug Discharge Control Procedures (See Section S6.A.)

1. In the event of a concentrated solution spill such as a tank failure, the Permittee shall not discharge any spilled solution to the metropolitan sewer system unless laboratory test results indicate that the substance meets the conditions of this permit and the Permittee receives approval from the King County Industrial Waste Program.

2. Concentrated waste or spilled chemicals that do not meet, or are not treated to meet, the discharge conditions of this permit shall be transported offsite for disposal at a facility approved by the Washington State Department of Ecology or appropriate county health department.

3. The Permittee shall maintain and inspect all process solution tanks on a regular basis. Any leaks shall be repaired promptly.

4. The Permittee shall use spill prevention practices to preclude the discharge of liquids, solids, or gases which by reason of their nature or quantity are, or may be, sufficient either alone or by interaction with other substances to cause fire or explosion.

5. All process tanks and chemical storage containers shall be accurately labeled. Emergency phone numbers of King County, Fire Departments, your company's 24-hour corporate contact, and Washington State Department of Ecology shall be posted at all sites that King County requires.

6. The Permittee shall ensure that concentrated waste from process tank filters and other equipment is prevented from entering the sanitary sewer unless it is treated to meet the discharge conditions of this permit.

7. The Permittee shall maintain and use product recovery options such as drag-out rinses for each plating bath or process as required to meet the discharge conditions of this permit. Recovered materials shall not be discharged to the sanitary sewer unless they are treated to meet the discharge conditions of this permit.

C. Pretreatment Equipment Maintenance and Operations

1. All pretreatment systems used to bring the Permittee's discharge into compliance with King County's discharge limitations shall be maintained continuously in satisfactory and effective operations by the Permittee at the Permittee's expense, and shall be subject to periodic inspections by authorized King County personnel. These systems shall be attended at all times during discharge to the King County sewerage system. In the event that such equipment fails, the Permittee must notify King County immediately and take spill prevention precautions.

2. The Permittee shall not initiate construction or modification of a pretreatment system prior to receiving King County approval of plans and specifications per WAC 173-240. In addition, King County may require an engineering report and an operations and maintenance manual.

3. King County shall be contacted before the beginning of any limited experimental modifications or new equipment testing that could reasonably be expected to affect effluent quality or quantity. This experimental work shall proceed only after securing written approval from King County and following the Permittee's adherence to any applicable special conditions.

4. The effluent limitations specified in this permit are to be met by treatment of the wastes for pollutant removal. The use of municipal water, ground water, seawater, storm water or other materials, including waste products, for the purpose of diluting a waste to achieve those limitations is prohibited.

5. The Permittee shall adequately maintain and efficiently operate all treatment or control facilities or systems installed or used by the Permittee to achieve compliance with the terms and conditions of this permit.

D. Water/Sewer Meter Requirements

The Permittee shall obtain or maintain access to a water or sewer meter that can provide accurate information regarding industrial process wastewater and cooling water discharge to the sewer. Another method of volume determination may be used only upon approval by King County.

E. Solid Waste

1. The Permittee shall handle and dispose of all solid waste material (as defined in WAC 173-304-100) not otherwise authorized by this permit in such a manner as to prevent its entry into the King County sewerage system.

2. All covers, screening devices, sumps, hoppers, conveyors, and other facilities provided for the recovery and handling of solid wastes are to be maintained in an efficient operating condition.

F. Stormwater

Stormwater, surface water, ground water, and roof runoff shall be excluded, except where specifically authorized by this permit or King County Code 28.84.060, from the King County sewerage system.

S9. GENERAL CONDITIONS

A. The discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this permit shall constitute a violation of the terms and conditions of this permit. Whenever the Permittee refuses to take corrective action or continues the violating condition, the imposition of civil penalties including fines up to $10,000 for each violation per day and/or termination of this permit may result. Termination of this permit may require disposal of the industrial waste in some manner other than into the public sewer, private sewer, or side sewer tributary to the King County sewerage system at the expense of the person holding the permit. Any person causing damage to a public sewer or treatment facility by discharges in violation of the terms and conditions of this permit shall be liable for any such damage incurred by King County as a result of such damage or discharge.

B. The diversion or bypass of any discharge from any pretreatment facility utilized by the Permittee to maintain compliance with the terms of this permit is prohibited except where unavoidable to prevent loss of life or severe property damage. The procedure outlined in Section S4.D shall be followed in case of such a diversion or bypass.

C. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its terms for those causes cited in King County Code 28.84.060.

D. If a toxic standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307 (a) of the Federal Clean Water Act for a toxic pollutant which is present in the discharge authorized herein, and such standard or prohibition is more stringent than any limitation upon such pollutant in this permit, this permit will be revised or modified in accordance with the toxic effluent standard or prohibition and the Permittee shall be so notified. Section 307 (a) requires that the Administrator of the Environmental Protection Agency shall promulgate effluent standards (or prohibitions) for toxic pollutants which he or she has listed as such.

E. Nothing in this permit shall be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

F. All requirements and ordinances of the U.S. Environmental Protection Agency and the Washington State Department of Ecology pertaining to hazardous and toxic wastes, disposal facilities, and discharge of wastes into the King County sewerage system, are hereby made a condition of this permit.

S10. WASHINGTON DEPARTMENT OF ECOLOGY CONDITIONS

This permit does not constitute authority for discharge into waters of the state. Any such discharge is subject to enforcement action by the Department of Ecology.

Upon issuance of this permit, the Permittee assumes the responsibility to abide by the following environmental requirements, and any other appropriate regulations stipulated by the Department of Ecology. **The Department of Ecology retains authority to enforce these permit conditions (RCW 70.105 and RCW 90.48).**

Conditions to Protect Ground and Surface Waters

1. Contaminated waters or wastes shall not be discharged to state waters.
2. Boiler blow down and water shall not be discharged to state waters.
3. Solid chemicals, chemical solutions, waste materials, oils, and solvents shall be stored in a manner which will prevent the entry of these materials into state ground or surface waters, and in a manner that will prevent spillage by overfilling, tipping, or rupture.
4. The Permittee shall handle and dispose of all solid waste material in such a manner as to not cause any adverse effect on ground or surface water quality.
5. Filtered solids or sludge shall be stored in such a manner that drainage from this material is prevented from either draining across public rights-of-way or entering the local storm drain system or the ground water.
6. No emulsifiers or dispersants are to be used on waters of the state without approval from the Department of Ecology.
7. If corrosive processing solutions are used, the processing/plating floor shall be sealed with corrosion resistant material that prevents leakage. This coating shall be repaired or replaced as needed.

Questions regarding the implementation of conditions outlined in Section S10 should be directed to the regulatory authority, the Washington State Department of Ecology, at 425-649-7000 (Northwest Regional Office, 3190 160th Avenue SE, Bellevue, Washington 98008-5452).

S11. ORGANIC CHEMICAL DEFINITION AND REPORTING REQUIREMENTS

A. Screening Levels for Selected Organic Compounds

Discharges that exceed the following screening levels have the potential to cause health hazards in the sewage collection system or indicate that treatment has not been sufficient enough to remove hazardous waste characteristics.

Compound	CAS Number	Wastewater Screening Level (mg/L)
Vinyl Chloride	75-01-4	0.10
Cis-1,2,-dichloroethylene	156-59-2	10.0
1,1,2,-Trichloroethylene	79-01-6	0.5

B. Organic Reporting Requirements

1. The permittee shall indicate in the self-monitoring report whether the organic chemical monitoring results exceed any of the screening levels listed in S11.A.

2. Whenever King County or the permittee's self-monitoring results exceed the screening level for three out of four months, the permittee shall submit a plan indicating the steps that will be taken to ensure that organic chemical discharges do not exceed screening levels. The plan shall be submitted within 30 days of the third self-monitoring report that shows organic chemical discharges that exceed screening levels. The report shall indicate the steps that will be taken to reduce organic chemical concentrations so that they remain consistently below screening levels within 60 days.

KING COUNTY INDUSTRIAL WASTE
COMPANY FACT SHEET

Date: October 15, 2010

COMPANY INFORMATION

Company Name:	B.S.B. Diversified Co. Inc.
Plant Address:	S. 200th Street and 81st Street Kent, WA 98032
Mailing Address:	c/o Dyson-Kissner-Moran Corp. 565 5th Avenue, 4th Floor New York, NY 10017-2413
Treatment Plant:	South Treatment Plant
Corp. Contact & Phone:	John Fitzsimmons, 212-661-4600
Plant Contact & Phone:	Bill Haldeman, 206-529-3980, ext. 107
Company Type:	Groundwater Remediation - Organics
Days Operating:	365
EPA ID #:	WAD 076655182
Investigator:	Peggy Rice

PERMIT INFORMATION

Permit No.:	7575-04
Revision Date:	October 15, 2010
Expiration Date:	May 18, 2014

DESCRIPTION OF SAMPLE SITES, LIMIT TYPES, & DISCHARGE VOLUMES

Sample Site No.	Description	Limit Type	Maximum Industrial Volume (gpd)
A8106	Spigot on discharge pipe	KCLL GT 5000	50,000

SELF-MONITORING REQUIREMENTS

Sample Site No.	Parameter	Sample Type	Frequency
A8106	1,1,2-Trichloroethylene	composite	monthly
A8106	Cis-1,2-Dichloroethylene	composite	monthly
A8106	Discharge Rate	continuous	monthly
A8106	Discharge Rate Daily Max	continuous	monthly
A8106	Total Monthly Flow	continuous	monthly
A8106	Vinyl Chloride	composite	monthly

MONITORING FEE PARAMETER

Sample Site No.	Fee Type
A8106	Organics Fee Parameter (ICR)

PERMIT PROCESSING

Permit No. 7575-04

ACTION	DATE
Application Received	NA-King County Initiated
Fee Requested	NA-King County Initiated
Fee Paid	NA-King County Initiated
Draft Issued	No draft permit issued
Revised Permit Issued	October 15, 2010

COMMENTS

Nature of Business/Sources of Wastewater
The B.S.B. Diversified Co. Inc. (BSB) 4.2-acre property was the former site of a metal finishing and electroplating plant and a composites plant formerly operated on the BSB and neighboring Hexcel Corp. properties. These properties housed impoundments, lagoons, container storage, and similar units for managing waste, including hazardous waste, through storage and disposal. The wastes contained in some of these units included chlorinated compounds. Beginning in the early 1980s, waste management activities and associated releases of hazardous substances were investigated and cleanup actions initiated under the federal Resource Conservation and Recovery Act (RCRA).

In April 2006, BSB separated their contaminated groundwater discharges from Hexcel's contaminated groundwater discharges. The remediation system, prior to the modifications, consisted of six groundwater recovery wells, two located on BSB property (HYR-1 and HYR-2) and four located on Hexcel's property (CG-1, CG-2, CG-3, and CG-4). Since April 2006, BSB has retained responsibility for operating and maintaining HYR-1 and HYR-2 and Hexcel assumed responsibility for CG-1, CG-2, CG-3, and CG-4.

Hexcel was issued a permit (7808-01) in February 2006 for their contaminated groundwater. BSB is currently discharging an average of 32,000 gallons per day of groundwater from this remediation project to the sewer.

Treatment System
BSB is in the process of installing a new Groundwater Pretreatment System (GWPS) in order to meet the more stringent screening limits being imposed in the permit. In 1995, the King County Industrial Waste Program (KCIW) approved the termination of the on-site treatment system (air stripper). Excess iron present in the groundwater was requiring excessive maintenance of the pretreatment system. At that time, King County established a maximum discharge limit of 0.75 mg/L for vinyl chloride based on an air monitoring study conducted by BSB and King County did not have screening levels for 1,1,2-trichloroethylene (TCE), Vinyl Chloride, and Cis-1,2-dichloroethylene (cDCE).

The engineering report for the new proposed GWPS was approved by KCIW Water Quality Engineer Bruce Tiffany in a letter dated July 7, 2010. The GWPS includes a low profile air stripper to transfer VOCs dissolved in water to the air stripper vapor effluent stack. Based on VOC concentrations in the existing groundwater extraction system, only extraction well HYR-1 requires pretreatment. As such, the low profile air stripper will be designed to manage and treat HYR-1 groundwater to below the revised screening levels. Historical VOC concentrations in extraction well HYR-2 water are already well below the revised screening levels so HYR-2 groundwater is approved to bypass the air stripper and will be combined with the treated HYR-1 water prior to the permitted sanitary sewer discharge point. Based on the expected mass transfer of vinyl chloride in the air stripper, the air stripper effluent vapors will require vapor treatment and an Order of Approval from the Puget Sound Clean Air Agency (PSCAA) to operate. BSB is working with PSCAA to receive this approval.

Trends in Discharge of Pollutants of Concern
In May 2009, with the renewal of BSB's permit, KCIW imposed new significantly lower screening levels for vinyl chloride and 1,1,2-trichloroethylene. In addition, at the time of the permit renewal, BSB was planning to replace their system with another groundwater cleanup action (passive remediation system) and discharge to the sewer was scheduled to end in the summer of 2010. Therefore, rather than design and incorporate pretreatment measures at that time, BSB proposed to verify that VOC concentrations in the sewer were consistently meeting the permissable exposure limit (PEL) by performing air/sewer sampling on a quarterly basis. KCIW approved BSB's proposal and issued a temporary exemption based on BSB's discharge history, expected limited duration of the discharge, and previous air toxics monitoring. The exemption was good through December 2010. After December 31, 2010, if discharging was to continue, the lower screening limits were to be met and pretreatment would be required.

As a result of BSB's deep aquifer dewatering event in September 2009, higher than normal concentrations of vinyl chloride, cDCE, and TCE were consistently being found in BSB's sewer air samples, with vinyl chloride concentrations above the PEL and the short term exposure limit (STEL), indicating a risk for an unsafe environment for sewer personnel. In May 2010, KCIW issued a compliance order to BSB requiring a submittal of Design/Installation of Pretreatment and increased sewer air monitoring frequency from quarterly to weekly. Because the subsequent results of this air monitoring indicated that

BSB's discharges were exceeding the PEL for vinyl chloride, KCIW required that BSB cease discharge. BSB has not discharged since June 2, 2010. Since June 2010, BSB has been working to get the GWPS approved, installed, and operational. Discharge is expected to resume in October 2010.

Slug and/or Spill Control Plan
BSB has a slug/spill plan on file with KCIW that is reviewed annually and has been determined to be sufficient.

Self-Monitoring Requirements
For the first four weeks of initial start-up of this new GWPS and discharge to the sewer, King County is requiring BSB to collect paired weekly sewer/air samples. This is in order to verify the effectiveness of the GWPS. Once verified that the screening levels and PELs are in compliance, BSB is required to sample the wastewater discharges for volatile organics once per month.

King County Monitoring Schedule
King County monitors this site twice annually for organics.

Special Conditions
The special conditions written into this permit apply to the initial start-up of BSB's GWPS. Upon commencement of discharge to the sewer, KCIW is requiring paired sewer/air sampling once per week for the first four weeks to verify the effective operation of the pretreatment system and to verify that groundwater discharges and sewer air are within wastewater screening levels and permissible exposure limits respectively. If the PELs are exceeded, BSB is required to notify KCIW and to cease discharge to the sewer.

Limit Calculations
Screening levels are the concentration in the wastewater that could potentially produce sewer gas concentrations in excess of the PEL. With the data submitted by BSB, KCIW Water Quality Engineer Bruce Tiffany established site specific screening levels for BSB's GWR discharge, specifically vinyl chloride, cis-1,2-DCE, and 1,1,2-TCE. These new screening limits are written into this permit. The calculations of the screening levels are based on Henry's law equilibrium between the volatile organic compound in the wastewater and the sewer gases.

Organic Compound Screening Limits

Compound	Previous Screening Limits	New Permit Screening Limits
Vinyl Chloride	0.75 mg/L	0.1 mg/L
Cis-1,2,-Dichloroethylene	2.0 mg/L	10.0 mg/L
1,1,2,-Trichloroethylene	5.0 mg/L	0.5 mg/L

Flow-Based vs. Time-Based Composite Sampling
The flow rate is continuous and does not fluctuate at this project. In addition, the only required sampling is for organics. Therefore, BSB is not required to evaluate whether flow-based or time-based composite sampling is appropriate. Time-based composite samples provide representative samples of BSB's discharges.

Changes Since the Last Permit
This new permit contains new screening limits for organics of concern: Vinyl Chloride; Cis-1,2,-Dichloroethylene; and 1,1,2,-Trichloroethylene.

Public and Agency Comments
Not Applicable. This is a revised permit initiated by King County.

Safety
No special safety gear is necessary while sampling or inspecting this site.

Appendix B-3

Stormwater Permit WAR-125362, Water Treatment Plan, and Clear Water Field Reports

CLEAR WATER SERVICES

November 11, 2011

Ray Mayhew
MidMountain Contractors
PO Box 2909
Kirkland, WA 98033

Re: BSB Diversified Site Clean-up Action Stormwater Treatment Report

This report summarizes *stormwater* treatment operations in support of the B.S.B Diversified Final Cleanup Action project as performed by Clear Water Services (Clear Water). Stormwater treatment operations and maintenance including mobilization and de-mobilization were conducted seven days during this reporting period. The stormwater treatment system was mobilized to the site on October 17, 2011 and demobilized on November 3, 2011.

During this reporting period, a total of approximately 63,500 gallons of stormwater were treated and 42,500 gallons of treated stormwater were discharged within state and local water quality parameters from the chitosan-enhanced sand filtration (CESF) system to the City of Kent's stormwater drainage system, which flows to Garrison Creek. The water was treated in preparation for site soil stabilization and paving, which is currently nearing substantial completion. Onsite construction stormwater is currently being infiltrated and/or controlled utilizing settling tanks.

System Discharge Volumes and Water Quality Parameters
Summarized discharge data is presented in the attached spreadsheets and in the table below. Turbidity and pH parameters were within the regulatory limits (less than 10 nephelometric turbidity units (NTU), and 6.5 to 8.5 standard units (s.u.)) for system discharges. All residual chitosan tests demonstrated no residual chitosan (negative result) in treatment system effluent and were conducted periodically during system operations in accordance with the General Use Level Designation.

Date	Gallons Discharged	Discharge Turbidity (NTU)	Discharge pH (SU)
10/14/2011	0	NO DISCHARGE	NO DISCHARGE
10/17/2011	0	NO DISCHARGE	NO DISCHARGE
10/18/2011	0	NO DISCHARGE	NO DISCHARGE
10/19/2011	12,000	3.8 - 9.6	7.44 - 7.56
10/26/2011	15,000	2.2 - 9.2	6.89 - 6.94
10/28/2011	10,000	1.6 - 3.5	7.06 - 7.07
11/03/2011	5000	3.1 - 6.6	8.36 - 8.36
Total/Average:	**42,000**	**2.69 - 7.20**	**7.41 - 7.48**

System Upsets
Successful implementation of stormwater treatment is reliant upon aggressive implementation of the project Stormwater Pollution Prevention Plan (SWPPP) and appropriate erosion and sediment controls.

Initial treatment system operations were delayed after the initial setup of the treatment system due to extremely high turbidity (>1100 NTU) and a layer of sludge build up within the tank. Frequent pretreatment operations, turbidity levels exceeding 600 NTU and overnight settling, was required to achieve pre-filtration and discharge criteria. On 10/18/2011 the treatment system pump was observed to have a small fuel leak and was replaced on 10/19/2011, at which point treatment operations resumed. On 10/21/2011 the system was reconfigured and relocated to new area of the site. Vactor truck services were performed to remove excessive sludge within the tank and an additional 10,000 gallon tank was incorporated into the treatment system to improve pretreatment capabilities and operations.

Total Rainfall

Clear Water monitors local meteorological stations through Weather Underground Inc. The rainfall data provided in the table below is from a Rainfall data was collected from a weather station located in Renton, WA (Station #: MSBKW1).

Daily Rainfall Totals											
Date	10/14	10/15	10/16	10/17	10/18	10/19	10/20	10/21	10/22	10/23	10/24
Rainfall (inches)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.42	0.04	0.02
Date	10/25	10/26	10/27	10/28	10/29	10/30	10/31	11/1	11/2	11/3	11/4
Rainfall (inches)	0.02	0.01	0.01	0.52	0.04	0.11	0.01	0.00	0.3	0.16	0.00
Total Rainfall for the Period = 1.30 inches											

If you have any questions regarding the information presented in this report or operations at the project site, please contact Nathan Holloway at (425) 754-1541.

Sincerely,

Nathan Holloway
VP-Operations / Project Manager
CLEAR WATER SERVICES

Attachments:

1. Monthly Data Summary for CESF Operations
2. Field Logs

CLEAR WATER SERVICES

Remediation Solutions for the Real World™ – Stormwater, Groundwater, and Waste Water

MONTHLY DATA SUMMARY FOR CESF OPERATIONS

Job name: BSB Diversified Stormwater Treatment
Job number: 11MID1
Month: October-11
Prepared for: MidMountain Contractors

DATE	3rd PARTY PRECIP (Inches)	VOLUME DISCHARGED (Gallons Approx)	SAND FILTER INFLUENT pH		SAND FILTER INFLUENT TURBIDITY (NTU)		SAND FILTER EFFLUENT pH		SAND FILTER EFFLUENT TURBIDITY (NTU)		RECEIVING WATER pH (Grab Sample)	RECEIVING WATER TURBIDITY (NTU) (Grab Sample)
-	-	-	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	-	-
10/14/2001	0	0									6.35	8000
10/15/2001	0											
10/16/2001	0											
10/17/2001	0											
10/18/2001	0										6.85	1,800
10/19/2001	0	12,000	7.50	7.50	58.0	120.0	7.44	7.56	3.8	9.6	7.65	375
10/20/2001	0											
10/21/2001	0.05											
10/22/2001	0.42											
10/23/2001	0.04											
10/24/2001	0.02											
10/25/2001	0.02											
10/26/2001	0.01	15,000	6.68	6.87	36.2	71.3	6.89	6.94	2.2	9.2	6.35	775
10/27/2001	0.01											
10/28/2001	0.52	10,000	7.05	7.05	18.5	19.2	7.06	7.07	1.6	3.5	6.42	432
10/29/2001	0.04											
10/30/2001	0.11											
10/31/2001	0.01											
11/1/2001	0											
11/2/2001	0.03											
11/3/2001	0.016	5,000	8.00	8.00	50.0	50.0	8.23	8.36	3.1	6.6		
11/4/2001	0											
Montly	**Total**	**Total**	**Min(Avg)**	**Max(Avg)**	**Min(Avg)**	**Max(Avg)**	**Min(Avg)**	**Max(Avg)**	**Min(Avg)**	**Max(Avg)**	**Average**	**Average**
	1.30	42,000	7.31	7.36	40.68	65.13	7.41	7.48	2.69	7.20	6.72	2276.40

CLEAR WATER COMPLIANCE SERVICES, INC.

CESF – System Monitoring Forms

Project Title: B55 Project No.: UMD1

Project Location: KENT, WA Date: 10/07/11

	Pretreatment Meter Reading		Influent Meter Reading		Effluent Meter Reading	
	Gallons	Time	Gallons	Time	Gallons	Time
Start:						
Finish:						
Total Volume:					NONE	

Operator's Evaluation of System Operations: START RECIRC @ 0830, PULLING OFF BOTTOM OF TANK CAUSING INCREASED STIRRING OF SLUDGE, AND HIGH NTU W/NO DROP OUT, RECONFIGURING TANK + FILTER SET UP FOR TAP DRAW, PUMP NOT ESTABLISHING PRIME

Surface discharge certified acceptable N/A

First Shift	Second Shift	Third Shift
BRYAN DENNIS		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER COMPLIANCE SERVICES, INC.

CESF – System Monitoring Forms

Project Title: BSB

Project Location: KENT, WA

Project No.: 11MCD1

Date: 10/18/11

	Pretreatment Meter Reading		Influent Meter Reading		Effluent Meter Reading	
	Gallons	Time	Gallons	Time	Gallons	Time
Start:						
Finish:						
Total Volume:					None	

Operator's Evaluation of System Operations: PUMP 1 ON, TODD PROCURING NEW PUMP FROM _____, NEW PUMP INSTALLED, START RECIRC @ 1230, STOP SYSTEM @ 1530, TURBIDITY STUN AROUND 1500 NTU

Surface discharge certified acceptable NA

First Shift	Second Shift	Third Shift
BRYAN DEVALOS		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER SERVICES

CESF – System Monitoring Forms

Project Title: BSB

Project No.: 11[illegible]C

Project Location: Kent, WA

Date: 10/18/11

BENCH-SCALE TREATABILITY TEST

	Sample ID	Time	Volume (ml)	Turbidity (NTU)	pH	Adjusted pH (if necessary)	Conductivity (µS/cm)
Sample 1	1250 TANK	1250	500	≈ 1800	6.85	—	—
Sample 2	TANK	1430	500	≈ 1600	7.78	—	—

Sample 1

Estimated Dose Rate (ppm)	Floc Size	Settling Time
1.0	0	5m
2.0	1	—
4.0	2	2min
6.0	2	2min
7.0	2/3	5min
8.0	3	5min

Floc Size Guide:
0 – No Reaction
1 – Pin Floc
2 – Medium Floc
3 – Large Floc

Sample 2

Estimated Dose Rate (ppm)	Floc Size	Settling Time
4.0	½	5min
6.0	2	5min
8.0	3	5min

CHEMICAL METERING PUMP CALIBRATION

Pretreat Pump

Time	Flow (gpm)	Chitosan Delivery (ml/min)	Dose Rate (ppm)	Initials

~~Sand Filter Pump~~ TOTAL PT + FILTER

Time	Flow (gpm)	Chitosan Delivery (ml/min)	Dose Rate (ppm)	Initials
1320	≈ 120	≈ 80	1.76	BSJ

First ~~Shift~~	Second Shift	Third Shift
RYAN PENNING		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER COMPLIANCE SERVICES, INC.

CESF – System Monitoring Forms

Project Title: 353 Project No.: 11(M:D)1

Project Location: CONCRETE, WA Date: 10/19/11

	Pretreatment Meter Reading		Influent Meter Reading		Effluent Meter Reading	
	Gallons	Time	Gallons	Time	Gallons	Time
Start:						
Finish:						
Total Volume:					≈ 17600 GAL	

Operator's Evaluation of System Operations: START RECIRC FILTER BYPASS @ 0830, START SAND FILTERS @ 0930, START DISCHARGE @ 1100, STOP SYSTEM @ 1335 INTO SPIKE, START SYS @ 1415, STOP @ 1530

Surface discharge certified acceptable CKS

First Shift	Second Shift	Third Shift
RYAN JENNINGS		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CWCS 111 9.09

CLEAR WATER SERVICES

CESF – Manual Data Collection Form

Project Title: BSB

Project No.: 4M191

Project Location: KENT, WA

Date: 10/19/11

Notes	Effluent Flow	Time	pH Influent / Effluent	NTU Influent / Effluent	Pressures Influent / Effluent	Initials
D.S	49.5" ↓	@ 1115	7.50 / 7.44	120 / 3.85	16 /	BD
D.S	52.5" ↓	1130	7.50 / 7.47	91.8 / 4.95	18 /	BD
D.S	54.5 ↓	1145	7.50 / 7.54	83.0 / 4.61	22 /	BD
D.S	56.5 ↓	1200	7.50 / 7.49	67.5 / 4.00	16 /	BD
D.S	59.5 ↓	1215	7.50 / 7.49	52.8 / 3.78	22 /	BD
D.S	61.0 ↓	1230	7.50 / 7.47	58.7 / 6.54	24 /	BD
D.S	63.0	1245	7.50 / 7.52	66.8 / 4.51	25 /	BD
D.S	68.0 ↓	1300	7.50 / 7.49	62.3 / 6.20	22 /	BD
D.S	70.0 ↓	1315	7.50 / 7.54	60.1 / 4.31	24 /	BD
D.S	72.5 ↓	1330	7.50 / 7.47	57.9 / 8.22	20 /	BD
D.S	75.0 ↓	1430	7.50 / 7.52	/ 0.63	24 /	BD
D.S	77.5 ↓	1445	7.50 / 7.46	/ 7.31	26 /	BD
D.S	80.5 ↓	1500	7.50 / 7.47	/ 9.46	30 /	BD
D.S	84.0 ↓	1515	7.50 / 7.51	/ 18.20	22 /	BD
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* Indicates verification of in-line meters – samples measured with benchtop meters (required once per day).

First Shift	Second Shift	Third Shift
BRYAN D KNOCS		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER SERVICES

Residual Chitosan Form

Project Title: 355 Project No.: 11M.01

Project Location: KENT, WA Date: 10/19/21

Note: Residual chitosan testing is required during the first 30 minutes and after two hours of each operational period.

	Sample Time	Turbidity NTU	Specific Conductivity µS/cm	pH	Adjusted pH (if necessary)	Chitosan Dose Rate ppm	Result (Positive/ Negative)	Result Time	Pass/Fail
Analysis	1205	3.78	364	7.48	/	0.05	NEG	1220	PASS
Matrix Spike		"	"	"		"	Pos	"	

	Sample Time	Turbidity NTU	Specific Conductivity µS/cm	pH	Adjusted pH (if necessary)	Chitosan Dose Rate ppm	Result (Positive/ Negative)	Result Time	Pass/Fail
Analysis	1240	6.41	359	7.54	/	0.05	NEG	1300	PASS
Matrix Spike		"	"	"		"	Pos	"	

	Sample Time	Turbidity NTU	Specific Conductivity µS/cm	pH	Adjusted pH (if necessary)	Chitosan Dose Rate ppm	Result (Positive/ Negative)	Result Time	Pass/Fail
Analysis									
Matrix Spike									

	Sample Time	Turbidity NTU	Specific Conductivity µS/cm	pH	Adjusted pH (if necessary)	Chitosan Dose Rate ppm	Result (Positive/ Negative)	Result Time	Pass/Fail
Analysis									
Matrix Spike									

First Shift	Second Shift	Third Shift
BRYAN DENNIS		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER SERVICES

CESF – System Monitoring Forms

Project Title: BSB

Project No.: 11MD1

Project Location: Kent, WA

Date: 10/19/11

BENCH-SCALE TREATABILITY TEST

	Sample ID	Time	Volume (ml)	Turbidity (NTU)	pH	Adjusted pH (if necessary)	Conductivity (µS/cm)
Sample 1	Tank	0835	1L	375	7.65	–	–
Sample 2							

Sample 1

Estimated Dose Rate (ppm)	Floc Size	Settling Time
.5	1	–
1.0	2	–
1.5	3	5min

Floc Size Guide:
0 – No Reaction
1 – Pin Floc
2 – Medium Floc
3 – Large Floc

Sample 2

Estimated Dose Rate (ppm)	Floc Size	Settling Time

CHEMICAL METERING PUMP CALIBRATION

Pretreat Pump

Time	Flow (gpm)	Chitosan Delivery (ml/min)	Dose Rate (ppm)	Initials
1205	≈ 50	≈ 50	2.0	(JH)

Sand Filter Pump

Time	Flow (gpm)	Chitosan Delivery (ml/min)	Dose Rate (ppm)	Initials
1205	≈ 50	≈ 50	0.05	SD

First Shift	Second Shift	Third Shift
Sean Yenus		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CW-05

CLEAR WATER COMPLIANCE SERVICES, INC.

CESF – System Monitoring Forms

Project Title: BOB Project No.: 11[illegible]1

Project Location: KENT, WA Date: 10/26/11

	Pretreatment Meter Reading		Influent Meter Reading		Effluent Meter Reading	
	Gallons	Time	Gallons	Time	Gallons	Time
Start:						
Finish:						
Total Volume:					≈ 15000	

Operator's Evaluation of System Operations: START SYS @ 0700, STOP @ 0915, PT TO SMALL BAKER @ 0930, STOP @ 1100, START SF @ 1415, STOP SYS @ 1515

Surface discharge certified acceptable YES

First Shift	Second Shift	Third Shift
[signature] TONY DENNIS		
Technician Name	Technician Name	Technician Name
[signature]		
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER SERVICES

CESF – Manual Data Collection Form

Project Title: 353 Project No.: 11M14 1

Project Location: KENT, WA Date: 10/26/11

Notes	Effluent Flow	Time	pH Influent / Effluent	NTU Influent / Effluent	Pressures Influent / Effluent	Initials
DS	10"↓	0715	6.85 / 6.94	70.7 / 3.78	16 /	BD
DS	14"↓	0730	6.85 / 6.92	68.2 / 6.24	18 /	BD
DS	21"↓	0745	6.86 / 6.92	68.6 / 9.17	22 /	BD
DS	30"↓	0800	6.86 / 6.90	69.4 / 2.71	20 /	BD
DS	39"↓	0815	6.86 / 6.90	71.3 / 4.47	20 /	BD
DS	48"↓	0830	6.87 / 6.91	67.4 / 3.96	21 /	BD
DS	58"↓	0845	6.87 / 6.91	69.1 / 4.72	19 /	BD
DS	64"↓	0900	6.86 / 6.89	68.4 / 3.91	21 /	BD
DS	12"	1430	6.68 / 6.71	43.6 / 3.57	21 /	BD
DS	24"	1445	6.68 / 6.72	42.4 / 2.21	22 /	BD
DS	42"	1500	6.71 / 6.77	36.2 / 4.46	22 /	BD
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* Indicates verification of in-line meters – samples measured with benchtop meters (required once per day).

First Shift	Second Shift	Third Shift
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CW-03

CLEAR WATER SERVICES

CESF – System Monitoring Forms

Project Title: B55B

Project No.: 11MD1

Project Location: Kent WA

Date: 10/26/11

BENCH-SCALE TREATABILITY TEST

	Sample ID	Time	Volume (ml)	Turbidity (NTU)	pH	Adjusted pH (if necessary)	Conductivity (µS/cm)
Sample 1	TREATMENT TANK	0720	1L	775	6.35	6.78	372
Sample 2							

Sample 1

Estimated Dose Rate (ppm)	Floc Size	Settling Time
.5	1	–
1.0	2	–
1.5	3	5 min

Floc Size Guide:
0 – No Reaction
1 – Pin Floc
2 – Medium Floc
3 – Large Floc

Sample 2

Estimated Dose Rate (ppm)	Floc Size	Settling Time

CHEMICAL METERING PUMP CALIBRATION

Pretreat Pump

Time	Flow (gpm)	Chitosan Delivery (ml/min)	Dose Rate (ppm)	Initials
0710	120	80	1.76	BL

Sand Filter Pump

Time	Flow (gpm)	Chitosan Delivery (ml/min)	Dose Rate (ppm)	Initials
~~0710~~	~~120~~	~~80~~	~~1.76~~	~~BL~~
0712	120	45	.99	BL
1420	120	45	.99	BL

First Shift	Second Shift	Third Shift
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER SERVICES

Residual Chitosan Form

Project Title: 35B Project No.: LL Mod 1

Project Location: Kent WA Date: 10/26/24

Note: Residual chitosan testing is required during the first 30 minutes and after two hours of each operational period.

	Sample Time	Turbidity NTU	Specific Conductivity µS/cm	pH	Adjusted pH (if necessary)	Chitosan Dose Rate ppm	Result (Positive/ Negative)	Result Time	Pass/Fail
Analysis	0720	3.64	355	6.90	–	.99	–	0740	Pass
Matrix Spike		"	"	"	"	"	+	"	

	Sample Time	Turbidity NTU	Specific Conductivity µS/cm	pH	Adjusted pH (if necessary)	Chitosan Dose Rate ppm	Result (Positive/ Negative)	Result Time	Pass/Fail
Analysis	0750	4.91	357	6.95	–	.99	–	0810	Pass
Matrix Spike		"	"	"	–	"	+	"	

	Sample Time	Turbidity NTU	Specific Conductivity µS/cm	pH	Adjusted pH (if necessary)	Chitosan Dose Rate ppm	Result (Positive/ Negative)	Result Time	Pass/Fail
Analysis									
Matrix Spike									

	Sample Time	Turbidity NTU	Specific Conductivity µS/cm	pH	Adjusted pH (if necessary)	Chitosan Dose Rate ppm	Result (Positive/ Negative)	Result Time	Pass/Fail
Analysis									
Matrix Spike									

First Shift	Second Shift	Third Shift
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CW-06

CLEAR WATER COMPLIANCE SERVICES, INC.

CESF – System Monitoring Forms

Project Title: SSB Project No.: 11111

Project Location: KENT, WA Date: 10/28/11

	Pretreatment Meter Reading		Influent Meter Reading		Effluent Meter Reading	
	Gallons	Time	Gallons	Time	Gallons	Time
Start:						
Finish:						
Total Volume:					≈ 10,000	

Operator's Evaluation of System Operations: START PT TO SMALL BAKER @ 0730, STOP @ 0800, START SF @ 0830, STOP SYS @ 1000

Surface discharge certified acceptable YES

First Shift	Second Shift	Third Shift
BRYAN ZINTO		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER SERVICES

CESF – Manual Data Collection Form

Project Title: BSB

Project No.: 11M.01

Project Location: KENT (W)

Date: 10/28/11

Notes	Effluent Flow	Time	pH Influent / Effluent	NTU Influent / Effluent	Pressures Influent / Effluent	Initials
D.S	23" ↓	0845	7.05 / 7.07	18.5 / 3.46	16 /	BCD
D.S	31" ↓	0900	7.05 / 7.07	18.5 / 2.73	17 /	BCD
D.S	41"	0915	7.05 / 7.06	18.5 / 1.81	20 /	BCD
D.S	51"	0930	7.05 / 7.06	18.7 / 1.64	18 /	BCD
D.S	59"	0945	7.05 / 7.06	19.2 / 1.74	18 /	BCD
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* Indicates verification of in-line meters – samples measured with benchtop meters (required once per day).

First Shift	Second Shift	Third Shift
BRIAN TENNIS		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER SERVICES

CESF – System Monitoring Forms

Project Title: BSB Project No.: 11 M.D 1

Project Location: Kent WA Date: 10/28/11

BENCH-SCALE TREATABILITY TEST

	Sample ID	Time	Volume (ml)	Turbidity (NTU)	pH	Adjusted pH (if necessary)	Conductivity (µS/cm)
Sample 1	Intake	0840	1L	432	6.42	7.38	—
Sample 2							

Sample 1

Estimated Dose Rate (ppm)	Floc Size	Settling Time
.5	2	✓
1.0	3	5m.N

Floc Size Guide:
0 – No Reaction
1 – Pin Floc
2 – Medium Floc
3 – Large Floc

Sample 2

Estimated Dose Rate (ppm)	Floc Size	Settling Time

CHEMICAL METERING PUMP CALIBRATION

Pretreat Pump

Time	Flow (gpm)	Chitosan Delivery (ml/min)	Dose Rate (ppm)	Initials

Sand Filter Pump

Time	Flow (gpm)	Chitosan Delivery (ml/min)	Dose Rate (ppm)	Initials
0835	120	45	.99	BJ

First Shift	Second Shift	Third Shift
Brant Finn		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CW-05

CLEAR WATER COMPLIANCE SERVICES, INC.

CESF – System Monitoring Forms

Project Title: BSB Project No.: 11M101

Project Location: KENT WA Date: 11/3/11

	Pretreatment Meter Reading		Influent Meter Reading		Effluent Meter Reading	
	Gallons	Time	Gallons	Time	Gallons	Time
Start:						
Finish:						
Total Volume:					≈ 5000	

Operator's Evaluation of System Operations: START SYS @ 1200 SYS @ 1247
No chlo added.

Surface discharge certified acceptable YES

First Shift	Second Shift	Third Shift
NEIL ROBBINS		
Technician Name	Technician Name	Technician Name
Technician Signature	Technician Signature	Technician Signature

CLEAR WATER SERVICES

CESF – Manual Data Collection Form

Project Title: BSB

Project No.: 11MED1

Project Location: Kent

Date: 11/3/11

Notes	Effluent Flow	Time	pH Influent / Effluent	NTU Influent / Effluent	Pressures Influent / Effluent	Initials
DIS	75	1220	/ 8.23	/ 6.55	/ 16/18	NR
DIS	75	1235	/ 8.36	/ 3.14	/ 17/18	NR
OFF		1247	/	/	/	

* Indicates verification of in-line meters – samples measured with benchtop meters (required once per day).

First Shift	Second Shift	Third Shift
Neil Robbins		
Technician Name	Technician Name	Technician Name
[signature]		
Technician Signature	Technician Signature	Technician Signature

Page ___ of ___

CW-03

DEPARTMENT OF ECOLOGY
State of Washington

NOTICE OF INTENT (NOI) APPLICATION FORM

Construction Stormwater General Permit

Check if applicable:
☐ Change or Update Permit Information
☐ Modification of Permit Coverage
Permit #WAR_____

Please print or type all sections of this application. All fields are required unless otherwise marked.

I. Operator/Permittee (Party with operational control over plans and specifications or day-to-day operational control of activities which ensure compliance with Stormwater Pollution Prevention Plan (SWPPP) and permit conditions. Ecology will send correspondence and permit fee invoices to the permittee on record.)

Name: Ray Mayhew		Company: MidMountain Contractors Inc.		
Business Phone: 425-202-3600	Ext. 3692	Unified Business Identifier (UBI): 600 546 077 *(UBI is a nine-digit number used to identify a business entity. **Write "none" if you do not have a UBI number.**)*		
Cell Phone (Optional):	Fax (Optional):			
E-mail:rmayhew@midmtn.com				
Mailing Address: P.O. Box 2909		City: Kirkland	State: WA	Zip + 4: 98083-2909

II. Property Owner (The party listed on the County Assessor's records as owner and taxpayer of the parcel[s] for which permit coverage is requested. Ecology will not send correspondence and permit fee invoices to the Property Owner. The Property Owner information will be used for emergency contact purposes.)

Name: John FitzSimons		Company (if applicable): B.S.B. Diversified Company, Inc.		
Business Phone: 212-661-4600	Ext.	Unified Business Identifier (UBI): *(UBI is a nine-digit number used to identify a business entity. **Write "none" if you do not have a UBI number.**)*		
Cell Phone (Optional):	Fax (Optional):			
E-mail:jfitzsimons@dkmcorp.com				
Mailing Address: 565 Fifth Avenue, Fourth Floor		City: New York	State: New York	Zip + 4: 10017-2413

III. On-site Contact Person (Typically the Certified Erosion & Sediment Control Lead or Operator/Permittee)

Name: Brad Duncan		Company: MidMountain Contractors Inc.		
Business Phone: 206-354-2370	Ext.	Mailing Address: P.O. Box 2909		
Cell Phone (Optional)	Fax (Optional):	City: Kirkland	State: WA	Zip + 4: 98083-2909
E-mail:bduncan@midmtn.com				

IV. WebDMR (Electronic Discharge Monitoring Reporting)

You must submit monthly discharge monitoring reports using Ecology's WebDMR system. To sign up for WebDMR, or to register a new site, go to www.ecy.wa.gov/stormwater, and click on the "Construction Stormwater" link. You will find information on WebDMR under the "WebDMR and PARIS" link on the right-hand side. If you are unable to submit your DMRs electronically, you may contact Ecology to request a waiver. Ecology will generally only grant waiver requests to those permittees without internet access. Only a permittee or representative, designated in writing, may request access to or a waiver from WebDMR. To have the ability to use the system immediately, **you must submit the Electronic Signature Agreement with your application.** If you have questions on this process, contact Ecology's WebDMR staff at WebDMR@ecy.wa.gov or 360-407-7097.

V. Site Information

Site or Project Name
B.S.B. Diversified Company Inc. Site Cleanup Action

Street Address or Location Description (*If the site lacks a street address, list its specific location. For example, Intersection of Highway 61 and 34.)*

Parcel ID#: _____ *(Optional)*

Type of Construction Activity (*check all that apply*):
- ☐ Residential
- ☐ Commercial
- ☐ Industrial
- ☐ Highway or Road (city ,county, state)
- ☐ Utilities (specify): _____.
- ☒ Other (specify):Ecology Cleanup Action

.

Site Acreage
Total size of your site/project (that you own/control): 4acres.

Total area of soil disturbance (grading and/or excavating) for your site/project over the life of the project: 4acres. *(Note: 1 acre = 43,560 ft².)*

Concrete / Engineered Soils
How many yards of concrete will be poured over the life of the project? 937yd³ (estimate)

How many yards of recycled concrete will be used over the life of the project? 0yd³ (estimate)

Will any engineered soils be used? (For example: cement treated base, cement kiln dust, etc.)
☒ Yes ☐ No

City (or nearest city): Kent
County: King

Zip Code: 98032

Estimated project start-up date (mm/dd/yy): 08/08/11

Estimated project completion date (mm/dd/yy): 11/04/11

Record the latitude and longitude of the *main entrance* to the site or the approximate center of site.

Latitude: 47.422778 °N Longitude: 122.230833 °W

For assistance with latitude and longitude, refer to any of the following websites: www.getlatlon.com *or* http://www.worldatlas.com/aatlas/imageg.htm. *Please convert all latitude and longitude coordinates into decimal degrees format. For help with this process, go to:* http://www.fcc.gov/mb/audio/bickel/DDDMMSS-decimal.html.

VI. Existing Site Conditions

1. Are you aware of contaminated soils present on the site? ☒ Yes ☐ No
2. Are you aware of groundwater contamination located within the site boundary? ☒ Yes ☐ No
3. If you answered yes to questions 1 or 2, will any contaminated soils be disturbed or will any contaminated groundwater be discharged due to the proposed construction activity? ☒ Yes ☐ No

["Contaminated" and "contamination" here mean containing any hazardous substance (as defined in WAC 173-340-200) that does not occur naturally or occurs at greater than natural background levels.]

If you answered yes to Question 3, please explain below or on a separate paper in detail the locations, contaminants, and concentrations, and pollution prevention and/or treatment BMPs proposed to control the discharge of soil/groundwater contaminants. Ecology may request a copy of your SWPPP. All soil, including that which could potentially be contaminated with low mg/kg VOCs, will be stockpiled under cover on the property during construction and used as grade fill under an asphalt cap during the final phase of the cleanup action. Groundwater (which is contaminated with ug/L to low mg/L concentrations of trichloroethene, cis-1,2-dichloroethene, and vinyl chloride) will be treated on the property and discharged under permit to the sanitary sewer.

VII. Stormwater Pollution Prevention Plan (SWPPP)

You must develop a SWPPP prior to starting construction. Do **not** submit your SWPPP with your application. The exception is that Ecology may request a copy of your SWPPP if you answered yes to the questions in Part VI.

VIII. Best Management Practices (BMPs)

You must use the BMPs listed in the Stormwater Management Manual for Western Washington or the Stormwater Management Manual for Eastern Washington or other manuals approved by Ecology. Alternatively, you may use demonstrably equivalent BMPs on the basis of permit condition S9.C.4. If you intend to use a BMP at your site that is not included in these manuals, but that you believe meets the definition of a *demonstrably equivalent* BMP, you must notify the appropriate regional office. (See Definitions in the Construction Stormwater General Permit).*

http://www.ecy.wa.gov/programs/wq/stormwater/construction/contacts.html

**Note that if you receive permit coverage without indicating the preference for a demonstrably equivalent BMP and later decide to use one, you must provide Ecology with notice of the selection of an equivalent BMP no less than 60 days before the intended use of the equivalent BMP.*

IX. Discharge/Receiving Water Information

Indicate whether your site's stormwater and/or dewatering water could enter surface waters, **directly** and/or **indirectly**:

☒ Water will discharge directly or indirectly (through a storm drain system or roadside ditch) into one or more surface waterbodies (wetlands, creeks, lakes, and all other surface waters and water courses).

If your discharge is to a storm sewer system, provide the name of the operator of the storm sewer system:

(e.g., City of Tacoma): City of Kent

(NOTE: If your stormwater discharges to a storm sewer system operated by the City of Seattle, King County, Snohomish County, City of Tacoma, Pierce County, or Clark County, you must **also** submit a copy of this NOI to the appropriate jurisdiction.)

☐ Water will discharge to ground with 100% infiltration, with no potential to reach surface waters under any conditions.

If your project includes dewatering, you **must** include dewatering plans and discharge locations in your site Stormwater Pollution Prevention Plan.

Location of Discharge into Surface Waterbody

Enter the waterbody name and latitude/longitude of the point(s) where the site has the potential to discharge into a waterbody (enter all locations).

- Include the names and locations of both direct and indirect discharges to surface waterbodies, even if the risk of discharge is low or limited to periods of extreme weather.
- Some large construction projects (for example, subdivisions, roads, or pipelines) may discharge into several waterbodies.
- If the creek or tributary is unnamed, use a format such as "unnamed tributary to Deschutes River."
- **Attach a separate list if necessary.**

Surface Waterbody Name	Latitude Decimal Degrees	Longitude Decimal Degrees
Garrison Creek	47.42652° N	122.22577° W
	° N	° W
	° N	° W
	° N	° W

If your site discharges to a waterbody that is on the impaired waterbodies list (i.e., 303[d] list) for turbidity, fine sediment, high pH, or phosphorus, Ecology will require additional documentation before issuing permit coverage and these sites will be subject to additional sampling and numeric effluent limits (per Permit Condition S8). Ecology will notify you if any additional sampling requirements apply. Information on impaired waterbodies is available online at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/impaired.html.

X. State Environmental Policy Act (SEPA)

This Notice of Intent (NOI) is incomplete and cannot be approved until the applicable SEPA requirements under Chapter 197-11 WAC are met.

Who is the SEPA lead agency on your site? Ecology.

Has the SEPA lead agency issued a final decision on your checklist? ☐ **No** ☒ **Yes** ☐ **Exempt***

If No: The NOI is incomplete. Ecology will hold the application until a final SEPA decision is made or the Construction Stormwater NOI public comment period ends, whichever is later. **You must notify Ecology once the lead agency has issued a determination.**

If Yes: Type of SEPA decision issued: ☒ Determination of Non-Significance (DNS) ☐ Mitigated DNS (MDNS) ☐ Determination of Significance (DS) ☐ Final Environmental Impact Statement (EIS) ☐ Other:_____

- Date of final SEPA decision: August 14, 2008.
- If a supplemental EIS, SEPA addendum, or some other type of additional SEPA review was required, please attach and submit with this form.
- Date when all SEPA-related comment & appeal periods are exhausted: May 19, 2008.

***If Exempt:** Attach written documentation, check type of exemption below, and proceed to Section VII.

☐ Watershed Restoration & Fish Habitat Enhancement Exemption (RCW 43.21C.0382).

☐ Infill Development Exemption (RCW 43.21C.229).

☐ Planned Action Exemption (RCW 43.21C.031).

☐ Categorical Exemption. Under what section of the SEPA Rule (WAC 197-11-800) is it exempt? _____ (for example, WAC 197-11-800(1) Minor New Construction)

More SEPA information is available at: http://www.ecy.wa.gov/programs/sea/sepa/e-review.html.

XI. Public Notice

You must publish a public notice at least **once** a week for **two** consecutive weeks with **seven days** between publications, in at least a **single** newspaper of general circulation in the county in which the construction is to take place. Ecology cannot grant permit coverage sooner than the end of the 30-day public comment period, which begins on the date of the **second** public notice.

Mail or fax (360-407-6426) the NOI to Ecology on or **before** the **first** public notice date. If you fax the public notice to Ecology, you must also mail a hard copy. Failure to do so may delay the issuance of your permit.

Provide the **exact** dates (mm/dd/yy) that the first and second public notices will appear in the newspaper(s):

First notice: 09/05/11

Second notice: 09/12/11 (Begins 30-day public comment period.)

For example: First notice: 01/01/10

Second notice: 01/08/10

Name of the newspaper(s) publishing the notices: The Seattle Times

PUBLIC NOTICE TEMPLATE

Complete this template using project-specific information and submit to a local newspaper with general circulation within the county where the project is located. The **bold** language is required by WAC 173-226-130 and must be included in its entirety. (Either use the fill-in template below or **attach on a separate sheet of paper, if necessary.**)

(Note: This section is unprotected so you can delete text in parentheses)

MidMountain Contractors Inc. , 825 Fifth Avenue, Kirkland, Washington , **is seeking coverage under the Washington State Department of Ecology's Construction Stormwater NPDES and State Waste Discharge General Permit.**

The proposed project, B.S.B. Diversified Company Inc. Site Cleanup Action, **is located at** 8202 South 200th Street in *Kent,* in King County.

This project involves 4 **acres of soil disturbance for** cleanup action **construction activities.**

Stormwater will be discharged to Garrison Creek.

Any persons desiring to present their views to the Washington State Department of Ecology regarding this application, or interested in Ecology's action on this application, may notify Ecology in writing no later than 30 days of the last date of publication of this notice. Ecology reviews public comments and considers whether discharges from this project would cause a measurable change in receiving water quality, and, if so, whether the project is necessary and in the overriding public interest according to Tier II antidegradation requirements under WAC 173-201A-320.

Comments can be submitted to:
Department of Ecology
Attn: Water Quality Program, Construction Stormwater
P.O. Box 47696, Olympia, WA 98504-7696

XII. Certification of Permittees

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Ray Mayhew / MidMountain Contractors — Printed Name / Company (operator/permittee only)

Ray Mayhew — Title

Ray Mayhew — Signature of Operator/Permittee*

9-7-11 — Date

*** Federal regulations require this application is signed by one of the following:**

A. For a corporation: By a principal executive officer of at least the level of vice president.
B. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively.
C. For a municipality, state, federal, or other public facility: By either a principal executive officer or ranking elected official.

Please sign and return this document to the following address:

Washington Department of Ecology - Stormwater
P.O. Box 47696
Olympia, WA 98504-7696

DEPARTMENT OF ECOLOGY
State of Washington

Notice of Termination Form
Construction Stormwater General Permit

Use this form to request termination of permit coverage

Permit # WAR 125362

I. Operator/Permittee (Party with operational control over plans and specifications, or day-to-day operational control of activities which ensure compliance with SWPPP and permit conditions. Ecology will send correspondence and permit fee invoices to the permit holder on record.)

Name: Ray Mayhew	Company: Mid Mountain Contractors, Inc.	
Business Phone: 425-202-3606 Ext. 3692 Cell Phone (Optional):	Fax (Optional):	
E-mail: rmayhew@midmtn.com		
Mailing Address: PO Box 2909		
City: Kirkland	State: WA	Zip + 4: 98083-2909

II. Site Location/Address

Site name: BSB Diversified Lo. Site Cleanup Action		Total area of soil disturbance for your site/project: 4 acres
Street address (or location description): 8202 S 200th St.		
City (or nearest city): Kent	Zip: 98032	County: King

III. Construction Activity- The site is eligible for termination by one of the following methods:

☑ The site has undergone final stabilization. The operator has permanently stabilized all exposed soils, removed all temporary BMPs, and eliminated all stormwater discharges associated with construction activity.

☐ Permit coverage on all portions of the site that have not undergone final stabilization (Permit Condition S10.A.1) are being, or have been, transferred (Permit Condition G9), and the Permittee no longer has operational control of the construction activity.

We provided the new owner Transfer of Coverage paperwork on:

☐ All portions of the site that have not undergone final stabilization (Permit Condition S10.A.1) have been sold and the Permittee no longer has operational control of the construction activity. We will not be submitting Transfer of Permit coverage paperwork. (Optional).

Please provide new owner contact info:

IV. Certification of Permittees. Please read the certification statement carefully before signing.

"I certify under penalty of law that all stormwater discharges associated with construction activity from the identified site that are authorized by the National Pollution Discharge Elimination System (NPDES) and State Waste Discharge general permit have been eliminated, or that I no longer own or operate on this site. I understand that by submitting this Notice of Termination that I am no longer authorized to discharge stormwater associated with construction activity by the general permit, and that discharging pollutants in stormwater to waters of the State of Washington is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release the permittee from liability for any violations of this permit or the Clean Water Act."

Ray Mayhew
Operator printed name

Manager Special Projects
Title

Operator signature

2-15-12
Date

ECY 020-87 (Rev. 04/10)

cc: Ray Mayhew

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

January 11, 2012

Ray Mayhew
MidMountain Contractors, Inc.
P.O. Box 2909
Kirkland, WA 98083-2909

RE: Coverage under the Construction Stormwater General Permit

Permit number:	**WAR-125362**
Site Name:	**B.S.B. Diversified Company, Inc. Site Cleanup Action**
Location:	**8202 South 200th Street**
	Kent, WA **County: King**
Disturbed Acres:	**4**

Dear Mr. Mayhew:

The Washington State Department of Ecology (Ecology) received your Notice of Intent for coverage under Ecology's Construction Stormwater General Permit (permit). This is your permit coverage letter. Your permit coverage is effective on January 11, 2012. **Please retain this permit coverage letter with your permit (enclosed), stormwater pollution prevention plan (SWPPP), and site log book. These materials are the official record of permit coverage for your site.**

Please take time to read the entire permit and contact Ecology if you have any questions.

Appeal Process
You have a right to appeal coverage under the general permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this letter. This appeal is limited to the general permit's applicability or non-applicability to a specific discharger. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

Construction Stormwater
SITE INSPECTION CHECKLIST

Project_____ Permit No._____ Inspector_____ Date_____ Time_____

Will existing BMPs need to be modified or removed, or other BMPs installed? YES NO
IF YES, list the action items to be completed on the following table:

Actions to be Completed	Date Completed/ Initials
1.	
2.	
3.	
4.	
5.	
6.	

Describe current weather conditions

Approximate amount of precipitation since last inspection: _____ inches
and precipitation in the past 24 hours*: _____ inches
**based on an on-site rain gauge or local weather data.*

Describe discharging stormwater, if present. Note the presence of suspended sediment, "cloudiness", discoloration, or oil sheen.

Was water quality sampling part of this inspection? YES NO
If yes, record results below (attach separate sheet, if necessary):

Parameter	Method (circle one)	Result	Units
Turbidity	tube, meter, laboratory		NTU (cm, if tube used)
pH	paper, kit, meter		pH standard units

Is the site in compliance with the SWPPP and the permit requirements? YES NO
If no, indicate tasks necessary to bring site into compliance on the "Actions to be Completed" table above, and include dates each job WILL BE COMPLETED.
If no, has the non-compliance been reported to Dept. of Ecology? YES NO
If no, should the SWPPP be modified: YES NO

Sign the following certification:
"I certify that this report is true, accurate, and complete, to the best of my knowledge and belief."

Inspection completed on:_____ by: (print+signature)_____

Title/Qualification of Inspector:_____

WAR125362
BSB DIVERSIFIED COMPANY INC -
SITE CLEANUP ACTION
KING COUNTY

Issuance Date: December 1, 2010
Effective Date: January 1, 2011
Expiration Date: December 31, 2015

CONSTRUCTION STORMWATER GENERAL PERMIT

National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activity

State of Washington
Department of Ecology
Olympia, Washington 98504

In compliance with the provisions of
Chapter 90.48 Revised Code of Washington
(State of Washington Water Pollution Control Act)
and
Title 33 United States Code, Section 1251 et seq.
The Federal Water Pollution Control Act (The Clean Water Act)

Until this permit expires, is modified or revoked, Permittees that have properly obtained coverage under this general permit are authorized to discharge in accordance with the special and general conditions that follow.

Kelly Susewind, P.E., P.G.
Water Quality Program Manager
Washington State Department of Ecology

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SPECIAL CONDITIONS

S1. PERMIT COVERAGE

A. Permit Area

This Construction Stormwater General Permit (CSWGP) covers all areas of Washington State, except for federal and Tribal lands as specified in Special Condition S1.E.3.

B. Operators Required to Seek Coverage Under this General Permit:

1. Operators of the following construction activities are required to seek coverage under this CSWGP:

   a. Clearing, grading and/or excavation that results in the disturbance of one or more acres and discharges stormwater to surface waters of the State; and clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.

      i. This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, and discharge to surface waters of the State (that is, forest practices that prepare a site for construction activities); and

   b. Any size construction activity discharging stormwater to waters of the State that the Department of Ecology ("Ecology"):

      i. Determines to be a significant contributor of pollutants to waters of the State of Washington.

      ii. Reasonably expects to cause a violation of any water quality standard.

2. Operators of the following activities are not required to seek coverage under this CSWGP (unless specifically required under Special Condition S1.B.1.b. above):

   a. Construction activities that discharge all stormwater and non-stormwater to ground water, sanitary sewer, or combined sewer, and have no point source discharge to either surface water or a storm sewer system that drains to surface waters of the State.

   b. Construction activities covered under an Erosivity Waiver (Special Condition S2.C).

   c. Routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Condition S3. At a minimum, discharges from potable water (including water line flushing), fire hydrant system flushing, and pipeline hydrostatic test water must undergo the following: dechlorination to a concentration of 0.1 parts per million (ppm) or less, and pH adjustment to within 6.5 – 8.5 standard units (su), if necessary.

D. Prohibited Discharges:

The following discharges to waters of the State, including ground water, are prohibited.

1. Concrete wastewater.
2. Wastewater from washout and clean-up of stucco, paint, form release oils, curing compounds and other construction materials.
3. Process wastewater as defined by 40 Code of Federal Regulations (CFR) 122.1 (see Appendix A of this permit).
4. Slurry materials and waste from shaft drilling.
5. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.
6. Soaps or solvents used in vehicle and equipment washing.
7. Wheel wash wastewater, unless discharged according to Special Condition S9.D.9.d.
8. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed according to Special Condition S9.D.10.

E. Limits on Coverage

Ecology may require any discharger to apply for and obtain coverage under an individual permit or another more specific general permit. Such alternative coverage will be required when Ecology determines that this CSWGP does not provide adequate assurance that water quality will be protected, or there is a reasonable potential for the project to cause or contribute to a violation of water quality standards.

The following stormwater discharges are not covered by this permit:

1. Post-construction stormwater discharges that originate from the site after completion of construction activities and the site has undergone final stabilization.
2. Non-point source silvicultural activities such as nursery operations, site preparation, reforestation and subsequent cultural treatment, thinning, prescribed burning, pest and fire control, harvesting operations, surface drainage, or road construction and maintenance, from which there is natural runoff as excluded in 40 CFR Subpart 122.
3. Stormwater from any federal project or project on federal land or land within an Indian Reservation except for the Puyallup Reservation. Within the Puyallup

iii. changes to the area/acreage affected by construction activity.

2. Transfer of Coverage Form

The Permittee can transfer current coverage under this permit to one or more new operators, including operators of sites within a Common Plan of Development, provided the Permittee submits a Transfer of Coverage Form in accordance with General Condition G9. Transfers do not require public notice.

B. Public Notice

For new or previously unpermitted construction activities, the applicant must publish a public notice at least one time each week for two consecutive weeks, at least 7 days apart, in a newspaper with general circulation in the county where the construction is to take place. The notice must contain:

1. A statement that "The applicant is seeking coverage under the Washington State Department of Ecology's Construction Stormwater NPDES and State Waste Discharge General Permit."

2. The name, address and location of the construction site.

3. The name and address of the applicant.

4. The type of construction activity that will result in a discharge (for example, residential construction, commercial construction, etc.), and the number of acres to be disturbed.

5. The name of the receiving water(s) (that is, the surface water(s) to which the site will discharge), or, if the discharge is through a storm sewer system, the name of the operator of the system.

6. The statement: "Any persons desiring to present their views to the Washington State Department of Ecology regarding this application, or interested in Ecology's action on this application, may notify Ecology in writing no later than 30 days of the last date of publication of this notice. Ecology reviews public comments and considers whether discharges from this project would cause a measurable change in receiving water quality, and, if so, whether the project is necessary and in the overriding public interest according to Tier II antidegradation requirements under WAC 173-201A-320. Comments can be submitted to: Department of Ecology, P.O. Box 47696, Olympia, WA 98504-7696 Attn: Water Quality Program, Construction Stormwater."

project falls within the applicable regional timeframe in Special Condition S2.C.2.b, complete and submit an amended waiver certification form before the original waiver expires; or

b. Submit a complete permit application to Ecology in accordance with Special Condition S2.A and B before the end of the certified waiver period.

S3. COMPLIANCE WITH STANDARDS

A. Discharges must not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), ground water quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CFR Part 131.36). Discharges not in compliance with these standards are not authorized.

B. Prior to the discharge of stormwater and non-stormwater to waters of the State, the Permittee must apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate Stormwater Pollution Prevention Plan (SWPPP), with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.

C. Ecology presumes that a Permittee complies with water quality standards unless discharge monitoring data or other site-specific information demonstrates that a discharge causes or contributes to a violation of water quality standards, when the Permittee complies with the following conditions. The Permittee must fully:

1. Comply with all permit conditions, including planning, sampling, monitoring, reporting, and recordkeeping conditions.

2. Implement stormwater BMPs contained in stormwater management manuals published or approved by Ecology, or BMPs that are demonstrably equivalent to BMPs contained in stormwater technical manuals published or approved by Ecology, including the proper selection, implementation, and maintenance of all applicable and appropriate BMPs for on-site pollution control. (For purposes of this section, the stormwater manuals listed in Appendix 10 of the Phase I Municipal Stormwater Permit are approved by Ecology.)

D. Where construction sites also discharge to ground water, the ground water discharges must also meet the terms and conditions of this CSWGP. Permittees who discharge to ground water through an injection well must also comply with any applicable requirements of the Underground Injection Control (UIC) regulations, Chapter 173-218 WAC.

Construction sites one acre or larger that discharge stormwater to surface waters of the State must have site inspections conducted by a certified CESCL. Sites less than one acre may have a person without CESCL certification conduct inspections; sampling is not required on sites that disturb less than an acre.

1. The Permittee must examine stormwater visually for the presence of suspended sediment, turbidity, discoloration, and oil sheen. The Permittee must evaluate the effectiveness of BMPs and determine if it is necessary to install, maintain, or repair BMPs to improve the quality of stormwater discharges.

   Based on the results of the inspection, the Permittee must correct the problems identified by:

   a. Reviewing the SWPPP for compliance with Special Condition S9 and making appropriate revisions within 7 days of the inspection.

   b. Immediately beginning the process of fully implementing and maintaining appropriate source control and/or treatment BMPs as soon as possible, addressing the problems no later than within 10 days of the inspection. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period.

   c. Documenting BMP implementation and maintenance in the site log book.

2. The Permittee must inspect all areas disturbed by construction activities, all BMPs, and all stormwater discharge points at least once every calendar week and within 24 hours of any discharge from the site. (For purposes of this condition, individual discharge events that last more than one day do not require daily inspections. For example, if a stormwater pond discharges continuously over the course of a week, only one inspection is required that week.) The Permittee may reduce the inspection frequency for temporarily stabilized, inactive sites to once every calendar month.

3. The Permittee must have staff knowledgeable in the principles and practices of erosion and sediment control. The CESCL (sites one acre or more) or inspector (sites less than one acre) must have the skills to assess the:

   a. Site conditions and construction activities that could impact the quality of stormwater, and

   b. Effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges.

4. The SWPPP must identify the CESCL or inspector, who must be present on site or on-call at all times. The CESCL must obtain this certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (see BMP C160 in the manual referred to in Special Condition S9.C.1 and 2).

2. Sampling Frequency

   a. The Permittee must sample all discharge locations at least once every calendar week when stormwater (or authorized non-stormwater) discharges from the site or enters any on-site surface waters of the state (for example, a creek running through a site).

   b. Samples must be representative of the flow and characteristics of the discharge.

   c. Sampling is not required when there is no discharge during a calendar week.

   d. Sampling is not required outside of normal working hours or during unsafe conditions.

   e. If the Permittee is unable to sample during a monitoring period, the Permittee must include a brief explanation in the monthly Discharge Monitoring Report (DMR).

   f. Sampling is not required before construction activity begins.

3. Sampling Locations

   a. Sampling is required at all points where stormwater associated with construction activity (or authorized non-stormwater) is discharged off site, including where it enters any on-site surface waters of the state (for example, a creek running through a site).

   b. The Permittee may discontinue sampling at discharge points that drain areas of the project that are fully stabilized to prevent erosion.

   c. The Permittee must identify all sampling point(s) on the SWPPP site map and clearly mark these points in the field with a flag, tape, stake or other visible marker.

   d. Sampling is not required for discharge that is sent directly to sanitary or combined sewer systems.

4. Sampling and Analysis Methods

   a. The Permittee performs turbidity analysis with a calibrated turbidity meter (turbidimeter) either on site or at an accredited lab. The Permittee must record the results in the site log book in nephelometric turbidity units (NTU).

   b. The Permittee performs transparency analysis on site with a 1¾-inch-diameter, 60-centimeter (cm)-long transparency tube. The Permittee will record the results in the site log book in centimeters (cm). Transparency tubes are available from: http://watermonitoringequip.com/pages/stream.html.

- Eastern Region (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400
- Northwest Region (Kitsap, Snohomish, Island, King, San Juan, Skagit, Whatcom): (425) 649-7000
- Southwest Region (Grays Harbor, Lewis, Mason, Thurston, Pierce, Clark, Cowlitz, Skamania, Wahkiakum, Clallam, Jefferson, Pacific): (360) 407-6300

These numbers are also listed at the following web site: http://www.ecy.wa.gov/programs/wq/stormwater/construction/permit.html

ii. Review the SWPPP for compliance with Special Condition S9 and make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.

iii. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, addressing the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.

iv. Document BMP implementation and maintenance in the site log book.

v. Continue to sample discharges daily until:

a) Turbidity is 25 NTU (or lower); or

b) Transparency is 33 cm (or greater); or

c) The Permittee has demonstrated compliance with the water quality limit for turbidity:

1) No more than 5 NTU over background turbidity, if background is less than 50 NTU, or

2) No more than 10% over background turbidity, if background is 50 NTU or greater; or

d) The discharge stops or is eliminated.

D. pH Sampling Requirements -- Significant Concrete Work or Engineered Soils

If construction activity results in the disturbance of 1 acre or more, **and** involves significant concrete work (significant concrete work means greater than 1000 cubic yards poured concrete or recycled concrete used over the life of a project) or the use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD], or fly ash), and stormwater from the affected area

S5. REPORTING AND RECORDKEEPING REQUIREMENTS

A. High Turbidity Phone Reporting

Anytime sampling performed in accordance with Special Condition S4.C indicates turbidity has reached the 250 NTU phone reporting level, the Permittee must call Ecology's Regional office by phone within 24 hours of analysis. The web site is http://www.ecy.wa.gov/programs/wq/stormwater/construction/permit.html. Also see phone numbers in Special Condition S4.C.5.b.i.

B. Discharge Monitoring Reports

Permittees required to conduct water quality sampling in accordance with Special Conditions S4.C (Turbidity/Transparency), S4.D (pH), S8 (303[d]/TMDL sampling), and/or G13 (Additional Sampling) must submit the results to Ecology.

Permittees must submit monitoring data using Ecology's WebDMR program. To find out more information and to sign up for WebDMR go to: http://www.ecy.wa.gov/programs/wq/permits/paris/webdmr.html.

Permittees unable to submit electronically (for example, those who do not have an internet connection) must contact Ecology to request a waiver and obtain instructions on how to obtain a paper copy DMR at:

Mailing Address:
Department of Ecology
Water Quality Program
Attn: Stormwater Compliance Specialist
PO Box 47696
Olympia, WA 98504-7696

Permittees who obtain a waiver not to use WebDMR must use the forms provided to them by Ecology; submittals must be mailed to the address above. Permittees shall submit DMR forms to be received by Ecology within 15 days following the end of each month.

If there was no discharge during a given monitoring period, all Permittees must submit a DMR as required with "no discharge" entered in place of the monitoring results. For more information, contact Ecology staff using information provided at the following web site: http://www.ecy.wa.gov/programs/spills/response/assistancesoil%20map.pdf

C. Records Retention

The Permittee must retain records of all monitoring information (site log book, sampling results, inspection reports/checklists, etc.), Stormwater Pollution Prevention Plan, and any other documentation of compliance with permit requirements for the entire life of the construction project and for a minimum of three years following the termination of permit coverage. Such information must include all calibration and maintenance records, and records of all data used to complete the application for this

The Permittee must report any unanticipated bypass and/or upset that exceeds any effluent limit in the permit in accordance with the 24-hour reporting requirement contained in 40 C.F.R. 122.41(l)(6)).

Compliance with these requirements does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failure to comply. Refer to Section G14 of this permit for specific information regarding non-compliance.

G. Access to Plans and Records

1. The Permittee must retain the following permit documentation (plans and records) on site, or within reasonable access to the site, for use by the operator or for on-site review by Ecology or the local jurisdiction:

   a. General Permit.

   b. Permit Coverage Letter.

   c. Stormwater Pollution Prevention Plan (SWPPP).

   d. Site Log Book.

2. The Permittee must address written requests for plans and records listed above (Special Condition S5.G.1) as follows:

   a. The Permittee must provide a copy of plans and records to Ecology within 14 days of receipt of a written request from Ecology.

   b. The Permittee must provide a copy of plans and records to the public when requested in writing. Upon receiving a written request from the public for the Permittee's plans and records, the Permittee must either:

      i. Provide a copy of the plans and records to the requester within 14 days of a receipt of the written request; or

      ii. Notify the requester within 10 days of receipt of the written request of the location and times within normal business hours when the plans and records may be viewed; and provide access to the plans and records within 14 days of receipt of the written request; or

      Within 14 days of receipt of the written request, the Permittee may submit a copy of the plans and records to Ecology for viewing and/or copying by the requester at an Ecology office, or a mutually agreed location. If plans and records are viewed and/or copied at a location other than at an Ecology office, the Permittee will provide reasonable access to copying services for which a reasonable fee may be charged. The Permittee must notify the requester within 10 days of receipt of the request where the plans and records may be viewed and/or copied.

3. Provides Ecology with data indicating the discharge is not expected to cause or contribute to an exceedance of a water quality standard, and retains such data on site with the SWPPP. The operator must provide data and other technical information to Ecology that sufficiently demonstrate:

   a. For discharges to waters without an EPA-approved or -established TMDL, that the discharge of the pollutant for which the water is impaired will meet in-stream water quality criteria at the point of discharge to the water body; or

   b. For discharges to waters with an EPA-approved or -established TMDL, that there is sufficient remaining wasteload allocation in the TMDL to allow construction stormwater discharge and that existing dischargers to the water body are subject to compliance schedules designed to bring the water body into attainment with water quality standards.

   Operators of construction sites are eligible for coverage under this permit if Ecology issues permit coverage based upon an affirmative determination that the discharge will not cause or contribute to the existing impairment.

C. Sampling and Numeric Effluent Limits for Discharges to Water Bodies on the 303(d) List for Turbidity, Fine Sediment, or Phosphorus

1. Permittees who discharge to segments of water bodies on the 303(d) list (Category 5) for turbidity, fine sediment, or phosphorus must conduct turbidity sampling in accordance with Special Condition S4.C.2 and comply with either of the numeric effluent limits noted in Table 5 below.

2. As an alternative to the 25 NTU effluent limit noted in Table 5 below (applied at the point where stormwater [or authorized non-stormwater] is discharged off-site), permittees may choose to comply with the surface water quality standard for turbidity. The standard is: no more than 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or no more than a 10% increase in turbidity when the background turbidity is more than 50 NTU. In order to use the water quality standard requirement, the sampling must take place at the following locations:

   a. Background turbidity in the 303(d)-listed receiving water immediately upstream (upgradient) or outside the area of influence of the discharge.

   b. Turbidity at the point of discharge into the 303(d)-listed receiving water, inside the area of influence of the discharge.

3. Discharges that exceed the numeric effluent limit for turbidity constitute a violation of this permit.

4. Permittees whose discharges exceed the numeric effluent limit shall sample discharges daily until the violation is corrected and comply with the non-compliance notification requirements in Special Condition S5.F.

E. Sampling and Limits for Sites Discharging to Waters Covered by a TMDL or Another Pollution Control Plan

1. Discharges to a water body that is subject to a Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus must be consistent with the TMDL. Refer to http://www.ecy.wa.gov/programs/wq/tmdl/index.html for more information on TMDLs.

    a. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges must be consistent with any specific waste load allocations or requirements established by the applicable TMDL.

        i. The Permittee must sample discharges weekly or as otherwise specified by the TMDL to evaluate compliance with the specific waste load allocations or requirements.

        ii. Analytical methods used to meet the monitoring requirements must conform to the latest revision of the Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136. Turbidity and pH methods need not be accredited or registered unless conducted at a laboratory which must otherwise be accredited or registered.

    b. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but has not identified specific requirements, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    c. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with Special Conditions S4 (Monitoring) and S9 (SWPPPs) will constitute compliance with the approved TMDL.

    d. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

2. Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus that is completed and approved by EPA before January 1, 2011, or before the date the operator's complete permit application is received by Ecology, whichever is later. TMDLs completed after the operator's complete permit application is received by Ecology become applicable to the Permittee only if they are imposed through an administrative order by Ecology, or through a modification of permit coverage.

installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when an extension is requested by a Permittee within the initial 10-day response period,

c. Document BMP implementation and maintenance in the site log book.

The Permittee must modify the SWPPP whenever there is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

C. Stormwater Best Management Practices (BMPs)

BMPs must be consistent with:

1. Stormwater Management Manual for Western Washington (most recent edition), for sites west of the crest of the Cascade Mountains; or

2. Stormwater Management Manual for Eastern Washington (most recent edition), for sites east of the crest of the Cascade Mountains; or

3. Revisions to the manuals listed in Special Condition S9.C.1. & 2., or other stormwater management guidance documents or manuals which provide an equivalent level of pollution prevention, that are approved by Ecology and incorporated into this permit in accordance with the permit modification requirements of WAC 173-226-230; or

4. Documentation in the SWPPP that the BMPs selected provide an equivalent level of pollution prevention, compared to the applicable Stormwater Management Manuals, including:

   a. The technical basis for the selection of all stormwater BMPs (scientific, technical studies, and/or modeling) that support the performance claims for the BMPs being selected.

   b. An assessment of how the selected BMP will satisfy AKART requirements and the applicable federal technology-based treatment requirements under 40 CFR part 125.3.

D. SWPPP – Narrative Contents and Requirements

The Permittee must include each of the 12 elements below in Special Condition S9.D.1-12 in the narrative of the SWPPP and implement them unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the SWPPP.

1. Preserve Vegetation/Mark Clearing Limits

   a. Before beginning land-disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area.

resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site.

c. Direct stormwater runoff from disturbed areas through a sediment pond or other appropriate sediment removal BMP, before the runoff leaves a construction site or before discharge to an infiltration facility. Runoff from fully stabilized areas may be discharged without a sediment removal BMP, but must meet the flow control performance standard of Special Condition S9.D.3.a.

d. Locate BMPs intended to trap sediment on site in a manner to avoid interference with the movement of juvenile salmonids attempting to enter off-channel areas or drainages.

e. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible.

f. Where feasible, design outlet structures that withdraw impounded stormwater from the surface to avoid discharging sediment that is still suspended lower in the water column.

5. Stabilize Soils

a. The Permittee must stabilize exposed and unworked soils by application of effective BMPs that prevent erosion. Applicable BMPs include, but are not limited to: temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base on areas to be paved, and dust control.

b. The Permittee must control stormwater volume and velocity within the site to minimize soil erosion.

c. The Permittee must control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion.

d. Depending on the geographic location of the project, the Permittee must not allow soils to remain exposed and unworked for more than the time periods set forth below to prevent erosion:

West of the Cascade Mountains Crest
During the dry season (May 1 - Sept. 30): 7 days
During the wet season (October 1 - April 30): 2 days

East of the Cascade Mountains Crest, except for Central Basin*
During the dry season (July 1 - September 30): 10 days
During the wet season (October 1 - June 30): 5 days

The Central Basin*, East of the Cascade Mountains Crest

ii. East of the Cascade Mountains Crest: Temporary pipe slope drains must handle the expected peak flow velocity from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

d. Place excavated material on the uphill side of trenches, consistent with safety and space considerations.

e. Place check dams at regular intervals within constructed channels that are cut down a slope.

7. Protect Drain Inlets

a. Protect all storm drain inlets made operable during construction so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

b. Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

8. Stabilize Channels and Outlets

a. Design, construct and stabilize all on-site conveyance channels to prevent erosion from the following expected peak flows:

i. West of the Cascade Mountains Crest: Channels must handle the peak 10-minute velocity of flow from a Type 1A, 10-year, 24-hour frequency storm for the developed condition. Alternatively, the 10-year, 1-hour flow rate indicated by an approved continuous runoff model, increased by a factor of 1.6, may be used. The hydrologic analysis must use the existing land cover condition for predicting flow rates from tributary areas outside the project limits. For tributary areas on the project site, the analysis must use the temporary or permanent project land cover condition, whichever will produce the highest flow rates. If using the WWHM to predict flows, bare soil areas should be modeled as "landscaped area."

ii. East of the Cascade Mountains Crest: Channels must handle the expected peak flow velocity from a 6-month, 3-hour storm for the developed condition, referred to as the short duration storm.

b. Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches at the outlets of all conveyance systems.

9. Control Pollutants

Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. The Permittee must:

controlled conveyance system before discharge to a sediment trap or sediment pond.

b. Permittees may discharge clean, non-turbid dewatering water, such as well-point ground water, to systems tributary to, or directly into surface waters of the State, as specified in Special Condition S9.D.8, provided the dewatering flow does not cause erosion or flooding of receiving waters. Do not route clean dewatering water through stormwater sediment ponds. Note that "surface waters of the State" may exist on a construction site as well as off site; for example, a creek running through a site.

c. Other treatment or disposal options may include:

   i. Infiltration.

   ii. Transport off site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters.

   iii. Ecology-approved on-site chemical treatment or other suitable treatment technologies.

   iv. Sanitary or combined sewer discharge with local sewer district approval, if there is no other option.

   v. Use of a sedimentation bag with discharge to a ditch or swale for small volumes of localized dewatering.

d. Permittees must handle highly turbid or contaminated dewatering water separately from stormwater.

11. Maintain BMPs

    a. Permittees must maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function in accordance with BMP specifications.

    b. Permittees must remove all temporary erosion and sediment control BMPs within 30 days after achieving final site stabilization or after the temporary BMPs are no longer needed.

12. Manage the Project

    a. Phase development projects to the maximum degree practicable and take into account seasonal work limitations.

    b. Inspection and monitoring -- Inspect, maintain and repair all BMPs as needed to assure continued performance of their intended function. Conduct site inspections and monitoring in accordance with Special Condition S4.

    c. Maintaining an updated construction SWPPP -- Maintain, update, and implement the SWPPP in accordance with Special Conditions S3, S4 and S9.

3. For residential construction only, the Permittee has completed temporary stabilization and the homeowners have taken possession of the residences.

B. When the site is eligible for termination, the Permittee must submit a complete and accurate Notice of Termination (NOT) form, signed in accordance with General Condition G2, to:

Department of Ecology
Water Quality Program - Construction Stormwater
PO Box 47696
Olympia, Washington 98504-7696

The termination is effective on the date Ecology receives the NOT form, unless Ecology notifies the Permittee within 30 days that termination request is denied because the Permittee has not met the eligibility requirements in Special Condition S10.A.

Permittees transferring the property to a new property owner or operator/permittee are required to complete and submit the Notice of Transfer form to Ecology, but are not required to submit a Notice of Termination form for this type of transaction.

information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

G3. RIGHT OF INSPECTION AND ENTRY

The Permittee must allow an authorized representative of Ecology, upon the presentation of credentials and such other documents as may be required by law:

A. To enter upon the premises where a discharge is located or where any records are kept under the terms and conditions of this permit.

B. To have access to and copy – at reasonable times and at reasonable cost -- any records required to be kept under the terms and conditions of this permit.

C. To inspect -- at reasonable times – any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.

D. To sample or monitor – at reasonable times – any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

G4. GENERAL PERMIT MODIFICATION AND REVOCATION

This permit may be modified, revoked and reissued, or terminated in accordance with the provisions of Chapter 173-226 WAC. Grounds for modification, revocation and reissuance, or termination include, but are not limited to, the following:

A. When a change occurs in the technology or practices for control or abatement of pollutants applicable to the category of dischargers covered under this permit.

B. When effluent limitation guidelines or standards are promulgated pursuant to the CWA or Chapter 90.48 RCW, for the category of dischargers covered under this permit.

C. When a water quality management plan containing requirements applicable to the category of dischargers covered under this permit is approved, or

D. When information is obtained that indicates cumulative effects on the environment from dischargers covered under this permit are unacceptable.

G5. REVOCATION OF COVERAGE UNDER THE PERMIT

Pursuant to Chapter 43.21B RCW and Chapter 173-226 WAC, the Director may terminate coverage for any discharger under this permit for cause. Cases where coverage may be terminated include, but are not limited to, the following:

G9. TRANSFER OF GENERAL PERMIT COVERAGE

Coverage under this general permit is automatically transferred to a new discharger, including operators of lots/parcels within a common plan of development or sale, **if**:

A. A written agreement (Transfer of Coverage Form) between the current discharger (Permittee) and new discharger, signed by both parties and containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to the Director; and

B. The Director does not notify the current discharger and new discharger of the Director's intent to revoke coverage under the general permit. If this notice is not given, the transfer is effective on the date specified in the written agreement.

When a current discharger (Permittee) transfers a portion of a permitted site, the current discharger must also submit an updated application form (NOI) to the Director indicating the remaining permitted acreage after the transfer.

G10. REMOVED SUBSTANCES

The Permittee must not re-suspend or reintroduce collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of stormwater to the final effluent stream for discharge to state waters.

G11. DUTY TO PROVIDE INFORMATION

The Permittee must submit to Ecology, within a reasonable time, all information that Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology, upon request, copies of records required to be kept by this permit [40 CFR 122.41(h)].

G12. OTHER REQUIREMENTS OF 40 CFR

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

G13. ADDITIONAL MONITORING

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

G18. TOXIC POLLUTANTS

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

G19. PENALTIES FOR TAMPERING

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this condition, punishment shall be a fine of not more than $20,000 per day of violation, or imprisonment of not more than four (4) years, or both.

G20. REPORTING PLANNED CHANGES

The Permittee must, as soon as possible, give notice to Ecology of planned physical alterations, modifications or additions to the permitted construction activity. The Permittee should be aware that, depending on the nature and size of the changes to the original permit, a new public notice and other permit process requirements may be required. Changes in activities that require reporting to Ecology include those that will result in:

A. The permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b).

B. A significant change in the nature or an increase in quantity of pollutants discharged, including but not limited to: for sites 5 acres or larger, a 20% or greater increase in acreage disturbed by construction activity.

C. A change in or addition of surface water(s) receiving stormwater or non-stormwater from the construction activity.

D. A change in the construction plans and/or activity that affects the Permittee's monitoring requirements in Special Condition S4.

Following such notice, permit coverage may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

shall be remanded to Ecology for consideration of issuance of an individual permit or permits.

G25. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

G26. BYPASS PROHIBITED

A. Bypass Procedures

Bypass, which is the intentional diversion of waste streams from any portion of a treatment facility, is prohibited for stormwater events below the design criteria for stormwater management. Ecology may take enforcement action against a Permittee for bypass unless one of the following circumstances (1, 2, 3 or 4) is applicable.

1. Bypass of stormwater is consistent with the design criteria and part of an approved management practice in the applicable stormwater management manual.

2. Bypass for essential maintenance without the potential to cause violation of permit limits or conditions.

   Bypass is authorized if it is for essential maintenance and does not have the potential to cause violations of limitations or other conditions of this permit, or adversely impact public health.

3. Bypass of stormwater is unavoidable, unanticipated, and results in noncompliance of this permit.

   This bypass is permitted only if:

   a. Bypass is unavoidable to prevent loss of life, personal injury, or severe property damage. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass.

   b. There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, maintenance during normal periods of equipment downtime (but not if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance), or transport of untreated wastes to another treatment facility.

After consideration of the above and the adverse effects of the proposed bypass and any other relevant factors, Ecology will approve, conditionally approve, or deny the request. The public must be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible. Approval of a request to bypass will be by administrative order issued by Ecology under RCW 90.48.120.

B. Duty to Mitigate

The Permittee is required to take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

consistent plan for long-term development; 3) projects in a contiguous area that may be unrelated but still under the same contract, such as construction of a building extension and a new parking lot at the same facility; and 4) linear projects such as roads, pipelines, or utilities. If the project is part of a common plan of development or sale, the disturbed area of the entire plan must be used in determining permit requirements.

Composite Sample means a mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increases while maintaining a constant time interval between the aliquots.

Concrete wastewater means any water used in the production, pouring and/or clean-up of concrete or concrete products, and any water used to cut, grind, wash, or otherwise modify concrete or concrete products. Examples include water used for or resulting from concrete truck/mixer/pumper/tool/chute rinsing or washing, concrete saw cutting and surfacing (sawing, coring, grinding, roughening, hydro-demolition, bridge and road surfacing). When stormwater comingles with concrete wastewater, the resulting water is considered concrete wastewater and must be managed to prevent discharge to waters of the state, including ground water.

Construction Activity means land disturbing operations including clearing, grading or excavation which disturbs the surface of the land. Such activities may include road construction, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Contaminant means any hazardous substance that does not occur naturally or occurs at greater than natural background levels. See definition of "hazardous substance" and WAC 173-340-200.

Demonstrably Equivalent means that the technical basis for the selection of all stormwater BMPs is documented within a SWPPP, including:

1. The method and reasons for choosing the stormwater BMPs selected.
2. The pollutant removal performance expected from the BMPs selected.
3. The technical basis supporting the performance claims for the BMPs selected, including any available data concerning field performance of the BMPs selected.
4. An assessment of how the selected BMPs will comply with state water quality standards.
5. An assessment of how the selected BMPs will satisfy both applicable federal technology-based treatment requirements and state requirements to use all known, available, and reasonable methods of prevention, control, and treatment (AKART).

Department means the Washington State Department of Ecology.

Detention means the temporary storage of stormwater to improve quality and/or to reduce the mass flow rate of discharge.

by rule to present a threat to human health or the environment if released into the environment. The term hazardous substance does not include any of the following when contained in an underground storage tank from which there is not a release: crude oil or any fraction thereof or petroleum, if the tank is in compliance with all applicable federal, state, and local law.

Injection Well means a well that is used for the subsurface emplacement of fluids. (See Well.)

Jurisdiction means a political unit such as a city, town or county; incorporated for local self-government.

National Pollutant Discharge Elimination System (NPDES) means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Federal Clean Water Act, for the discharge of pollutants to surface waters of the State from point sources. These permits are referred to as NPDES permits and, in Washington State, are administered by the Washington Department of Ecology.

Notice of Intent (NOI) means the application for, or a request for coverage under this general permit pursuant to WAC 173-226-200.

Notice of Termination (NOT) means a request for termination of coverage under this general permit as specified by Special Condition S10 of this permit.

Operator means any party associated with a construction project that meets either of the following two criteria:

- The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

Permittee means individual or entity that receives notice of coverage under this general permit.

pH means a liquid's measure of acidity or alkalinity. A pH of 7 is defined as neutral. Large variations above or below this value are considered harmful to most aquatic life.

pH monitoring period means the time period in which the pH of stormwater runoff from a site must be tested a minimum of once every seven days to determine if stormwater pH is between 6.5 and 8.5.

Point source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, and container from which pollutants are or may be discharged to surface waters of the State. This term does not include return flows from irrigated agriculture. (See Fact Sheet for further explanation.)

reasonable potential to cause a violation of surface or ground water quality or sediment management standards.

Significant concrete work means greater than 1000 cubic yards poured concrete or recycled concrete over the life of a project.

Significant Contributor of Pollutants means a facility determined by Ecology to be a contributor of a significant amount(s) of a pollutant(s) to waters of the State of Washington.

Site means the land or water area where any "facility or activity" is physically located or conducted.

Source control BMPs means physical, structural or mechanical devices or facilities that are intended to prevent pollutants from entering stormwater. A few examples of source control BMPs are erosion control practices, maintenance of stormwater facilities, constructing roofs over storage and working areas, and directing wash water and similar discharges to the sanitary sewer or a dead end sump.

Stabilization means the application of appropriate BMPs to prevent the erosion of soils, such as, temporary and permanent seeding, vegetative covers, mulching and matting, plastic covering and sodding. See also the definition of Erosion and Sediment Control BMPs.

Storm drain means any drain which drains directly into a storm sewer system, usually found along roadways or in parking lots.

Storm sewer system means a means a conveyance, or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains designed or used for collecting or conveying stormwater. This does not include systems which are part of a combined sewer or Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Stormwater means that portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Stormwater Management Manual (SWMM) or Manual means the technical Manual published by Ecology for use by local governments that contain descriptions of and design criteria for BMPs to prevent, control, or treat pollutants in stormwater.

Stormwater Pollution Prevention Plan (SWPPP) means a documented plan to implement measures to identify, prevent, and control the contamination of point source discharges of stormwater.

Surface Waters of the State includes lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the jurisdiction of the state of Washington.

Wheel wash wastewater means any water used in, or resulting from the operation of, a tire bath or wheel wash (BMP C106: Wheel Wash), or other structure or practice that uses water to physically remove mud and debris from vehicles leaving a construction site and prevent track-out onto roads. When stormwater comingles with wheel wash wastewater, the resulting water is considered wheel wash wastewater and must be managed according to Special Condition S9.D.9.

APPENDIX C

Relevant Product Submittals

C-1 – Geocomposite Drainage Layer for Excavation Dewatering

C-2 – Tremco Water Proofing

C-3 – Geotextile Separator

C-4 – Water Stop

C-5 – Butterfly Valve for Cell 1 Inlet

Appendix C-1

Geocomposite Drainage Layer for Excavation Dewatering

TENCATE

Mirafi®

Miragrid® 5XT

Miragrid® 5XT geogrid is composed of high molecular weight, high tenacity polyester multifilament yarns which are woven in tension and finished with a PVC coating. Miragrid® 5XT geogrid is inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids.

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value
			Machine Direction
Tensile Strength (at ultimate)	ASTM D 6637	kN/m (lbs/ft)	68.6 (4700)
Tensile Strength (at 5% strain)	ASTM D 6637	kN/m (lbs/ft)	25.4 (1740)
Creep Reduced Strength	ASTM D 5262	kN/m (lbs/ft)	43.4 (2975)
Long Term Allowable Design Load[1]	GRI GG-4(b)	kN/m (lbs/ft)	37.6 (2575)

[1] NOTE: Long Term Allowable Design values are for sand, silt and clay

Physical Properties	Test Method	Unit	Typical Value
Grid Aperture Size (machine direction)	--	mm (in)	30.5 (1.2)
Grid Aperture Size (cross machine direction)	--	mm (in)	25.4 (1.0)
Mass/Unit Area	ASTM D 5261	g/m^2 (oz/yd^2)	305.1 (9.0)
Roll Dimensions (width x length)	--	m (ft)	3.6 (12) x 45.7 (150)
Roll Area	--	m^2 (yd^2)	164.5 (200)
Estimated Roll Weight	---	kg (lbs)	63 (140)

TENCATE
materials that make a difference

FGS000531
ETQR13

2-Sided Geocomposite
250mil Geonet

Geonet Component[4]

Property	Test Method	Minimum Average Roll Value[5] 6-250-6	8-250-8
Thickness, (mm)	ASTM D5199	250	250
*The thickness values may be changed due to project specifications (i.e., absolute minimum thickness)			
Peak Tensile Strength, lbs./in. (MD)	ASTM D5035	55	55
Melt Flow Index, g/10 minutes (max.)	ASTM D1238, 190°C, 2.16kg	≤1.0	≤1.0
Density, g/cm³	ASTM D792, Method B	0.94	0.94
Carbon Black Content	ASTM D4218	2 - 3	2 - 3
Transmissivity[1], m²/sec.	ASTM D4716	3×10^{-3}	3×10^{-3}

Geotextile Component (Prior to Lamination)

Property	Test Method	Minimum Average Roll Value[5]	
Mass per Unit Area, oz./sq. yd.	ASTM D5261	6.0	8.0
Grab Tensile Strength, lbs.	ASTM D4632	170	225
Grab Elongation, %	ASTM D4632	50	50
Trapezoidal Tear, lbs.	ASTM D4533	70	90
Puncture, lbs.	ASTM D4833	95	140
Mullen Burst, psi	ASTM D3786	325	400
Permittivity[2], sec.⁻¹	ASTM D4491	1.60	1.26
Water Flow[2], gpm./ft.²	ASTM D4491	125	90
Apparent Opening Size, U.S. Stnd Sieve Size (max.)	ASTM D4751	70	80
UV Resistance after 500 hours, % Strength Retained	ASTM D4355	70	70

Geocomposite[4]

Property	Test Method	Minimum Average Roll Value[5]	
Laminated Strength (Ply Adhesion), lbs./in.	ASTM D7005	1	1
Transmissivity[3], m²/sec.	ASTM D4716	5×10^{-4}	5×10^{-4}

Notes: **(1) Geonet Transmissivity at a temp. of 21°C, gradient of 0.1 and a load of 10,000psf: seating time 15 min. between steel plates.**
(2) At time of manufacture. Handling may change these properties.
(3) Geocomposite Transmissivity at a temp. of 21°C, gradient of 0.1 and a load of 10,000psf: seating time 15 min. between steel plates.
(4) Component Properties are prior to Lamination
(5) For Geonet, Melt Flow Index is a maximum value, and for Geotextile, AOS is a maximum average roll value.
(6) All roll lengths and widths have a tolerance of ±1%

500 Garrison Road, Georgetown, South Carolina 29440 843-546-0600 800-373-2478 Fax: 843-527-2738
email: salesmkg@agruamerica.com www.agruamerica.com

Appendix C-2

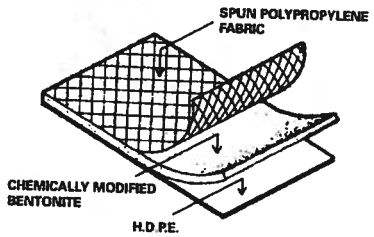
Tremco Water Proofing

Paraseal® LG

Multiple Component Sheet Membrane Waterproofing System

Product Description

Paraseal LG is a multi-layer sheet membrane waterproofing system. It consists of a self-sealing, expandable layer of granular bentonite. This bentonite layer is laminated at the rate of up to one pound per square foot to an impermeable, high density polyethylene (HDPE). The third component is a protective layer of spun polypropylene. Together, these three components form a tough, high performance waterproofing membrane manufactured in controlled thicknesses of 170 mils to 200 mils, specially designed for blindside installations such as lagging, under floor slabs and elevator pits. Paraseal LG also withstands applications where shotcrete is blown directly into the face of the membrane.



Basic Uses

Paraseal LG is especially effective when waterproofing from the blindside (lagging, etc.) where the waterproofing membrane is applied before the walls or floor are poured. It is designed to resist damage from multiple exposures to inclement weather, extremely abrasive concrete pours or direct installation of shotcrete. Paraseal LG will also exhibit outstanding protection against water intrusion in areas of high water heads.

Packaging

4' x 24' (1.2m x 7.3m) standard rolls.

Also Available by SPECIAL ORDER:

- Larger size rolls may be customized for a nominal cutting charge.

NOTE: This specification data is not complete. Use installation guidelines from specification manual for detailed information.

INSTALLATION

For complete details, refer to our website. All blindside installations have bentonite side facing installer.

Preparatory Work

Examine all surfaces prior to starting application. All spaces between lagging larger than 1" (2.5cm) shall be covered with 3/4" (6.4mm) treated plywood prior to installation.

Lagging

Paraseal LG may be installed in a vertical or horizontal direction. Lap joints 3" (7.6cm) shingle fashion (top over bottom) when pouring against, 4" (10.2cm) shingle fashion (bottom over top) when shotcreting against. Fasten all seams at 4" (10.2cm) over center. Trowel Paramastic, TREMproof 201/60T or TREMproof 250GC-T around all tiebacks and penetrations. Protect from flooding prior to concrete pour.

Earth

Paraseal LG may be used to cover earth design cuts which are to serve as the external side of a vertical wall form. Overlap joints 4" (10.2cm) to 6" (15.2cm) depending on regularity of soil cut (soil proctor min 85).

Buried Forms

Paraseal LG may be directly attached to forms which are to be left in the earth after the concrete is poured (i.e. elevator pits, sumps, etc.). Overlap joints min 3" (7.6cm).

Under Floor

Paraseal LG is installed whenever direct contact of the bentonite and floor slab are desired. Paraseal LG will form an instant seal to floor area. Overlap joints 3" (7.6cm). May be installed over consolidated earth at 85 proctor or mud slab.

To establish a moisture vapor protective barrier beneath the floor, all seams are sealed with Permanent Seam Tape. Deckseal may be recommended.

Penetration

Tiebacks, tie bolts, misaligned soldier piles, whalers and bracking may all penetrate the Paraseal LG membrane and must be detailed properly. Should this occur, contact your Tremco representative.

Protection

The Paraseal LG dual waterproofing system has a PUNCTURE RESISTANCE OF 169-lb point load (76.6 kg) and does not require an additional protection course for most applications. For special applications, contact your Tremco Representative for details.

Storage

Protect from moisture. Store on skid or pallet, cover with polyethylene or tarp. Do not double stack pallets.

Availability

Immediately available from distributors worldwide.

Limitations

If groundwater is brackish, consult Tremco. Do not apply in standing water or over snow. Paraseal products require compaction/confinement to be effective. A minimum confinement of 24 psf is required. Contact your local representative or technical services for more information.

Warranty

Tremco warrants its Paraseal Membranes to be free of defects in materials, but makes no warranty as to appearance or color. Since methods of application can affect performance, Tremco makes no other warranty, expressed or implied, including warranties of MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE, with respect to Paraseal Membranes. Tremco's sole obligation shall be, at its option, to replace or to refund the purchase price of the quantity of Paraseal membrane proved to be defective and Tremco shall not be liable for any loss or damage including incidental or consequential damages arising from the use of Paraseal Membranes.

TYPICAL PHYSICAL PROPERTIES

Physical Properties	Value	Test Method
Tensile Strength: Membrane (PSI)	4,000 PSI (27.6MPa)	ASTM-D412
Resistance to microrganisms (bacteria, fungi, mold, yeast)	unaffected	
Elongation-ultimate failure of membrane:	700%	D412 Dumbbell
Puncture Resistance:	169 Lbs (76.6kg)	FTMS 101B
Resistance to hydrostatic head (Ft. (m) of water):	150 Ft (45.6m)	ASTMD751 Method A Footnote #1
Resistance to water migration under membrane: zero leakage	150 Ft (45.6m)/Head	Footnote #2
Permeance	2.7x10^{-13}cm/sec or 1.7ng/Pa.S.m^2 or .031 grain/hr ft^2 in Hg	
Installation Temperatures:	-25°F to 130°F (-31.7°C to 54.4°C)	
Non-toxic:	Do not ingest	
Freeze/thaw cycles: No effect before or after installation.		
Non-staining:		
Resistance to chemicals & gasses: Extremely high resistance - contact manufacturer for specific information.		
Life Expectancy: Both high density polyethylene and bentonite have life expectancy measurable in the thousands-of-years.		

FOOTNOTES FOR TECHNICAL DATA:
1. A 1" (2.5cm) diameter hole was cut in the middle of a 3 1/2" (8.9cm) diameter sample of Paraseal LG. Sample clamped in 3" (7.6cm) diameter permeameter, 150' (45.6m) waterhead applied.
2. Membrane applied to porous stone and placed in permeameter. Pressure increased to equivalent of 150 ft. (45.6m) water head.

An RPM Company

Tremco Commercial Sealants & Waterproofing
3735 Green Road, Beachwood, OH 44122 // Phone: 216.292.5000 // 800.321.7906
220 Wicksteed Avenue, Toronto, ON M4H 1G7 // Phone: 416.421.3300 // 800.363.3213
1451 Jacobson Avenue, Ashland OH 44805 // Phone: 419.289.2050 // 800.321.6357
www.tremcosealants.com

TREMCO

08/00
2 Pages

PRODUCT
DATA
SHEET

Paraseal LG

A MULTIPLE COMPONENT SHEET MEMBRANE WATERPROOFING SYSTEM.

Key Benefits Summary

- ☐ Multi layer/dual waterproofing system
- ☐ Long life HDPE
- ☐ Installation made easy
- ☐ Suitable for use with shotcrete

PRODUCT INFORMATION

DESCRIPTION

Paraseal LG is a multi-layer sheet membrane waterproofing system. It consists of a self-sealing, expandable layer of bentonite laminated at the rate of approximately 4.8Kg per square metre to an impermeable, high density polyethylene (HDPE). The third component is a protective layer of spun polypropylene. Together, these three components form a tough, high performance waterproofing membrane manufactured in controlled thicknesses of 4.25mm to 5mm, specially designed for blindside installations such as lagging, under floor and elevator pits. Paraseal LG also withstands applications where shotcrete is blown directly into the face of the membrane.

BASIC USES

Paraseal LG is especially effective when waterproofing from the blindside (lagging etc.) where the waterproofing membrane is applied before the walls or floor are poured. It is designed to resist damage from multiple exposure to inclement weather, extremely abrasive concrete pours or direct installation of shotcrete. Paraseal LG will also exhibit outstanding protection against water intrusion in areas of high water heads. Its special weather treatment allows Paraseal LG to be installed for relatively long periods of time before the walls are poured.

LIMITATIONS

If groundwater is brackish, consult Tremco. Do not apply in standing water or over snow.

PACKAGING

1.2m x 7.4m standard rolls.

NOTE: This specification data is not complete. Use installation guidelines fromthe specification manual for detailed information.

USAGE GUIDELINES

INSTALLATION

For complete details, refer to the appropriate Paraseal LG installation manual. All blindside installations have the bentonite side facing the installer.

Preparatory Work:

Examine all surfaces prior to starting application. All spaces between lagging larger than 25mm shall be covered with 6mm plywood prior to installation.

Lagging:

Paraseal LG may be installed in a vertical or horizontal direction. Lap joints 75mm shingle fashion (top over bottom) when pouring against, 150mm shingle fashion (bottom over top) when shotcreting against. Trowel Paramastic or Vulkem 201 T around all tiebacks and penetrations. Protect from flooding prior to concrete pour.

Earth:

Paraseal LG may be used to cover earth design cuts which are to serve as the external side of a vertical wall form. Overlap joints 100mm to 150mm depending on regularity of soil cut.

Buried Forms:

Paraseal LG may be directly attached to forms which are to be left in the earth after the concrete is poured (i.e. elevator pits, sumps, etc.) Overlap joints min 75mm.

Under Floor:

Paraseal LG is installed whenever direct contact of the bentonite and floor slab are desired. Paraseal LG will form an instant seal to floor area. Overlap joints 75mm. May be installed over consolidated earth, sand or mud slab.

To establish a moisture vapour protective barrier beneath the floor, all seams are sealed with Permanent Seam Tape.

Penetrations:

Tiebacks, tie bolts, misaligned soldier piles, whalers and bracking may all penetrate the Paraseal LG membrane. Should this occur, contact your Tremco representative.

Protection:

The Paraseal LG dual waterproofing system has a PUNCTURE RESISTANCE of 43Kg. and does not require an additional protection course for most applications. For special applications, please contact your Tremco representative for details.

Storage:

Protect from moisture. Store on skid or pallet, cover with polyethelene or tarp. Do not double stack pallets.

Paraseal LG

TREMCO

Paraseal LG

TECHNICAL INFORMATION

PHYSICAL PROPERTIES

	Value	Test Method
Pliability: 180 bend over 25mm mandral @ -3°C	10,000	ASTM D146
Tensile Strength: membrane (PSI) ASTM D412		4,000PSI
Resistance to microrganisms (bacteria, fungi, mold, yeast)	unaffected	
Elongation - ultimate failure of membrane	700%	D638 Type 4 Dumbell
Puncture Resistance	43Kg	FTMS 101B
Resistance to Hydrostatic Head (m of water)	46m	ASTMD751 Method A Footnote #4
Resistance to water migration under membrane:zero leakage	46m/head	Footnote #1
Water migration at or through joint	Instant Seal/ no penetration	Footnote #5
Perm rating ASTM E96	0.03	
Permeance co-efficient of permeability	2.7 x 10-13 cm3/cm2/sec.	Footnote #4
Cycling over 38mm joint	No deterioration	Footnote #2
Cycling over 6.3mm crack 250 cyc.	No deterioration	Footnote #3
Installation temperatures	-27.5°C to 50°C	

Non toxic: Do not ingest

Freeze/thaw cycles: No effect before or after installation

Non Staining

Resistance to chemicals and gases: Extremely high resistance - contact manufacturer for specific information.

Life Expectancy: Both high density polyethylene and bentonite have life expectancy measurable in the thousands-of-years.

FOOTNOTES FOR TECHNICAL DATA:

1. A 2.5cm diameter hole was cut in the middle of a 8.8cm diameter sample of Paraseal LG. Sample clamped in 7.5cm diameter permeameter, 46m waterhead applies.
2. Membrane placed between 2 clamps 3.8cm apart. Temperature reduced to -27.5°C and clamps are pulled apart to 6.5cm. Cycle repeated between 3.8cm and 6.3cm - 2000 times.
3. Membrane placed between 2 butting clamps. Clamps spread at -27.5°C. Cycle repeated 250 times.
4. Membrane applied to porous stone and placed in permeamerter. Pressure increase to equivalent of 46m water head.
5. Test same as #4 only performed at joint.
6. Above values on 20 mil HDPE system.

TECHNICAL SERVICE

TREMCO has a team of qualified Technical Sales Representatives who provide assistance in the selection and specification of products. For more detailed information or service and advice call Customer Service on (02) 9638 2755 or fax (02) 9638 2955.

GUARANTEE/WARRANTY

We warrant our products to be free of defects and manufactured to meet published physical properties when tested according to applicable specifications and TREMCO standards.
Under this warranty we will provide at no charge, product to replace any product proven to be defective when applied in accordance with our written instructions and in applications recommended by TREMCO as being suitable for this product.
All claims concerning product defects must be made within 12 months of shipment. Absence of such claims in writing during this period will contribute a waiver of all claims with respect to such product. This warranty is in lieu of any and all other warranties expressed or implied.

TREMCO PTY LTD ABN 25 000 024 064
Unit 1, 2 Park Rd, RYDALMERE NSW 2116 Australia
Tel: (02) 9638 2755 Fax: (02) 9638 2955
tremco@tremco.com.au

Material Safety Data Sheet

PARASEAL GM LG

Version 1.
REVISION DATE: 07/18/2007

Print Date 07/19/2007

SECTION 1 - PRODUCT IDENTIFICATION / PREPARATION INFORMATION

Product Information

Trade name	:	PARASEAL GM LG
Product code	:	516220L503
Supplier	:	Tremco Canada division 220 Wicksteed Avenue Toronto, ON M4H 1G7
Telephone	:	(416) 421-3300
Emergency Phone:	:	(613) 996-6666
Product use	:	Waterproofing

Preparation Information

Prepared by:	:	Sewnauth Raghunandan
Date:	:	07/18/2007
Telephone	:	(416) 421-3300

SECTION 2 - HAZARDS IDENTIFICATION

Emergency Overview

Gray. Solid ply rolls. Not applicable under normal conditions of use. Generally not required under normal conditions of use.

Acute Potential Health Effects/ Routes of Entry

Inhalation	:	Not applicable under normal conditions of use.
Eyes	:	Not applicable under normal conditions of use.
Ingestion	:	Not applicable under normal conditions of use.
Skin	:	May cause mild irritation.

Aggravated Medical Conditions

Pre-existing eye, skin and respiratory disorders may be aggravated by exposure.

Chronic Health Effects

This product contains granular materials which may cause mechanical skin, eye or respiratory irritation.
Target Organs: Skin, Eye, Lung

SECTION 3 : HAZARDOUS INGREDIENTS

This is not a controlled product as defined in the Canadian Workplace Hazardous Materials Information System (WHMIS).

SECTION 4 - FIRST AID MEASURES

Get immediate medical attention for any significant overexposure.

Inhalation	:	Generally not required under normal conditions of use.
Eye contact	:	Generally not required under normal conditions of use.

Skin contact	:	Clean area of contact thoroughly using soap and water. If irritation, rash or other disorders develop, get medical attention immediately.
Ingestion	:	Not applicable under normal conditions of use.
Notes to physician	:	Not applicable.

SECTION 5: FIRE / EXPLOSION HAZARDS

Flash point	:	Not available.
Method	:	Not available.
Lower explosion limit	:	Not available.
Upper explosion limit	:	Not available.
Autoignition temperature	:	Not available.
Hazardous combustion products	:	Hydrogen sulfide and hydrocarbon fractions.
Protective equipment for firefighters	:	Use accepted fire fighting techniques. Wear full firefighting protective clothing, including self-contained breathing apparatus (SCBA).

SECTION 6 - SPILLS / LEAKS / ACCIDENTAL RELEASE MEASURES

Scrape up and transfer to appropriate container for disposal.

SECTION 7 - HANDLING AND STORAGE

Store under normal warehouse conditions.

SECTION 8 - PREVENTIVE MEASURES/EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection equipment

Respiratory protection	:	Not required under normal conditions of use.
Hand protection	:	Use suitable impervious leather gloves and protective apparel to reduce exposure.
Eye protection	:	Wear appropriate eye protection.
Skin and body protection	:	Not required.
Protective measures	:	Other equipment not normally required.
Engineering measures	:	General ventilation is sufficient.

Exposure Limits

Chemical Name	CAS Number	Regulation	Limit	Form
Crystalline Silica (Quartz)/ Silica Sand	14808-60-7	Ontario TWA: ACGIH TWA:	0.10 mg/m3 0.025 mg/m3	Respirable fraction. Respirable fraction.
Silica (crystalline-cristobalite)	14464-46-1	Ontario TWA: ACGIH TWA:	0.05 mg/m3 0.025 mg/m3	Respirable fraction. Respirable fraction.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State	: Solid
Form	: Solid ply rolls
Color	: Gray
Odor	: None
pH	: Not available.
Vapour pressure	: Not available.
Vapor density	: Not available.
Melting point/range	: Not available.
Freezing point	: Not available.
Boiling point/range	: Not available.
Water solubility	: Gels
Evaporation Rate:	: Not available.
Specific Gravity	: 1.7
% Volatile Weight	: 0 %

SECTION 10 - REACTIVITY / STABILITY

Stability	: Material is stable under normal storage, handling, and use.
Hazardous polymerization	: Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

No Data Available

SECTION 12 - ECOLOGICAL INFORMATION

No Data Available

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Disposal Method : As purchased, this product, when discarded, is not a listed or characteristic hazardous waste according to Federal regulations (40 CFR 261). Check local, regional, state or provincial regulations for applicable requirements for disposal. Any processing, using, alteration or chemical additions to the product, as purchased, may alter the disposal requirements. Under Federal regulations, it is the generator's responsibility to determine if a waste is a hazardous waste. Empty containers may retain product residue. Do not reuse.

SECTION 14 - TRANSPORTATION / SHIPPING DATA

TDG / DOT Shipping Description:

NOT REGULATED

SECTION 15 - REGULATORY INFORMATION

North American Inventories:
All components are listed or exempt from the TSCA inventory.
This product or its components are listed on, or exempt from the Canadian Domestic Substances List.

Canadian Regulations:
WHMIS Classification : Not Controlled

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Other Regulations:
Regulatory VOC (less water and exempt solvent) : 0 g/l

SECTION 16 - OTHER INFORMATION

HMIS Rating :

Health	1
Flammability	0
Reactivity	0
PPE	

0 = Minimum
1 = Slight
2 = Moderate
3 = Serious
4 = Severe

Further information:

For Industrial Use Only. Keep out of Reach of Children. The hazard information herein is offered solely for the consideration of the user, subject to their own investigation of compliance with applicable regulations, including the safe use of the product under every foreseeable condition.

Prepared by: Sewnauth Raghunandan

Legend

ACGIH - American Conference of Governmental Hygienists
DOT - Department of Transportation
DSL - Domestic Substance List
EPA - Environmental Protection Agency
HMIS - Hazardous Materials Information System
IARC - International Agency for Research on Cancer
MSHA - Mine Safety Health Administration
NDSL - Non-Domestic Substance List
NIOSH - National Institute for Occupational Safety and Health
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit
RCRA - Resource Conservation and Recovery Act
STEL - Short Term Exposure Limit
TLV - Threshold Limit Value
TSCA - Toxic Substances Control Act
TWA - Time Weighted Average
V - Volume
VOC - Volatile Organic Compound
WHMIS - Workplace Hazardous Materials Information System

Appendix C-3

Geotextile Separator

NORTHWEST LININGS &
GEOTEXTILE PRODUCTS, Inc.
"Helping to Protect the Environment"
21000 77th Avenue South
Kent, WA 98032
(253) 872-0244 • (800) 729-6954
FAX: (253) 872-0245
www.northwestlinings.com

October 27, 2011

MidMountain Contractors
Attn: Brad
PO Box 2909
Kirkland, WA 98083

Subject: Letter of Certification

Dear Brad:

We hereby certify that the geosynthetic materials supplied to your firm is the product designated by the manufacturer for the referenced project. This product shall meet and/or exceed the attached manufacturer's product specifications.

Product:	**Crown Resources (formerly known as TNS), R080 Non-Woven 8 oz Geotextile, 15'**
Quantity:	**1 rolls (500 SY)**
Roll #'s:	**110020866**

Sales Order #: **G50168**

If you have any questions, please call me at Ext. 102.

Sincerely,

Cara M Kryzsko

Cara Kryzsko

Crown Resources
2694 Hayes Wilbanks Rd.
Toccoa, GA 30577

(864) 968-0592 Tel
(864) 879-4639 Fax

10/27/2011

REF: R080
PO#: 5190

Northwest Linings and Geotextile

Dear Sir/Madam:

This is to certify that R080 is a 100% polypropylene, nonwoven, needle-punched fabric. R080 is resistant to degradation due to ultraviolet exposure and resists commonly encountered soil chemicals, insects, mildew, and is non-biodegradable. Polypropylene is stable within a pH range of 2 to 13. R080 conforms to the physical properties listed in the following table:

FABRIC PROPERTY	TEST METHOD	UNITS	M.A.R.V
Grab Tensile	ASTM D 4632	lbs	205 (.911 kN)
Grab Elongation	ASTM D 4632	%	50
Trap Tear	ASTM D 4533	lbs	80 (.356 kN)
CBR Puncture	ASTM D 6241	lbs	525 (2.33 kN)
A.O.S.	ASTM D 4751	U.S. Sieve	80 (.180 mm)
Permittivity	ASTM D 4491	1/sec	1.4
Water Flow	ASTM D 4491	gpm/sq.ft.	90 (3657 l/min/sm)
U.V. Resistance after 500 hours	ASTM D 4355	% retained	70 (.212 mm)

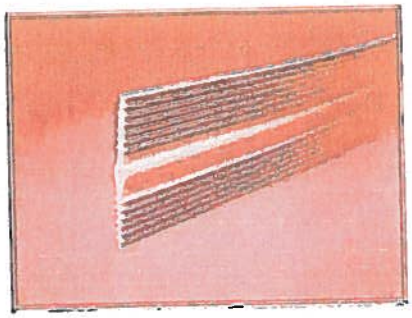
***modified**

Marshall O. Gaddy
Quality Control Manager

Northwest Linings								Crown Resources, LLC					
PO # 5190								2654 Hayes Wilbanks Rd.					
								Toccoa, GA 30577					
				D4632	D4632	D4533	D-4632	D4632	D4533	D4491	D4491	D4751	D6241
Roll number	Style	Width	Length	GTMD	GEMD	TTMD	GTXMD	GEXMD	TTXMD	WF	PERT	AOS	CBR
110020866	R080	180	300	266	84	99	238	96	102	106	1.67	80	532

Appendix C-4

Water Stop



PVC Or Polyvinylchloride Waterstops

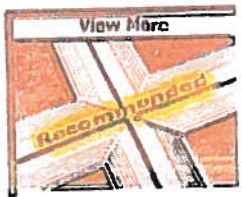
Greenstreak PVC Waterstops are the benchmark for the industry and exceed standard specifications. The versatility of PVC has made these waterstops popular with specifiers and engineers. Outstanding physical properties, excellent inherent elasticity and resistance to many waterborne chemicals has made it the most widely specified waterstop material.

Plugging Taper Tie Voids, Simple and Reliable

PVC waterstops are available in several styles and sizes. Choosing the correct waterstop begins with determining whether the joint is moving or non-moving.

Typical Applications For PVC Waterstops Include:

- Water and waste water treatment facilities
- Dams, lock, canals, water reservoirs and aqueducts
- Tunnels and culverts
- Foundations
- Primary and secondary containment structures



Specify Quality Factory Fabrications

Greenstreak PVC Waterstop Physical Properties

Property	Test *ASTM	Nominal Value
Water absorption	*D 570	0.02
Tear resistance	*D 624	225 lb./in.
Ultimate Elongation	*D 638	360%
Tensile strength	*D 638	2000 psi
Low temperature brittleness	*D 746	Passed @ -35°F / -37°C
Stiffness in flexure	*D 747	700 psi
Specific gravity	*D 792	1.40
Hardness Shore A15	*D 2240	79±3
Accelerated extraction	CRD- C 572	
◦ Tensile strength		1850 psi
◦ Elongation		350%
Effect of Alkali		
◦ weight change		+ 0.10%
◦ hardness change		+ 1 point

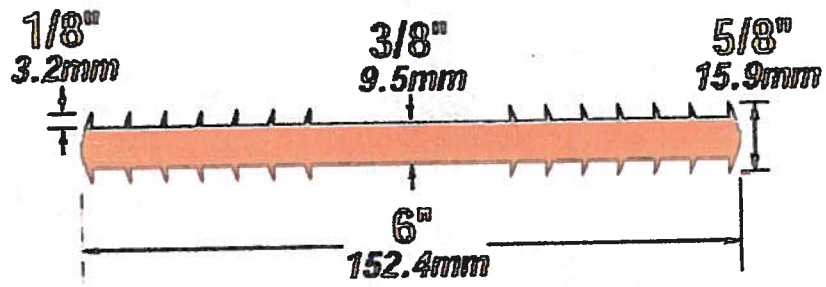
Greenstreak conducts regular tests of material physical properties. Refer to the suggested master specification for current values.

back to top

Print this Page

Waterstops - PVC: Catalog Item: 679

- Ribbed Flat - Non-tapered
- - - Application: Non-Moving



Specifications on this product:	
Weight (lbs/ft): 1.5	**Weight (Kg/m): 2.23**
Width (inches): 6	**Width (mm): 101.6**
Thickness (inches): 3/8	**Thickness (mm): 9.5**
Head Pressure (ft): 125	**Head Pressure (KPa): 373**
Other Notes:	
None	
Matching Products:	
None	

Close Window

Alternate option

SEP 18 2009

NB

☒ NO EXCEPTIONS NOTED ☐ MAKE CORRECTIONS NOTED

☐ REJECTED ☐ REVISE AND RESUBMIT

THIS REVIEW IS FOR GENERAL CONFORMANCE WITH DESIGN CONCEPT ONLY. ANY DEVIATION FROM PLANS OR SPECIFICATIONS NOT CLEARLY NOTED BY THE CONTRACTOR HAS NOT BEEN REVIEWED. REVIEW SHALL NOT CONSTITUTE A COMPLETE CHECK OF ALL DETAILED DIMENSIONS OR COUNT OR SERVE TO RELIEVE THE CONTRACTOR OF CONTRACTUAL RESPONSIBILITY FOR ANY ERROR OR DEVIATION FROM THE CONTRACT REQUIREMENTS.

LIVERMORE ASSOCIATES INCORPORATED
PORTLAND, OREGON

DATE 9/21/09 BY NB

Appendix C-5

Butterfly Valve for Cell 1 Inlet

Type 57 Butterfly Valves

Specifications

Sizes:	Lever: 1-1/2" – 8" Gear: 8" – 14"
Models:	Wafer Style
Operators:	Lever and Gear
Bodies:	PVC, PP and PVDF
Discs:	PVC, PP, PVDF and CPVC
Seats:	EPDM, FKM, and Nitrile
Seals:	Same as seating material
Stems:	403 and 316 stainless steel, Titanium, Hastelloy C ‡

PVC/PP/EPDM Models
NSF-61 Certified

‡ Trademark of Cabot Corporation

Standard Features (Sizes 1-1/2" – 14")

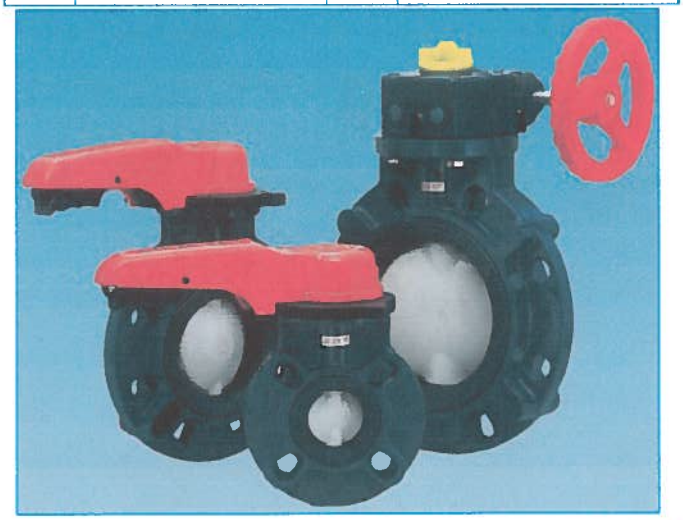
- Standard model (1-1/2" – 14") has PVC body and PP disc for superior chemical resistance and elevated temperature capabilities
- 316/403 stainless steel shaft has full engagement over the entire length of the disc and is a non-wetted part
- Only solid and abrasion-resistant plastic disc and elastomeric liner are wetted parts
- ISO bolt circle on top flange–no body or stem modifications required for accessories
- Stem retainer–PP retainer to prevent stem removal
- Seat over tightening protection–Molded body stops and seat stress relief area
- Spherical disc design offers increased Cv, ultimate sealing and high cycle life
- 18 position throttle plate for lever handle style

Options

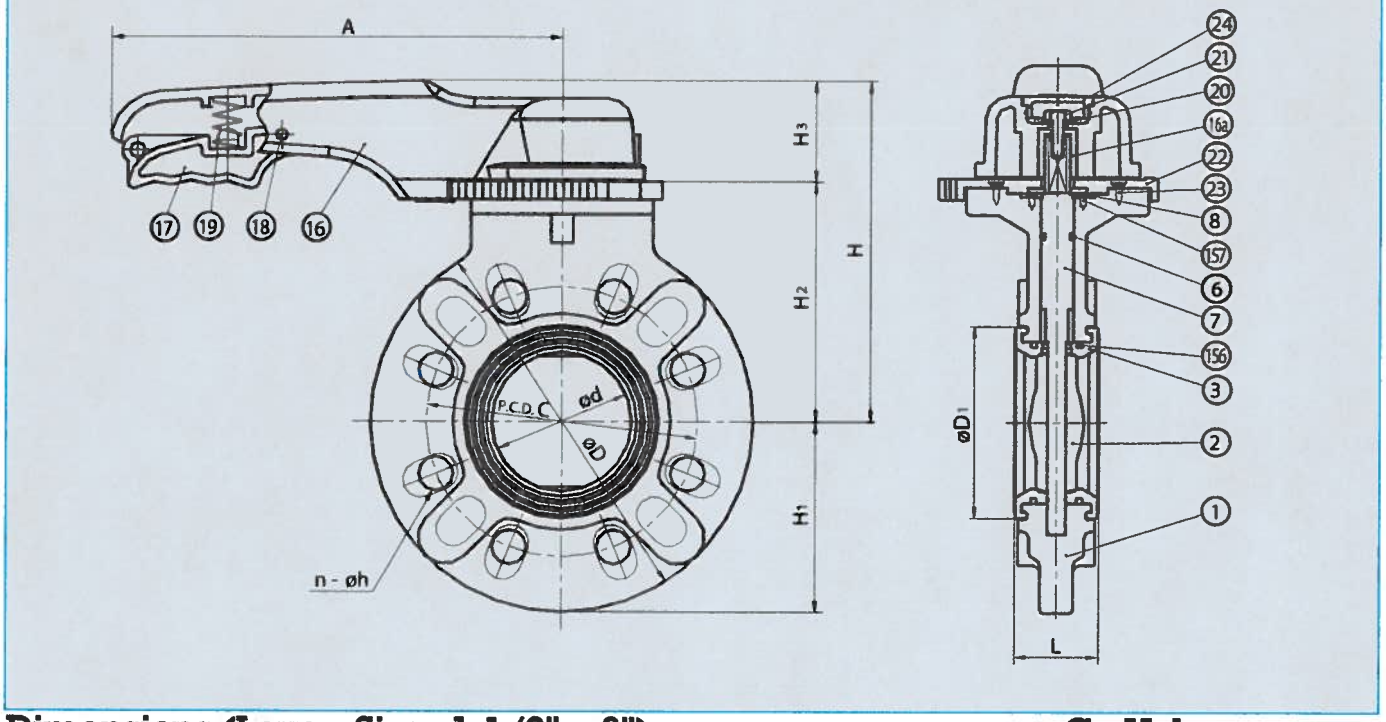
- Pneumatically and electrically actuated with accessories
- Alternate discs:
  (I) PVC : 1-1/2" – 14"
  (II) PVDF : 1-1/2" – 14"
  (III) CPVC : 3", 4", 6" & 8"
- Lug style (stainless steel 304 or 316) for blocking & end-of-line applications
- Stems in 316 stainless steel, titanium, Hastelloy C®
- 2" square nut on stem (1-1/2" - 8" only)
- 2" square nut on gear operator (All sizes)
- Stem extensions (Single stem and two-piece stem)
- Locking devices (Gear type – standard on lever)
- Chain operators
- Manual limit switch - Asahi P-Series
- Tandem arrangements (Patented by A/A, Inc.)

Parts List (Lever: Sizes 1-1/2" – 8")

PARTS			
NO.	DESCRIPTION	PCS.	MATERIAL
1	Body	1	PVC, PP, PVDF
2	Disc	1	PVC, CPVC, PP, PVDF
3	Seat	1	EPDM, FKM, NBR
6	O-Ring (C)	1	EPDM, FKM, NBR
7	Stem	1	Stainless Steel 316
8	Stem Retainer	1	PP
16	Handle	1	PP
16a	Metal Insert in Handle	1	Stainless Steel 316L
17	Handle Lever	1	PPG
18	Pin	1	PPG
19	Spring	1	Stainless Steel 304
20	Washer (A)	1	Stainless Steel 304
21	Bolt (B)	1	Stainless Steel 304
22	Locking Plate	1	PPG
23	Screw (B)	4	Stainless Steel 304
24	Cap (A)	1	PP
156	Liner Stabilization Ring	2	Stainless Steel (SCS13)
157	Screw (F)	4	Stainless Steel 304



Type 57 – Lever Operated Butterfly Valves



Dimensions (Lever: Sizes 1-1/2" – 8")

NOMINAL SIZE			ANSI CLASS 150										
INCHES	mm	d	C	n	h	D	D1	L	H	H1	H2	H3	A
1 1/2	40	1.77	3.88	4	0.62	5.91	2.83	1.54	6.14	2.95	3.94	2.20	8.66
2	50	2.20	4.75	4	0.75	6.50	3.23	1.65	6.54	3.25	4.33	2.20	8.66
2 1/2	65	2.72	5.50	4	0.75	7.28	3.78	1.81	6.93	3.64	4.72	2.20	8.66
3	80	3.03	6.00	4	0.75	8.31	4.17	1.81	7.52	4.15	5.31	2.20	9.84
4	100	4.02	7.50	8	0.75	9.37	5.31	2.20	8.11	4.69	5.91	2.20	9.84
5	125	5.08	8.50	8	0.88	10.39	6.69	2.60	9.33	5.20	6.61	2.72	12.60
6	150	5.91	9.50	8	0.88	11.22	7.52	2.80	9.92	5.61	7.20	2.72	12.60
8	200	7.68	11.75	8	0.88	13.39	9.53	3.43	11.14	6.69	8.43	2.72	15.75

Cv Values

NOMINAL SIZE		Cv (at various opening degrees)		
INCHES	mm	30°	60°	90°
1 1/2	40	4	43	71
2	50	7	73	120
2 1/2	65	15	153	250
3	80	18	183	300
4	100	28	287	470
5	125	49	506	830
6	150	66	671	1100
8	200	150	1525	2500

Pressure vs. Temperature (PSI, WATER, NON-SHOCK)*

BODY		PVC			PP		PVDF			
DISC		PP			PP		PVDF			
NOMINAL SIZE		30° F 120° F	121° F 140° F	141° F 175° F	-5° F 140° F	141° F 175° F	-5° F 140° F	141° F 175° F	176° F 210° F	211° F 250° F
INCHES	mm									
1 1/2	40	150	70	30	150	100	150	100	85	75
2	50	150	70	30	150	100	150	100	85	75
2 1/2	65	150	70	30	150	100	150	100	85	75
3	80	150	70	30	150	100	150	100	85	75
4	100	150	45	30	150	100	150	100	85	75
5	125	150	45	30	150	100	150	100	85	75
6	150	150	45	30	150	100	150	100	85	75
8	200	150	40	20	150	85	150	85	75	60

Wt. (LBS) / Vacuum Service

NOMINAL SIZE		PVC	PP	PVDF
INCHES	mm			
1 1/2	40	3	3	3
2	50	4	3	4
2 1/2	65	4	3	4
3	80	5	4	5
4	100	6	5	7
5	125	11	9	13
6	150	13	10	15
8	200	21	16	25

NOMINAL SIZE		VACUUM SERVICE (INCHES OF MERCURY)
INCHES	mm	
1 1/2	40	-29.92
2	50	-29.92
2 1/2	65	-29.92
3	80	-29.92
4	100	-29.92
5	125	-29.92
6	150	-29.92
8	200	-29.92

* For lug style data consult factory

TRUMBULL
1040 N. Meridian Rd., P.O. Box 1556, Youngstown, Ohio 44501
Phone: 330.799.3333 • Toll Free: 800.677.1799 • FAX: 330.797.3215
www.trumbull-mfg.com

ADJUSTABLE STEM GUIDES

Ductile Iron or Stainless Steel

TRUMBULL STEM GUIDES are designed as wall brackets for installation in treatment plants and pump stations to provide support for valve extension stems.

These stem guides are adjustable for stems as close to the wall as 2", or as far away as 36". They are available as follows:

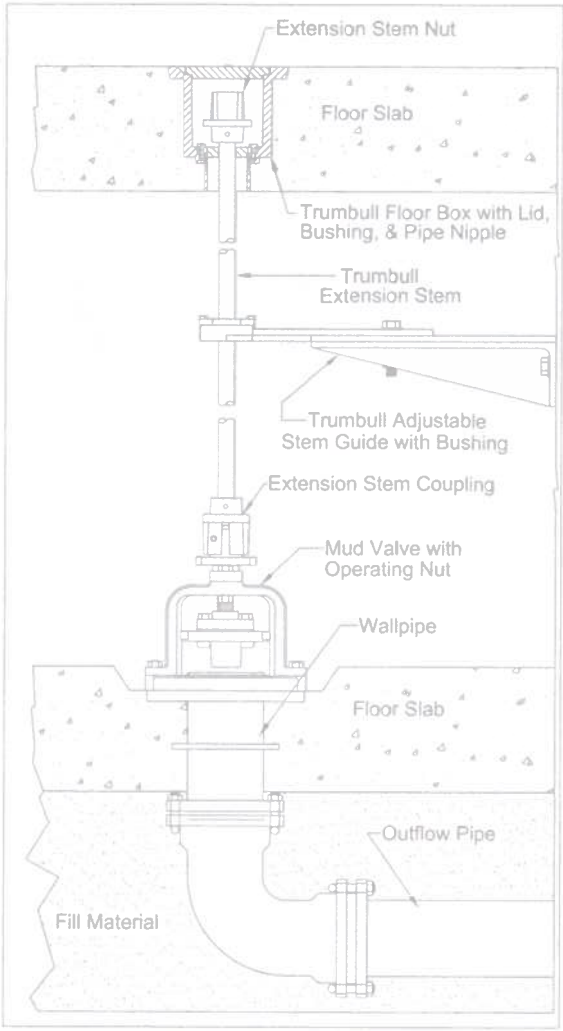
Trumbull Item No.	Material	Adjustment	Weight
367-4960	Ductile Iron	2" - 26"	25.0 lbs.
367-4970	Ductile Iron	2" - 36"	28.0 lbs.
367-5960	Stainless 316	2" - 26"	24.0 lbs.
367-5970	Stainless 316	2" - 36"	32.0 lbs.

Longer arm lengths are available, please inquire.

Stem guides are generally recommended at 6' to 8' intervals. Bronze bushings can be drilled up to a 2-1/8" bore diameter for 2" O.D. stems. By removing the bushing larger stems can be accomodated, up to 2-3/8" O.D. See separate literature on Stem Guides for larger diameter stems.

STAINLESS STEEL VERSION
with 2" - 26" Adjustment

DUCTILE IRON VERSION
with 2" - 36" Adjustment



Typical Stem Guide installation.

Both sizes available in Type 316 Stainless Steel

ORDERING INFORMATION:

1. Quantity.
2. Trumbull item number.
3. O.D. of stem being used, or desired bushing hole size (15/16" O.D. supplied if not specified.)*

See separate literature on Trumbull Floorstands, Floor Boxes, Extension Stems, Stem Guides for Large Diameter Stems and Mud Valves.

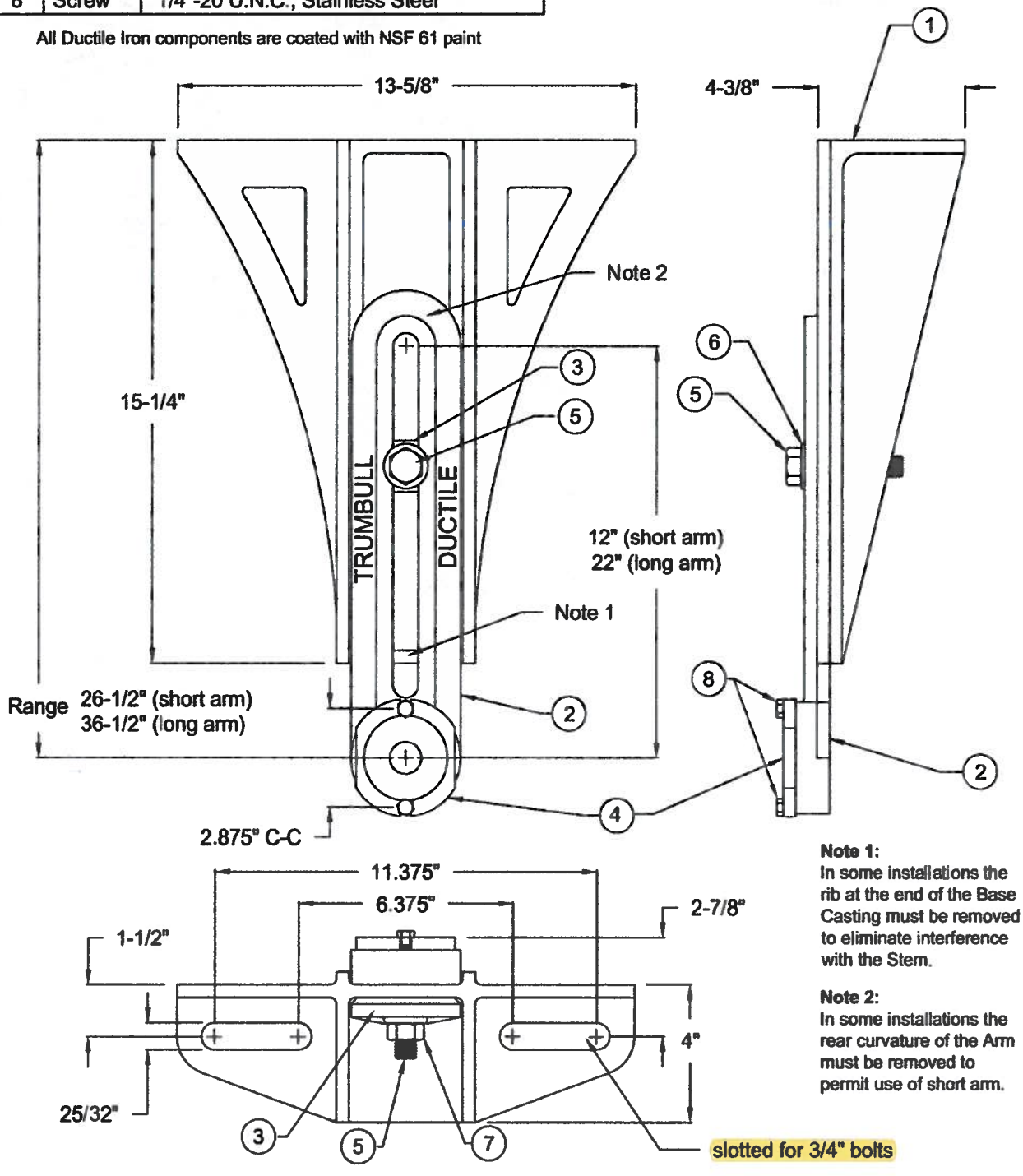
See reverse side for drawing.

***Asahi Stem Extension is 3/4" SS Pipe - 1.05" OD**

Item	Part	Material
1	Base	Ductile Iron or Stainless Steel
2	Arm	Ductile Iron or Stainless Steel
3	Clamp	Ductile Iron or Stainless Steel
4	Bushing	UNS C86400 (B584) Manganese Bronze
5	Bolt	5/8" x 4", Hex Head, Stainless Steel
6	Washer	1-1/2" O.D., Stainless Steel
7	Nut	5/8", Hex, Stainless Steel
8	Screw	1/4"-20 U.N.C., Stainless Steel

All Ductile Iron components are coated with NSF 61 paint

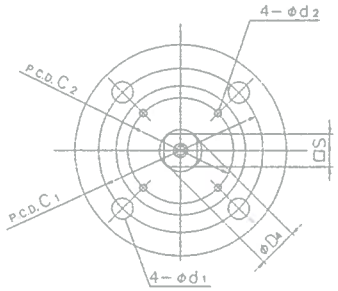
Item No.	Size	Weight
Ductile Iron Guides (65-45-12)		
367-4960	2"-26"	25#
367-4970	2"-36"	28#
Stainless Steel Guides (T316)		
367-5960	2"-26"	28#
367-5970	2"-36"	32#

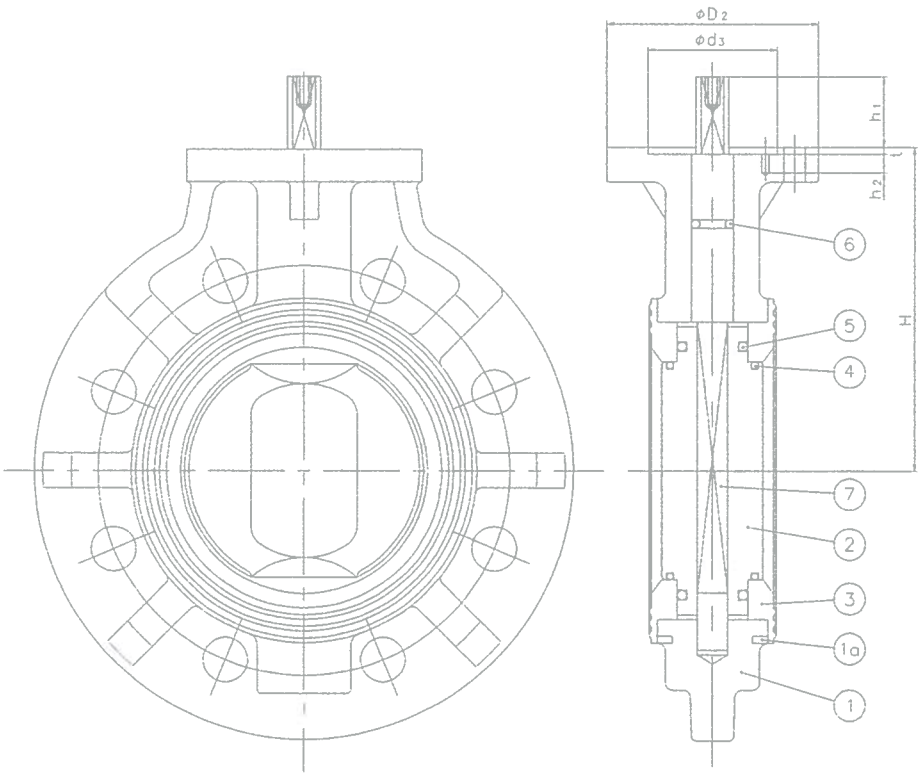


Note 1:
In some installations the rib at the end of the Base Casting must be removed to eliminate interference with the Stem.

Note 2:
In some installations the rear curvature of the Arm must be removed to permit use of short arm.

Drawn:	Drawing Revision:		TRUMBULL INDUSTRIES	Drawn to Scale
Date	Rev.	Date	P.O. Box 1556 1040 N. Meridian Rd. Youngstown, Ohio 44501	ADJUSTABLE STEM GUIDES
4/4/94	J	4/16/08		





DIMENSIONS TABLE

UNIT: INCH

NOMINAL SIZE		ISO 5211												
		D_2	TYPE	C_1	d_1	S	D_4	C_2	d_2	d_3	H	h_1	h_2	t
40mm	1 1/2"	3.94	F07	2.75	.35	.43	.55	1.8	.12	2.17	3.74	1.18	.32	.12
50	2	3.94	F07	2.75	.35	.43	.55	1.8	.12	2.17	3.98	1.18	.32	.12
65	2 1/2	3.94	F07	2.75	.35	.43	.55	1.8	.12	2.17	4.41	1.18	.32	.12
80	3	3.94	F07	2.75	.35	.55	.67	1.8	.12	2.17	4.69	1.18	.32	.12
100	4	3.94	F07	2.75	.35	.55	.67	1.8	.12	2.17	5.39	1.18	.32	.12
125	5	5.51	F10	4.02	.43	.67	.83	2.4	.16	2.75	6.46	1.38	.39	.12
150	6	5.51	F10	4.02	.43	.67	.83	2.4	.16	2.75	6.97	1.38	.39	.12
200	8	5.51	F10	4.02	.43	.75	.95	2.4	.16	2.75	8.23	1.38	.39	.12
250	10	7.09	F10	4.02	.43	.87	1.06	—	—	2.75	9.49	1.38	—	.12
300	12	9.25	F14	5.51	.71	1.06	1.34	—	—	3.94	11.73	1.77	—	.16
350	14	9.25	F14	5.51	.71	1.06	1.34	—	—	3.94	12.05	1.77	—	.16
400	16	9.25	F14	5.51	.71	1.06	1.34	—	—	3.94	13.54	1.77	—	14

NOTE: 1. The shape and appearance of assembly differ a little with nominal size compared to this drawing.

2. FOR OVER VIEW DIMENSION, REFER TO DWG.# 0171BF AND 0172BF

FOR REFERENCE ONLY
ASAHI/AMERICA

No.	DESCRIPTION	No.REQ'D	MATERIAL	REMARKS
1a	RING 3)	2	STEEL(SS400) WITH EPOXY POWDER COAT.	3) PP Body ..." :Used for 6 ~ 16" PVDF Body :Used for 12 ~ 16" 2)Used for Size 2 ~ 16"
7	STEM	1	STAINLESS STEEL 403,316	
6	O-RING (C)	1	EPDM, FKM, OTHERS	
5	O-RING (B)	2		
4	O-RING (A) 2)	2		
3	SEAT	1		
2	DISC	1	PVC, PP, PVDF	1) PVC Body : 1-1/2 ~ 14"
1	BODY 1)	1		

	NAME	DATE
DR	KENICHI MIYAZAKI	8/28/02
APPD	DAVE HURLEY	8/28/02
PROD	LEO LESTER	8/28/02
WO#/SO#		
FILE		

ASAHI/AMERICA
ISO 9001 CERTIFIED
35 GREEN STREET, P.O. BOX 653, MALDEN, MA.

BUTTERFLY VALVE TYPE56
TOP DIMENSIONS OF BODY
1-1/2" THRU. 16"

SIZE	DWG. NO.	REV
A	0186BF	C

SCALE NTS

SHEET 1 OF 1

APPENDIX D

Mayes Testing and Livermore Associates Steel Reinforcement Inspection Reports

MAYES TESTING ENGINEERS, INC.

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
fax 425.745.1737

Tacoma Office
10029 S. Tacoma Way
Suite E-2
Tacoma, WA 98499
ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

Project No.	T11132
Project	BSB Diversified Final Clean Up
Address	8202 South 200th Street, Kent, WA
Contractor	PES Environmental, Inc.
Record No.	001
Date	8-5-11
Weather	Cloudy
Inspection	Reinforcing Steel

Onsite to evaluate reinforcing steel that has been stored on site for an extended period of time. Stored reinforcing steel was covered during this period of time, so no appreciable rust has accumulated on the steel. There is a minor amount of rust at the ends of some of the bars, but nothing that is detrimental to the steel or reduces its effective cross-section. The reinforcing steel that has been stored on the site appears to be acceptable for use.

To the best of our knowledge, all items inspected today are in conformance with approved plans and specifications.

Inspector: Tom Robinson

Reviewed By:

Dennis Sanborn
Senior Project Manager

MAYES TESTING ENGINEERS, INC.

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
fax 425.745.1737

Tacoma Office
10029 S. Tacoma Way
Suite E-2
Tacoma, WA 98499
ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

Project No.	T11132
Project	BSB Diversified Final Clean Up
Address	8202 South 200th Street, Kent, WA
Contractor	PES Environmental, Inc.
Record No.	002
Date	9-2-11
Weather	Clear
Inspection	Project Management

Onsite for reinforcing steel inspection and concrete placement. These activities were cancelled for today. Reinforcing steel installation incomplete, but in progress.

Reviewed plans with Michael Stewart, PES Environmental and Davae Austenfeld, Livermore Architecture and Engineering. Discussed concrete sampling requirements.

1. Air entrainment of 6% +/- 1.5% required.
2. Two 7-day cylinders requested by Michael Stewart.

Concrete will be supplied by Miles Sand and Gravel. Sampling to occur at every 50 cubic yards placed. Notified Dennis Sanborn, Mayes Testing Engineer's of requirements.

Preliminary: Preliminary reinforcing steel inspection, reinforcing steel installation in progress.

Inspector: Kevin Hill

Reviewed By:

Dennis Sanborn
Senior Project Manager

LIVERMORE architecture & engineering, inc.
industrial • commercial

FIELD REPORT

PROJECT NAME: BSB Diversified, Inc. Property
PROJECT NUMBER: 208009.10

PRESENT AT SITE: Mike Stewart
Danae Austenfeld

Date: September 2, 2011
Arrival Time: 11:10 a.m.

Weather: Sunny
Temperature: 80 degrees

WORK REVIEWED:

Concrete reinforcement placement for the mat foundation, dowels to walls, water stops and water proofing membrane. The reinforcing for the mat foundation was approximately 80% complete with the bottom mat in place and the top mat about 65% complete. Reinforcing dowels for the walls were not in place at the time of the inspection. Waterstops were also not installed at the time of the site visit, but were on site.

OBSERVATIONS:

The mat foundation appears to be in general conformance with the contract documents with the following exceptions:

- Clear distances for the bottom mat of reinforcing were not in place at all locations.
- Reinforcing dowels from the mat foundation to the walls were not installed.
- Waterstops were not installed.

Kevin Hill with Mayes Testing was on site during this site visit and coordinated concrete and reinforcing testing and inspection to be completed on Tuesday, 09/06/11.

INFORMATION OR ACTION REQUIRED:

- Verify reinforcing clear distances adhere to requirements prior to concrete pour as per our discussion on site.
- Install wall dowels per construction documents as discussed. Mayes to perform placement inspection prior to concrete placement.
- Install waterstops per construction documents as discussed. Mayes to perform placement inspection prior to concrete pour.

REPORT BY: Danae Austenfeld, P.E.

Departure Time: 12:30 p.m.

Cc: Gary Livermore, P.E.
Colleen Nichols, P.E.
File

MAYES TESTING ENGINEERS, INC.

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
fax 425.745.1737

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10029 S. Tacoma Way
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ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

Project No. T11132
Project BSB Diversified Final Clean Up
Address 8202 South 200th Street, Kent, WA

Contractor PES Environmental, Inc.

Record No. 003
Date 9-6-11
Weather Clear
Inspection Reinforced Concrete
Sample(s) (10) 4 x 8”

Onsite to verify installation of reinforcing steel placed for 2’ thick slab for bottom of water treatment vault. Reinforcing steel was verified for size, grade, location, spacing, lap length, clearances and cleanliness. Reinforcement was found to conform to approved drawings and plans. Also verified was the installation of water stop as per plan.

Observed the placement of Miles Sand and Gravel Design Mix # 0442A for 2’ thick slab referenced for reinforcing steel inspection. Sampling frequency today was at every 50 cubic yards placed with testing for air entrainment with 6.0% +/- specified. Method of placement was via pump truck with mechanical consolidation. Miles QC was onsite and sampled in conjunction with Maye’s. Sampling occurred at mid-point of 11 cubic yards and 63 cubic yards cumulative of 93 cubic yards delivered/placed today. Two sets of (5) 4 x 8” cylinders were cast for compressive strength testing with 4,000 psi required at 28 days.

Set	Sample	Ambient	Slump	Air Content
1	75°	68°	4”	5.2%
2	79°	70°	4”	4.6%

To the best of our knowledge, all items inspected today are in conformance with approved plans and specifications.

Inspector: Kevin HIll

Reviewed By:

Dennis Sanborn
Senior Project Manager

MAYES TESTING ENGINEERS, INC.

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
fax 425.745.1737

Tacoma Office
10029 S. Tacoma Way
Suite E-2
Tacoma, WA 98499
ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

Project No.	T11132
Project	BSB Diversified Final Clean Up
Address	8202 South 200th Street, Kent, WA
Engineer	Livermore Architecture and Engineering
Architect	Livermore Architecture and Engineering
Contractor	PES Environmental, Inc.
Record No.	004
Date	9-15-11
Weather	Cloudy
Inspection	Reinforcing Steel

Performed preliminary inspection of the Reinforcing Steel for the New Vault Walls. The curtains for the South, East, and West Exterior Walls are completed per detail 3 on S1.1. The curtains for the South interior and connecting wall are completed per detail 3 on S1.1. Still need to complete the North Exterior Wall and the North Interior Wall with connecting walls and have final clearances checked on all walls after form closure.

Preliminary: As noted above.

Inspector: Tom Robinson

Reviewed By:

Dennis Sanborn
Senior Project Manager

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Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
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fax 425.745.1737

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Project No.	T11132
Project	BSB Diversified Final Clean Up
Address	8202 South 200th Street, Kent, WA
Engineer	Livermore Architecture and Engineering
Architect	Livermore Architecture and Engineering
Contractor	PES Environmental, Inc.
Record No.	005
Date	9-19-11
Weather	Overcast
Inspection	Reinforcing Steel

Performed a reinforcing steel inspection for the 2 North Interior Walls located in the middle chamber of the New Vault. This inspection was performed verifying the size, grade, proper spacing, lap slice length, clearances referencing details on 3/S1.1 in the approved plans. The final clearances of the reinforcing steel still needs verification after form closure and prior to the concrete placement. This inspection was performed referencing the preliminary inspection performed by Mayes Testing inspector Tom Robinson's report dated 9-15-2011 stating that these walls were not completed and that final clearances need verification. The North Exterior Wall and 1 North Interior Wall located in between the North Chambers still were not completed and needs inspection.

Preliminary: This inspection was performed referencing the preliminary inspection performed by Mayes Testing inspector Tom Robinson's report dated 9-15-2011. The 2 North Interior Walls located in the middle chamber were completed but the North Exterior Wall and 1 North Interior Wall located in between the North Chambers still were not completed and need inspection. The final clearances of all the reinforcing steel still needs verification after the form closure and prior to the concrete placement.

Inspector: Daniel Quehl

Reviewed By:

Dennis Sanborn
Senior Project Manager

MAYES TESTING ENGINEERS, INC.

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
fax 425.745.1737

Tacoma Office
10029 S. Tacoma Way
Suite E-2
Tacoma, WA 98499
ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

Project No.	T11132
Project	BSB Diversified Final Clean Up
Address	8202 South 200th Street, Kent, WA
Engineer	Livermore Architecture and Engineering
Architect	Livermore Architecture and Engineering
Contractor	PES Environmental, Inc.
Record No.	006
Date	9-20-11
Weather	Clear
Inspection	Reinforced Concrete

Inspected reinforcing steel for north wall and interior partition wall running north to south in the interior of the containment as per 3/S1.1 from bottom of the wall to the top of the wall. Inspected reinforcing steel for size, grade, and spacing, the final clearances and cleanliness to be inspected after forms are closed. At the North West corner of the exterior wall the mat inside the horizontal reinforcing steel has been cut which makes the lap splice 50 inches instead of 54 inches for the #7 bar and at the top 2 ft 6 inches of the wall the #6 bar lap splice is 33 inches. Also in the middle of the wall the partition has doubled up #6 bar due to lack of #7 corner bar for the connection of partition wall to exterior wall which is only 38 inches long not the 54 inch lap of a #7 bar from slab on grade to six feet above slab on grade.

Preliminary: Pending engineer approval or fix of reinforcing steel.

Inspector: Beorn Edmonds

Reviewed By: Dennis Sanborn
Senior Project Manager

MAYES TESTING ENGINEERS, INC.

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
fax 425.745.1737

Tacoma Office
10029 S. Tacoma Way
Suite E-2
Tacoma, WA 98499
ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

Project No.	T11132
Project	BSB Diversified Final Clean Up
Address	8202 South 200th Street, Kent, WA
Engineer	Livermore Architecture and Engineering
Architect	Livermore Architecture and Engineering
Contractor	PES Environmental, Inc.
Record No.	007
Date	10-7-11
Weather	Showers
Inspection	Reinforcing Steel

Completed inspection of reinforcing steel for the walls of the treatment vault on the northeast corner of the property. Verified clearances. See attached email from Gary Livermore accepting the as built conditions stated in the Mayes Testing Engineer's field report dated 9/20/11. The preliminary field report dated 9/15/11 is also cleared due to the completion of the reinforcing steel installation.

Note: The embeds for the vault lid are not installed. The contractor stated they will be installed by wet setting at the end of the concrete placement.

Corrective Actions Taken: 1. Attached email accepts as built condition in the Mayes Testing Engineer's preliminary report dated 9/20/11. 2. Reinforcing steel installation is completed. This clears the Mayes Testing Engineer's preliminary report dated 9/15/11.

To the best of our knowledge, all items inspected today are in conformance with approved plans and specifications.

Inspector: Mike Egger

Reviewed By:

Michael S. Dolder, P.E.
Vice President

Mike Stewart

From: Gary Livermore [GaryL@livermoreae.com]
Sent: Wednesday, September 21, 2011 5:29 PM
To: Mike Stewart; Danae Austenfeld
Cc: 'Brian O'Neal'; 'Roger North'
Subject: RE: rebar inspection issue at BSB

Mike,

Both of these items are acceptable given the locations that they occur. All other reinforcing shall comply with the construction documents.

What is the schedule for pouring these walls.

Thanks,
Gary Livermore

From: Mike Stewart [mailto:mstewart@eillc.com]
Sent: Tuesday, September 20, 2011 3:24 PM
To: Danae Austenfeld
Cc: Gary Livermore; 'Brian O'Neal'; 'Roger North'
Subject: rebar inspection issue at BSB

See Mayes testing report attached to the end of this report that describes a re-bar lap issue and doubling up of #6 bars to replace #7's. We need a recommendation for correcting the problem before we complete the outer wall forming. The report includes a photo of the missing overlap (horizontal bars cut too short) at the northwest corner.

LIVERMORE architecture & engineering, inc.
industrial • commercial

FIELD REPORT

PROJECT NAME: BSB Diversified, Inc. Property
PROJECT NUMBER: 208009.10

PRESENT AT SITE: Todd Baetman, Oldcastle Precast

Date: February 21, 2012
Arrival Time: 11:00 a.m.

Weather: Cloudy
Temperature: 50 degrees

WORK REVIEWED:
Reinforcement, connections and openings in precast concrete lids.

- The connections and openings were reviewed on two of the lids that were already poured.
- The reinforcement was reviewed on one lid that was ready to be poured during the inspection day.
- On the remaining three lids that will be cast at a later date no inspection was done. Todd Baetman said these lids will be cast by 02/27/2012.

OBSERVATIONS:
The precast lid reinforcement and connections appear to be in general conformance with the contract documents.

REPORT BY: Lucian Giloan, EIT

Departure Time: 12:00 p.m.

Cc: Gary Livermore, Architect, P.E., Livermore Architecture & Engineering, Inc.
Colleen Nichols, P.E., Livermore Architecture & Engineering, Inc.
Roger North, P.E., Vista Consultants, LLC.

APPENDIX E

Mayes Testing Concrete Inspection and Test Reports

MAYES TESTING ENGINEERS, INC.

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
fax 425.745.1737

Tacoma Office
10029 S. Tacoma Way
Suite E-2
Tacoma, WA 98499
ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

Project No. T11132
Project BSB Diversified Final Clean Up
Address 8202 South 200th Street, Kent, WA

Contractor PES Environmental, Inc.

Record No. 003
Date 9-6-11
Weather Clear
Inspection Reinforced Concrete
Sample(s) (10) 4 x 8”

Onsite to verify installation of reinforcing steel placed for 2’ thick slab for bottom of water treatment vault. Reinforcing steel was verified for size, grade, location, spacing, lap length, clearances and cleanliness. Reinforcement was found to conform to approved drawings and plans. Also verified was the installation of water stop as per plan.

Observed the placement of Miles Sand and Gravel Design Mix # 0442A for 2’ thick slab referenced for reinforcing steel inspection. Sampling frequency today was at every 50 cubic yards placed with testing for air entrainment with 6.0% +/- specified. Method of placement was via pump truck with mechanical consolidation. Miles QC was onsite and sampled in conjunction with Maye’s. Sampling occurred at mid-point of 11 cubic yards and 63 cubic yards cumulative of 93 cubic yards delivered/placed today. Two sets of (5) 4 x 8” cylinders were cast for compressive strength testing with 4,000 psi required at 28 days.

Set	Sample	Ambient	Slump	Air Content
1	75°	68°	4”	5.2%
2	79°	70°	4”	4.6%

To the best of our knowledge, all items inspected today are in conformance with approved plans and specifications.

Inspector: Kevin HIll

Reviewed By:

Dennis Sanborn
Senior Project Manager

MAYES TESTING ENGINEERS, INC

Tacoma
10029 S. Tacoma Way
Suite E-2
Tacoma WA 98499
ph 253.584.3720
fax 253.584.3707

CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	09/14/11
	Kent, WA	Sample Set ID:	315386
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	----------	Revised:	☐

FIELD DATA

ASTM C31 and C172

Air Temperature:	68°F
Weather:	Clear
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	Kent
Ticket Number :	143162
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
75°F	NR	5.2%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.402	4.0"	09/07/11

Actual **Mix Proportions:**

Ingredient	Weight (per cu.yd)	
Cement--Type I & II	562.0	lbs
Coarse Aggregate 7/8"	1,862.0	lbs
Fine Aggregate	1,275.0	lbs
MRWRA	34.2	oz
Non Chloride Accelerator	3.4	oz
Water	226.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 1: 2' thick slab for water treatment vault. Sampled at 11 cubic yards (0-50 cy).

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	**Strength (psi)**	Type of Fracture	
09/06/11	0001	3907	09/13/11	7	4 x 8	46380	4.01	12.63	3670	Type 3	*
09/06/11	0001	3908	09/13/11	7	4 x 8	47215	4.01	12.63	3740	Type 5	*
09/06/11	0001	3909	10/04/11	28	4 x 8		0.00	0.00		NA	*
09/06/11	0001	3910	10/04/11	28	4 x 8		0.00	0.00		NA	*
09/06/11	0001	3911	10/04/11	28	4 x 8		0.00	0.00		NA	*

Remarks:

Technician(s): Hill, K.

Tested by: Simmons, N.

Reviewed by:

Dennis Sanborn
Senior Project Manager

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

MAYES TESTING ENGINEERS, INC

Tacoma
10029 S. Tacoma Way
Suite E-2
Tacoma WA 98499
ph 253.584.3720
fax 253.584.3707

CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	09/14/11
	Kent, WA	Sample Set ID:	315387
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	----------	Revised:	☐

FIELD DATA

ASTM C31 and C172

Air Temperature:	70°F
Weather:	Clear
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	Kent
Ticket Number :	143167
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
79°F	NR	4.6%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.415	4"	09/07/11

Actual **Mix Proportions:**

Ingredient	Weight (per cu.yd)	
Cement--Type I & II	562.0	lbs
Coarse Aggregate 7/8"	1,852.0	lbs
Fine Aggregate	1,274.0	lbs
MRWRA	34.0	oz
Non Chloride Accelerator	3.4	oz
Water	233.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 2: 2' thick slab for water treatment vault. Sampled at 63 cubic yards (50-100 cy).

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	**Strength (psi)**	Type of Fracture	
09/06/11	0002	3912	09/13/11	7	4 x 8	47640	4.01	12.63	3770	Type 2	*
09/06/11	0002	3913	09/13/11	7	4 x 8	46225	4.01	12.63	3660	Type 5	*
09/06/11	0002	3914	10/04/11	28	4 x 8		0.00	0.00		NA	*
09/06/11	0002	3915	10/04/11	28	4 x 8		0.00	0.00		NA	*
09/06/11	0002	3916	10/04/11	28	4 x 8		0.00	0.00		NA	*

Remarks:

Technician(s): Hill, K.

Tested by: Simmons, N.

Reviewed by:

Dennis Sanborn
Senior Project Manager

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

MAYES TESTING ENGINEERS, INC

Tacoma
10029 S. Tacoma Way
Suite E-2
Tacoma WA 98499
ph 253.584.3720
fax 253.584.3707

CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	10/05/11
	Kent, WA	Sample Set ID:	315386
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	----------	Revised:	☐

FIELD DATA

ASTM C31 and C172

Air Temperature:	68°F
Weather:	Clear
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	Kent
Ticket Number :	143162
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
75°F	NR	5.2%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.402	4.0"	09/07/11

Actual **Mix Proportions:**

Ingredient	Weight (per cu.yd)	
Cement--Type I & II	562.0	lbs
Coarse Aggregate 7/8"	1,862.0	lbs
Fine Aggregate	1,275.0	lbs
MRWRA	34.2	oz
Non Chloride Accelerator	3.4	oz
Water	226.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 1: 2' thick slab for water treatment vault. Sampled at 11 cubic yards (0-50 cy).

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	**Strength (psi)**	Type of Fracture	
09/06/11	0001	3907	09/13/11	7	4 x 8	46380	4.01	12.63	3670	Type 3	*
09/06/11	0001	3908	09/13/11	7	4 x 8	47215	4.01	12.63	3740	Type 5	*
09/06/11	0001	3909	10/04/11	28	4 x 8	56770	4.01	12.63	4500	Type 5	*
09/06/11	0001	3910	10/04/11	28	4 x 8	58320	4.01	12.63	4620	Type 5	*
09/06/11	0001	3911	10/04/11	28	4 x 8	56740	4.01	12.63	4490	Type 5	*

Remarks:

Technician(s): Hill, K.

Tested by: Pauly, K.

Reviewed by:

Dennis Sanborn
Senior Project Manager

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

MAYES TESTING ENGINEERS, INC

Tacoma
10029 S. Tacoma Way
Suite E-2
Tacoma WA 98499
ph 253.584.3720
fax 253.584.3707

CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	10/05/11
	Kent, WA	Sample Set ID:	315387
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	----------	Revised:	☐

FIELD DATA

ASTM C31 and C172

Air Temperature:	70°F
Weather:	Clear
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	Kent
Ticket Number :	143167
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
79°F	NR	4.6%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.415	4"	09/07/11

Actual **Mix Proportions:**

Ingredient	Weight (per cu.yd)	
Cement--Type I & II	562.0	lbs
Coarse Aggregate 7/8"	1,852.0	lbs
Fine Aggregate	1,274.0	lbs
MRWRA	34.0	oz
Non Chloride Accelerator	3.4	oz
Water	233.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 2: 2' thick slab for water treatment vault. Sampled at 63 cubic yards (50-100 cy).

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	**Strength (psi)**	Type of Fracture	
09/06/11	0002	3912	09/13/11	7	4 x 8	47640	4.01	12.63	3770	Type 2	*
09/06/11	0002	3913	09/13/11	7	4 x 8	46225	4.01	12.63	3660	Type 5	*
09/06/11	0002	3914	10/04/11	28	4 x 8	57825	4.01	12.63	4580	Type 5	*
09/06/11	0002	3915	10/04/11	28	4 x 8	59075	4.01	12.63	4680	Type 5	*
09/06/11	0002	3916	10/04/11	28	4 x 8	59535	4.00	12.57	4740	Type 5	*

Remarks:

Technician(s): Hill, K.

Tested by: Pauly, K.

Reviewed by:

Dennis Sanborn
Senior Project Manager

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

MAYES TESTING ENGINEERS, INC.

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
fax 425.745.1737

Tacoma Office
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Suite E-2
Tacoma, WA 98499
ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

Project No.	T11132
Project	BSB Diversified Final Clean Up
Address	8202 South 200th Street, Kent, WA
Engineer	Livermore Architecture and Engineering
Architect	Livermore Architecture and Engineering
Contractor	PES Environmental, Inc.
Record No.	008
Date	10-10-11
Weather	Showers
Inspection	Reinforced Concrete
Sample(s)	(14) 4 x 8”

Observed casting of the walls for the treatment vault on the north east corner of the property. Verified clearances prior to concrete placement. Miles provided 113 cubic yards of mix# 0442a (4000 psi at 28 days required), placed by pump truck and mechanically consolidated by internal vibration. One set of four 4”x8” cylinders and two sets of five 4 x 8” cylinders cast for compressive strength testing. The lid embeds were installed at the end of the concrete placement today. The top one foot lift was not placed today (from the lid embed elevation to the top of lid elevation).

To the best of our knowledge, all items inspected today are in conformance with approved plans and specifications.

Inspector: Mike Egger

Reviewed By:

Michael S. Dolder, P.E.
Vice President

MAYES TESTING ENGINEERS, INC

Tacoma
10029 S. Tacoma Way
Suite E-2
Tacoma WA 98499
ph 253.584.3720
fax 253.584.3707

CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	10/19/11
	Kent, WA	Sample Set ID:	315453
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	----------	Revised:	☐

FIELD DATA

ASTM C31 and C172

Air Temperature:	54°F
Weather:	Rain
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	201
Ticket Number :	257067
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
67°F	NR	5%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.369	4.0"	10/11/11

Actual **Mix Proportions:**

Ingredient	Weight (per cu.yd)	
A/E Admix	3.3	oz
Cement--Type I & II	561.0	lbs
Coarse Aggregate 7/8"	1,353.0	lbs
Fine Aggregate	1,271.0	lbs
MRWRA	34.0	oz
Water	207.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 1: Walls for the treatment vault on the northeast corner of the property. Concrete sampled at 10 of 113 total cubic yards.

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	**Strength (psi)**	Type of Fracture	
10/10/11	0003	4196	10/17/11	7	4 x 8	49800	4.00	12.57	3960	Type 2	*
10/10/11	0003	4197	11/07/11	28	4 x 8		0.00	0.00		NA	*
10/10/11	0003	4198	11/07/11	28	4 x 8		0.00	0.00		NA	*
10/10/11	0003	4199	11/07/11	28	4 x 8		0.00	0.00		NA	*

Remarks:

Technician(s): Egger, M.

Tested by: Simmons, N.

Reviewed by:

Michael S. Dolder, P.E.
Vice President

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

MAYES TESTING ENGINEERS, INC

Tacoma
10029 S. Tacoma Way
Suite E-2
Tacoma WA 98499
ph 253.584.3720
fax 253.584.3707

CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	10/19/11
	Kent, WA	Sample Set ID:	315454
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	----------	Revised:	☐

FIELD DATA

ASTM C31 and C172

Air Temperature:	59°F
Weather:	Rain
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	203
Ticket Number :	143809
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
68°F	NR	5%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.384	3.75"	10/11/11

Actual **Mix Proportions:**

Ingredient	Weight (per cu.yd)	
A/E Admix	3.4	oz
Cement--Type I & II	568.0	lbs
Coarse Aggregate 7/8"	1,854.0	lbs
Fine Aggregate	1,269.0	lbs
MRWRA	33.8	oz
Water	218.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 2: Walls for the treatment vault on the northeast corner of the property. Concrete sampled at 62 of 113 total cubic yards.

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	**Strength (psi)**	Type of Fracture	
10/10/11	0004	4200	10/17/11	7	4 x 8	51035	4.01	12.63	4040	Type 2	*
10/10/11	0004	4201	10/17/11	7	4 x 8	49150	4.01	12.63	3890	Type 5	*
10/10/11	0004	4202	11/07/11	28	4 x 8		0.00	0.00		NA	*
10/10/11	0004	4203	11/07/11	28	4 x 8		0.00	0.00		NA	*
10/10/11	0004	4204	11/07/11	28	4 x 8		0.00	0.00		NA	*

Remarks:

Technician(s): Egger, M.

Tested by: Simmons, N.

Reviewed by:

Michael S. Dolder, P.E.
Vice President

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

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CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	10/19/11
	Kent, WA	Sample Set ID:	315455
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	----------	Revised:	☐

FIELD DATA

ASTM C31 and C172

Air Temperature:	61°F
Weather:	Rain
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	203
Ticket Number :	143816
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
68°F	NR	4.8%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.392	4.0"	10/11/11

Actual **Mix Proportions:**

Ingredient	Weight (per cu.yd)	
A/E Admix	3.4	oz
Cement--Type I & II	566.0	lbs
Coarse Aggregate 7/8"	1,850.0	lbs
Fine Aggregate	1,272.0	lbs
MRWRA	34.0	oz
Water	222.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 3: Walls for the treatment vault on the northeast corner of the property. Concrete sampled at 113 of 113 total cubic yards.

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	**Strength (psi)**	Type of Fracture	
10/10/11	0005	4205	10/17/11	7	4 x 8	46460	4.01	12.63	3680	Type 5	*
10/10/11	0005	4206	10/17/11	7	4 x 8	44270	4.01	12.63	3510	Type 5	*
10/10/11	0005	4207	11/07/11	28	4 x 8		0.00	0.00		NA	*
10/10/11	0005	4208	11/07/11	28	4 x 8		0.00	0.00		NA	*
10/10/11	0005	4209	11/07/11	28	4 x 8		0.00	0.00		NA	*

Remarks:

Technician(s): Egger, M.

Tested by: Simmons, N.

Reviewed by:

Michael S. Dolder, P.E.
Vice President

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

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CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	11/07/11
	Kent, WA	Sample Set ID:	315453
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	_____	Revised:	☐

FIELD DATA

ASTM C31 and C172

Air Temperature:	54°F
Weather:	Rain
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	201
Ticket Number :	257067
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
67°F	NR	5%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.369	4.0"	10/11/11

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)	
A/E Admix	3.3	oz
Cement--Type I & II	561.0	lbs
Coarse Aggregate 7/8"	1,353.0	lbs
Fine Aggregate	1,271.0	lbs
MRWRA	34.0	oz
Water	207.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 1: Walls for the treatment vault on the northeast corner of the property. Concrete sampled at 10 of 113 total cubic yards.

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	Strength (psi)	Type of Fracture	
10/10/11	0003	4196	10/17/11	7	4 x 8	49800	4.00	12.57	3960	Type 2	*
10/10/11	0003	4197	11/07/11	28	4 x 8	56375	4.00	12.57	4490	Type 2	*
10/10/11	0003	4198	11/07/11	28	4 x 8	60730	4.00	12.57	4830	Type 5	*
10/10/11	0003	4199	11/07/11	28	4 x 8	60325	4.00	12.57	4800	Type 2	*

Remarks:

Technician(s): Egger, M.

Tested by: Simmons, N.

Reviewed by:

Dennis Sanborn
Senior Project Manager

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

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CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	11/07/11
	Kent, WA	Sample Set ID:	315454
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	_____	Revised:	☐

FIELD DATA

ASTM C31 and C172

Air Temperature:	59°F
Weather:	Rain
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	203
Ticket Number :	143809
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
68°F	NR	5%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.384	3.75"	10/11/11

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)	
A/E Admix	3.4	oz
Cement--Type I & II	568.0	lbs
Coarse Aggregate 7/8"	1,854.0	lbs
Fine Aggregate	1,269.0	lbs
MRWRA	33.8	oz
Water	218.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 2: Walls for the treatment vault on the northeast corner of the property. Concrete sampled at 62 of 113 total cubic yards.

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	Strength (psi)	Type of Fracture	
10/10/11	0004	4200	10/17/11	7	4 x 8	51035	4.01	12.63	4040	Type 2	*
10/10/11	0004	4201	10/17/11	7	4 x 8	49150	4.01	12.63	3890	Type 5	*
10/10/11	0004	4202	11/07/11	28	4 x 8	63415	4.01	12.63	5020	Type 2	*
10/10/11	0004	4203	11/07/11	28	4 x 8	60340	4.01	12.63	4780	Type 2	*
10/10/11	0004	4204	11/07/11	28	4 x 8	59980	4.01	12.63	4750	Type 2	*

Remarks:

Technician(s): Egger, M.

Tested by: Simmons, N.

Reviewed by: _____

Dennis Sanborn
Senior Project Manager

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

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CONCRETE LABORATORY TEST REPORT

Project Name:	BSB Diversified Final Cleanup Action	Project No:	T11132
Site Address:	8202 South 200th Street	Issued on:	11/07/11
	Kent, WA	Sample Set ID:	315455
Client:	PES Environmental	Permit # (s):	N/A
Engineer:	PES Environmental	Original:	☑
Contractor:	----------	Revised:	☐

FIELD DATA

ASTM C31 and C172

	Actual
Air Temperature:	61°F
Weather:	Rain
Product:	Concrete
Supplier:	Miles
Batch Plant Location:	203
Ticket Number :	143816
MixDesign ID :	0442A

Sample Temp. (ASTM C1064)	Initial Storage Temp. (ASTM C31)	Air Content (ASTM C231)
68°F	NR	4.8%
Water/Cement Ratio:	**Slump (ASTM C143)**	**Sample(s) Rec'd:**
0.392	4.0"	10/11/11

Mix Proportions:

Ingredient	Weight (per cu.yd)	
A/E Admix	3.4	oz
Cement–Type I & II	566.0	lbs
Coarse Aggregate 7/8"	1,850.0	lbs
Fine Aggregate	1,272.0	lbs
MRWRA	34.0	oz
Water	222.0	lbs

Required Strength: (f'c)

4000 psi @ 28 days

Placement Location and Notes:

Set 3: Walls for the treatment vault on the northeast corner of the property. Concrete sampled at 113 of 113 total cubic yards.

COMPRESSION TEST RESULTS

(ASTM C31, C39, C617, C1231, C780, C109, C1019 or AASHTO T22 when applicable)

Date Made	Sample #	Lab #	Date Tested	Age	Size (in)	Load (lbs)	Dia (in)	Area	Strength (psi)	Type of Fracture	
10/10/11	0005	4205	10/17/11	7	4 x 8	46460	4.01	12.63	3680	Type 5	*
10/10/11	0005	4206	10/17/11	7	4 x 8	44270	4.01	12.63	3510	Type 5	*
10/10/11	0005	4207	11/07/11	28	4 x 8	57225	4.00	12.57	4550	Type 5	*
10/10/11	0005	4208	11/07/11	28	4 x 8	58570	3.99	12.50	4680	Type 5	*
10/10/11	0005	4209	11/07/11	28	4 x 8	58320	3.98	12.44	4690	Type 5	*

Remarks:

Technician(s): Egger, M.

Tested by: Simmons, N.

Reviewed by: 

Dennis Sanborn
Senior Project Manager

Notes:

See ASTM C39, for full description of the Type of Fracture.

All testing performed in accordance with applicable ASTM's except C-31, 10.1.2 - "recording field temperature"

APPENDIX F

CQA Installation Data for Soil Bentonite Cutoff Wall

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
22-Sep	1480	1487.5	9:12	9:23	0:11	11	0.68	1	9:12	3800	3800	650	2.25	7.5	38.50		
	1487.5	1495	9:23	9:36	0:13	13	0.58	2	9:26	3800	7600	650	2.25	7.5	38.50		
	1495	1502.5	9:36	9:51	0:15	15	0.50	3	9:34	3800	11400	650	2.25	7.5	38.50		
	1502.5	1510	9:51	10:01	0:10	10	0.75	4	9:49	3800	15200	650	2.25	7.5	38.50		
	1510	1517.5	10:01	10:17	0:16	16	0.47	5	10:01	3800	19000	650	2.25	7.5	38.50		
	1517.5	1525	10:17	10:28	0:11	11	0.68	6	10:17	3800	22800	650	2.25	7.5	38.50		
	1525	1532.5	10:28	10:48	0:20	20	0.38	7	10:29	3800	26600	650	2.25	7.5	38.50		
	1532.5	1540	10:44	10:58	0:14	14	0.54	8	10:40	3800	30400	650	2.25	7.5	38.50		
	1540		10:58	11:07	0:09			9	10:52	3800	34200						
			down														
			11:23	11:28	0:05												
			down														
		1547.5	13:40	13:47	0:21	21	0.36	10	13:13	3800	38000	650	2.25	7.5	38.50		
	1547.5	1555	13:47	13:58	0:11	11	0.68	11	13:49	3800	41800	650	2.25	7.5	38.50		
	1555		13:58	14:21	0:23	23	0.00	12	14:03	3800	45600						
			14:21	14:24	0:03	3											
			down														
		1562.5	15:07	15:12	0:31	31	#REF!	13	15:18	3800	49400	650	2.25	7.5	38.50		
			down				#DIV/0!										
	1562.5	1570	15:18	15:27	0:09	9	0.83					650	2.25	7.5	38.50		
	1570	1577.5	15:27	15:44	0:17	17	0.44	14	15:34	3800	53200	650	2.25	7.5	38.50		
	1577.5	1585	15:44	15:58	0:14	14	0.54	15	15:50	3800	57000	650	2.25	7.5	38.50		
	1585	6.5	15:58	16:12	0:14	14	0.61	16	16:05	3800	60800	736	2.25	8.5	38.50		
	6.5		16:12	16:18	0:06			17	16:49	3800	64600						
			down					18	17:17	3800	68400						
		14	16:12	16:18	0:12	12	0.63	19	17:30	3800	72200	650	2.25	7.5	38.50		
	14	21.5	16:57	17:11	0:14	14	0.54	20	17:44	3800	76000	650	2.25	7.5	38.50		
	21.5	29	17:11	17:25	0:14	14	0.54					650	2.25	7.5	38.50		

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
	29	36.5	17:25	17:37	0:12	12	0.63					650	2.25	7.5	38.50		
	36.5	43.5	17:37	17:53	0:16	16	0.44					606	2.25	7.0	38.50		
end 9/22										76000		13037		150.5			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										76,000		13,037		5.8	6.136%	1,238,521	
23-Sep																	
	43.5	51	9:55	10:05	0:10	10	0.75	21	9:55	3800	3800	650	2.25	7.5	38.50		
	51	58.5	10:05	10:21	0:16	16	0.47	22	10:09	3800	7600	650	2.25	7.5	38.50		
	58.5	66	10:21	10:34	0:13	13	0.58	23	10:28	3800	11400	650	2.25	7.5	38.50		
	66	73.5	10:34	10:57	0:23	23	0.33	24	10:45	3800	15200	650	2.25	7.5	38.50		
	73.5	81	10:57	11:10	0:13	13	0.58	25	11:05	3800	19000	650	2.25	7.5	38.50		
	81	88.5	11:10	11:21	0:11	11	0.68	26	11:15	3800	22800	650	2.25	7.5	38.50		
	88.5	96	11:21	11:45	0:24	24	0.31	27	11:27	3800	26600	650	2.25	7.5	38.50		
	96	103.5	11:45	12:26	0:41	41	0.18	28	12:41	3800	30400	650	2.25	7.5	38.50		
	103.5	111	12:26	13:19	0:53	53	0.14	29	13:05	3800	34200	650	2.25	7.5	38.50		
	111	118.5	13:19	13:40	0:21	21	0.36	30	13:20	3800	38000	650	2.25	7.5	38.50		
	118.5	125	13:40	13:52	0:12	12	0.54	31	13:37	3800	41800	563	2.25	6.5	38.50		
										41800		7060		81.5			
Logged By: MGS																	

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										41,800		7,060		5.9	6.232%	670,694	
23-Sep	125	133	14:27	14:47	0:20	20	0.40	32	13:50	3800	3800	693	2.25	8.0	38.50		Start Corner
	133	138	14:47	14:56	0:09	9	0.56	33	14:15	3800	7600	433	2.25	5.0	38.50		
	138	146	14:56	15:03	0:07	7	1.14	34	14:41	3800	11400	702	2.25	8.0	39.00		
	146	149	15:03	15:32	0:29	29	0.10	35	14:50	3800	15200	267	2.25	3.0	39.50		
	149	165	15:32	15:53	0:21	21	0.76	36	14:58	3800	19000	1440	2.25	16.0	40.00		
	165	175	15:53	16:05	0:12	12	0.83	37	15:25	3800	22800	911	2.25	10.0	40.50		
	175	187.5	16:42	16:57	0:15	15	0.83	38	15:40	3800	26600	1139	2.25	12.5	40.50		
	187.5	200	17:04	17:20	0:16	16	0.78	39	15:50	3800	30400	1181	2.25	12.5	42.00		
	200	204	17:20	17:25	0:05	5	0.80	40	16:00	3800	34200	369	2.25	4.0	41.00		end corner
	204	225	18:25	18:56	0:31	31	0.68	41	16:38	3800	38000	1866	2.25	21.0	39.50		end dip
								42	16:46	3800	41800						
								43	17:01	3800	45600						
								44	17:17	3800	49400						
										49400		9001.69		100.0			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	Total length of trench over estimated due to trench moving in towards radius point in curve.
										49,400		9001.69		5.5	5.777%	855,160	
23-Sep	225	236	8:12	8:32	0:20	20	0.55	45	8:12	3800	3800	941	2.25	11.0	38.00	238460	
	236	243.5	8:32	8:43	0:11	11	0.68	46	8:27	3800	7600	641	2.25	7.5	38.00		

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
	243.5	251	8:43	8:53	0:10	10	0.75	47	8:38	3800	11400	641	2.25	7.5	38.00		
	251	258.5	8:53	9:04	0:11	11	0.68	48	8:49	3800	15200	641	2.25	7.5	38.00		
	258.5	266	9:04	9:13	0:09	9	0.83	49	8:58	3800	19000	641	2.25	7.5	38.00	239079	
	266	273.5	9:13	9:23	0:10	10	0.75	50	9:09	3800	22800	641	2.25	7.5	38.00		
	273.5	281	9:23	9:35	0:12	12	0.63	51	9:19	3800	26600	641	2.25	7.5	38.00		
	281	288.5	9:35	9:45	0:10	10	0.75	52	9:27	3800	30400	641	2.25	7.5	38.00		
	288.5	291	9:45	9:50	0:05	5	0.50	53	9:40	3800	34200	214	2.25	2.5	38.00		
	291	298	11:30	11:40	0:10	10	0.70	54	9:50	3800	38000	599	2.25	7.0	38.00		
											38000						
end 9/23										38000		6242		73.0			
Logged By: MGS																	

Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	Total length of trench over estimated due to trench moving in towards radius point in curve.
										38,000		6241.50		6.1	6.409%	592,943	
24-Sep	298	303	11:50	11:59	0:09	9	0.56	55	11:43	3800	3800	433	2.25	5.0	38.50		
	303	309	11:59	12:10	0:11	11	0.55	56	12:00	3800	7600	527	2.25	6.0	39.00		
	309	316	12:10	12:27	0:17	17	0.41	57	12:13	3800	11400	622	2.25	7.0	39.50		
	316	321	12:27	12:47	0:20	20	0.25	58	12:33	3800	15200	450	2.25	5.0	40.00		
	321	326	12:47	13:07	0:20	20	0.25	59	12:51	3800	19000	461	2.25	5.0	41.00	240400	
	326	333	13:07	13:27	0:20	20	0.35	60	13:06	3800	22800	669	2.25	7.0	42.50		
	333	339.5	14:20	14:37	0:17	17	0.38	61	13:26	3800	26600	644	2.25	6.5	44.00		
	339.5	346	14:37	15:02	0:25	17	0.38	62	14:58	3800	30400	665	2.25	6.5	45.50		
	346	350	15:02	15:13	0:11	17	0.24	63	15:02	3800	34200	414	2.25	4.0	46.00		
												4885		52.0			
Logged By: MGS																	

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
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Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										34,200		4885.31		7.0	7.369%	464,105	
24-Sep	350	353	15:18	15:24	0:06	6	0.50	64	15:18	3800	3800	311	2.25	3.0	46.00		
	353	362	15:24	15:50	0:26	26	0.35	65	15:35	3800	7600	932	2.25	9.0	46.00		
	362	368.5	15:50	16:01	0:11	11	0.59	66	15:50	3800	11400	673	2.25	6.5	46.00		
	368.5	375	16:01	16:15	0:14	14	0.46	67	16:00	3800	15200	673	2.25	6.5	46.00		
	375	381.5	16:15	16:30	0:15	15	0.43	68	16:15	3800	19000	673	2.25	6.5	46.00		
	381.5	388	16:30	16:42	0:12	12	0.54	69	16:25	3800	22800	665	2.25	6.5	45.50		
	388	394.5	16:42	16:56	0:14	14	0.46	70	16:39	3800	26600	665	2.25	6.5	45.50		
	394.5	401	16:56	17:10	0:14	14	0.46	71	16:56	3800	30400	665	2.25	6.5	45.50		
	401	407.5	17:10	17:22	0:12	12	0.54	72	17:03	3800	34200	658	2.25	6.5	45.00		
	407.5	414	17:22	17:33	0:11	11	0.59	73	17:19	3800	38000	658	2.25	6.5	45.00		
	414	420.5	17:33	17:59	0:26	26	0.25	74	17:33	3800	41800	658	2.25	6.5	45.00		
	420.5	427	17:59	18:38	0:39	39	0.17	75	18:22	3800	45600	658	2.25	6.5	45.00		
	427	433.5	18:38	18:50	0:12	12	0.54	76	18:36	3800	49400	658	2.25	6.5	45.00		
	433.5	440	18:50	19:02	0:12	12	0.54	77	18:48	3800	53200	658	2.25	6.5	45.00		
	440	446.5	19:02	19:13	0:11	11	0.59	78	19:02	3800	57000	658	2.25	6.5	45.00		
end 9/24										57000		9863		96.5			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										57,000		9863.44		5.8	6.083%	937,027	
25-Sep	446.5	453	7:57	8:06	0:09	9	0.72	79	7:55	3800	3800	658	2.25	6.5	45.00		

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	453	459.5	8:06	8:22	0:16	16	0.41	80	8:01	3800	7600	658	2.25	6.5	45.00		
	459.5	466	8:22	8:34	0:12	12	0.54	81	8:17	3800	11400	658	2.25	6.5	45.00		
	466	472.5	8:34	8:48	0:14	14	0.46	82	8:32	3800	15200	658	2.25	6.5	45.00		
	472.5	479	8:48	8:57	0:09	9	0.72	83	8:47	3800	19000	658	2.25	6.5	45.00		
	479	485.5	8:57	9:10	0:13	13	0.50	84	8:59	3800	22800	658	2.25	6.5	45.00		
	485.5	492	9:10	9:24	0:14	14	0.46	85	9:06	3800	26600	658	2.25	6.5	45.00		
	492	498.5	9:24	9:40	0:16	16	0.41	86	9:19	3800	30400	658	2.25	6.5	45.00		
	498.5	505	9:40	10:10	0:30	30	0.22	87	9:34	3800	34200	658	2.25	6.5	45.00		
	505	511.5	10:10	10:18	0:08	8	0.81	88	10:14	3800	38000	651	2.25	6.5	44.50		
	511.5	518	10:18	10:28	0:10	10	0.65	89	10:21	3800	41800	651	2.25	6.5	44.50		
	518	524	10:28	10:45	0:17	17	0.35	90	10:28	3800	45600	601	2.25	6.0	44.50		
	524	530	10:45	11:25	0:40	40	0.15	91	10:35	3800	49400	601	2.25	6.0	44.50		
	530	536	11:25	11:36	0:11	11	0.55	92	10:47	3800	53200	601	2.25	6.0	44.50		
	536	542	11:36	11:55	0:19	19	0.32	93	11:18	3800	57000	601	2.25	6.0	44.50		
	542	548	11:55	12:03	0:08	8	0.75	94	11:34	3800	60800	597	2.25	6.0	44.25		
	548	554	12:03	12:13	0:10	10	0.60	95	11:47	3800	64600	597	2.25	6.0	44.25		
	554	560	12:13	12:18	0:05	5	1.20	96	12:00	3800	68400	597	2.25	6.0	44.25		
	560	566	12:18	12:30	0:12	12	0.50	97	12:14	3800	72200	597	2.25	6.0	44.25		
	566	572	12:30	13:29	0:59	59	0.10	98	13;13	3800	76000	597	2.25	6.0	44.25		
	572	578	13:29	13:35	0:06	6	1.00	99	13;30	3800	79800	594	2.25	6.0	44.00		
	578	584.5	13:35	13:43	0:08	8	0.81	100	13:41	3800	83600	644	2.25	6.5	44.00		
	584.5	591	13:43	13:48	0:05	5	1.30	101	13:53	3800	87400	644	2.25	6.5	44.00		
	591	597.5	13:48	13:58	0:10	10	0.65	102	14:00	3800	91200	644	2.25	6.5	44.00		
	597.5	604	13:58	14:07	0:09	9	0.72			3800	95000	644	2.25	6.5	44.00		
end 9/25	604	610.5	14:07	14:14	0:07	7	0.93			3800	98800	644	2.25	6.5	44.00		
										98800		16426		164.0			
Logged By: JL																	

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

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Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										98,800		16426.13		6.0	6.331%	1,560,482	
26-Sep	610.5	617	8:24	8:35	0:11	11	0.59	103	8:24	3800	3800	629	2.25	6.5	43.00	244630	
	617	623.5	8:35	8:51	0:16	16	0.41	104	8:33	3800	7600	629	2.25	6.5	43.00		
	623.5	630	8:51	9:00	0:09	9	0.72	105	8:44	3800	11400	629	2.25	6.5	43.00		
	630	636.5	9:00	9:15	0:15	15	0.43	106	9:00	3800	15200	629	2.25	6.5	43.00		
	636.5	643	9:15	9:34	0:19	19	0.34	107	9:15	3800	19000	629	2.25	6.5	43.00		
	643	649.5	9:34	9:44	0:10	10	0.65	108	9:29	3800	22800	629	2.25	6.5	43.00		
	649.5	656	9:44	9:59	0:15	15	0.43	109	9:39	3800	26600	629	2.25	6.5	43.00		
	656	662.5	9:59	10:09	0:10	10	0.65	110	9:52	3800	30400	629	2.25	6.5	43.00		
	662.5	669	10:09	10:24	0:15	15	0.43	111	10:09	3800	34200	629	2.25	6.5	43.00		
	669	675.5	10:24	10:39	0:15	15	0.43	112	10:22	3800	38000	629	2.25	6.5	43.00		
	675.5	682	10:59	11:20	0:21	21	0.31	113	10:37	3800	41800	629	2.25	6.5	43.00	245560	
	682	688.5	11:20	11:43	0:23	23	0.28	114	11:17	3800	45600	629	2.25	6.5	43.00		
	688.5	695	11:43	12:01	0:18	18	0.36	115	11:41	3800	49400	629	2.25	6.5	43.00		
	695	701.5	12:01	12:14	0:13	13	0.50	116	11:50	3800	53200	629	2.25	6.5	43.00		
	701.5	708	12:14	12:27	0:13	13	0.50	117	12:00	3800	57000	629	2.25	6.5	43.00		
	708	714.5	12:27	12:35	0:08	8	0.81	118	12:12	3800	60800	629	2.25	6.5	43.00		
								119	12:24	3800	64600						
										64600						246110	
												10062.00		104.0			
Logged By: MGS																	

QA/QC INFORMATION
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Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										64,600		10062.00		6.4	6.758%	955,890	
								120	12:35	3,800	3,800						
26-Sep	714.5	721	12:35	12:46	0:11	11	0.59	121	12:46	3800	7600	629	2.25	6.5	43.00		
	721	727.5	12:46	13:01	0:15	15	0.43	122	13:00	3800	11400	629	2.25	6.5	43.00		
	727.5	734	13:01	13:17	0:16	16	0.41	123	13:17	3800	15200	629	2.25	6.5	43.00		
	734	740.5	13:17	13:37	0:20	20	0.33	124	13:37	3800	19000	629	2.25	6.5	43.00		
	740.5	747	13:37	13:51	0:14	14	0.46	125	13:52	3800	22800	629	2.25	6.5	43.00		
	747	753.5	13:51	14:03	0:12	12	0.54	126	14:03	3800	26600	629	2.25	6.5	43.00		
	753.5	760	14:03	14:43	0:40	40	0.16	127	14:43	3800	30400	629	2.25	6.5	43.00		laser dow, replaced with MM
	760	766.5	14:43	14:57	0:14	14	0.46	128	14:57	3800	34200	629	2.25	6.5	43.00		
	766.5	773	14:57	15:08	0:11	11	0.59	129	15:11	3800	38000	629	2.25	6.5	43.00		
	773	779.5	15:08	15:21	0:13	13	0.50	130	15:23	3800	41800	629	2.25	6.5	43.00		
	779.5	786	15:21	15:31	0:10	10	0.65	131	15:35	3800	45600	622	2.25	6.5	42.50		
	786	792.5	15:31	15:42	0:11	11	0.59	132	15:42	3800	49400	622	2.25	6.5	42.50		
	792.5	799	15:42	15:54	0:12	12	0.54	133	15:54	3800	53200	622	2.25	6.5	42.50		
	799	805.5	15:54	16:07	0:13	13	0.50	134	16:07	3800	57000	622	2.25	6.5	42.50		
	805.5	812	16:07	16:17	0:10	10	0.65	135	16:17	3800	60800	622	2.25	6.5	42.50		
	812	818.5	16:17	16:29	0:12	12	0.54	136	16:28	3800	64600	622	2.25	6.5	42.50		
	818.5	825	16:29	16:39	0:10	10	0.65	137	16:38	3800	68400	622	2.25	6.5	42.50	247630	
	825	831.5	16:39	16:50	0:11	11	0.59	138	16:50	3800	72200	622	2.25	6.5	42.50		
	831.5	838	16:50	17:02	0:12	12	0.54	139	17:02	3800	76000	614	2.25	6.5	42.00		
	838	844.5	17:02	17:16	0:14	14	0.46	140	17:16	3800	79800	614	2.25	6.5	42.00		
	844.5	850	17:16	17:32	0:16	16	0.34	141	17:27	3800	83600	520	2.25	5.5	42.00		

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	850	856.5	17:32	17:44	0:12	12	0.54	142	17:41	3800	87400	614	2.25	6.5	42.00		
	856.5	863	17:44	17:51	0:07	7	0.93	143	17:52	3800	91200	614	2.25	6.5	42.00		
	863	869.5	17:51	17:59	0:08	8	0.81	144	18:06	3800	95000	614	2.25	6.5	42.00		
	869.5	875	17:59	18:06	0:07	15	0.37			91200		520	2.25	5.5	42.00		
end	875	881.5	18:06	18:16	0:10	10	0.65					614	2.25	6.5	42.00		
												15986		167.0			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										91,200		15986		5.7	6.005%	1,518,694	
27-Sep	881.5	888	9:41	9:51	0:10	10	0.65	145	9:40	3800	3800	614	2.25	6.5	42.00		
	888	894.5	9:51	10:05	0:14	10	0.65	146	9:52	3800	7600	629	2.25	6.5	43.00		
	894.5	901	10:05	10:15	0:10	10	0.65	147	10:04	3800	11400	629	2.25	6.5	43.00		
	901	907.5	10:15					148	10:15	3800	15200	636	2.25	6.5	43.50		
	907.5	914		11:19	1:04	19	0.34	149	10:19	3800	19000	644	2.25	6.5	44.00		
	914	920.5	11:19	11:27	0:08	8	0.81	150	10:29	3800	22800	644	2.25	6.5	44.00		
	920.5	925	11:27	11:38	0:11	11	0.41	151	11:10	3800	26600	446	2.25	4.5	44.00		
										26600							
												4241		43.5			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										26,600		4241		6.3	6.603%	402,865	
27-Sep	925	927	11:27	11:38	0:11	11	0.18	152	11:30	3800	3800	196	2.25	2.0	43.50		

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	927	933.5	11:38	11:49	0:11	11	0.59	153	11:40	3800	7600	636	2.25	6.5	43.50		
	933.5	940	11:49	12:00	0:11	11	0.59	154	11:50	3800	11400	636	2.25	6.5	43.50		
	940	946.5	12:00	12:10	0:10	10	0.65	155	12:00	3800	15200	636	2.25	6.5	43.50		
	946.5	953	12:10	12:20	0:10	10	0.65	156	12:08	3800	19000	636	2.25	6.5	43.50		
	953	959.5	12:20	12:29	0:09	9	0.72	157	12:19	3800	22800	636	2.25	6.5	43.50		
	959.5	966	12:29	12:40	0:11	11	0.59	158	12:29	3800	26600	636	2.25	6.5	43.50		
	966	972.5	12:40	12:50	0:10	10	0.65	159	12:39	3800	30400	651	2.25	6.5	44.50		
	972.5	979	12:50	13:06	0:16	16	0.41	160	12:56	3800	34200	651	2.25	6.5	44.50		
	979	985.5	13:06	13:21	0:15	15	0.43	161	13:07	3800	38000	651	2.25	6.5	44.50		
	985.5	992	13:21	13:33	0:12	12	0.54	162	13:21	3800	41800	651	2.25	6.5	44.50		
	992	998.5	13:33	13:43	0:10	10	0.65	163	13:33	3800	45600	651	2.25	6.5	44.50		
	998.5	1005	13:43	13:56	0:13	13	0.50	164	13:43	3800	49400	651	2.25	6.5	44.50		
	1005	1011.5	13:56					165	13:56	3800	53200	0	2.25		44.50		
										53200							
	1011.5	1024.5		14:06	0:10	10	1.95					1952	2.25	19.5	44.50		**Actual length measured to be about 10 feet less than stationing. Reduced length calculated by 6.5 feet.**
												9870		99.5			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										53,200		9870		5.4	5.674%	937,668	
27-Sep	1024.5	1031	14:12					166	14:12	3800	3800	644	2.25	6.5	44.00		
	1031	1037.5		15:35	1:23	83	0.08	167	15:12	3800	7600	629	2.25	6.5	43.00		
	1037.5	1044	15:35					168	15:29	3800	11400	614	2.25	6.5	42.00		
end 9/27	1044	1050		16:04	0:29	29	0.21	169	16:08	3800	15200	554	2.25	6.0	41.00		

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
28-Sep	1050	1057	9:57	10:08	0:11	11	0.64	170	9:58	3800	19000	646	2.25	7.0	41.00		
										19000		3086		32.5			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										19,000		3086		6.2	6.481%	293,158	
28-Sep	1118	1109.5	13:38	13:57	0:19	19	0.45	171	12:30	3800	3800	650	2.25	8.5	34.00		
	1109.5	1101	13:57	14:21	0:24	24	0.35	172	13:52	3800	7600	650	2.25	8.5	34.00		
	1101	1092.5	14:21	14:33	0:12	12	0.71	173	14:07	3800	11400	650	2.25	8.5	34.00		
	1092.5	1084	14:33	15:35	1:02	62	0.14	174	14:21	3800	15200	650	2.25	8.5	34.00		
	1084	1075.5	15:35	15:53	0:18	18	0.47	175	14:34	3800	19000	650	2.25	8.5	34.00		
	1075.5	1068	15:53	16:20	0:27	27	0.28	176	15:35	3800	22800	608	2.25	7.5	36.00		
	1068	1060.5	16:20	16:37	0:17	17	0.44	177	16:10	3800	26600	641	2.25	7.5	38.00		
29-Sep	1060.5	1053	9:28	9:37	0:09	9	0.83	178	16:21	3800	30400	675	2.25	7.5	40.00		
	1053	1050	9:37	9:41	0:04	4	0.75	179	16:39	3800	34200	284	2.25	3.0	42.00		
										53200		8544		68.0			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										53,200		8544		6.2	6.554%	811,716	
29-Sep	1118	1134	12:13	14:45	2:32	152	0.11	180	12:16	3800	3800	1224	2.25	16.0	34.00		Squared off corner. Added approximately 6 feet to stationing from 11+18 to end.
	1134	1142.2	14:45	15:00	0:15	15	0.55	181	14:22	3800	7600	627	2.25	8.2	34.00		
	1142.2	1150.4	15:00	15:18	0:18	18	0.46	182	14:45	3800	11400	627	2.25	8.2	34.00		

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
								183	15:03	3800	15200						
end 9/29								184	15:25	3800	19000						
										19000		2479		32.4			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										19,000		2479		7.7	8.069%	235,467	
30-Sep	1150.4	1158.6	10:48	10:56	0:08	8	1.03	185	10:18	3800	3800	637	2.25	8.2	34.50		
	1158.6	1166.8	10:56	11:13	0:17	17	0.48	186	10:55	3800	7600	637	2.25	8.2	34.50		
	1166.8	1175.0	11:13	11:47	0:34	34	0.24	187	11:12	3800	11400	637	2.25	8.2	34.50		
	1175.0	1183.2	11:47	11:57	0:10	10	0.82	188	11:54	3800	15200	637	2.25	8.2	34.50		
	1183.2	1191.4	11:57	12:03	0:06	6	1.37	189	12:10	3800	19000	637	2.25	8.2	34.50		
	1191.4	1199.6	12:03	12:10	0:07	7	1.17	190	12:23	3800	22800	637	2.25	8.2	34.50		
	1199.6	1207.8	12:10	12:21	0:11	11	0.75	191	12:53	3800	26600	637	2.25	8.2	34.50		
	1207.8	1216.0	12:21	12:49	0:28	28	0.29	192	13:46	3800	30400	637	2.25	8.2	34.50		
	1216.0	1224.2	12:49	13:02	0:13	13	0.63	193	14:30	3800	34200	646	2.25	8.2	35.00		
	1224.2	1231.8	13:02	14:06	1:04	64	0.12	194	14:51	3800	38000	599	2.25	7.6	35.00		
	1231.8	1239.4	14:06	14:52	0:46	46	0.17	195	15:07	3800	41800	650	2.25	7.6	38.00		
	1239.4	1247.0	14:52	15:06	0:14	14	0.54	196	15:18	3800	45600	650	2.25	7.6	38.00		
	1247.0	1254.6	15:06	15:18	0:12	12	0.63	197	15:43	3800	49400	693	2.25	7.6	40.50		
	1254.6	1261.4	15:18	15:42	0:24	24	0.28	198	15:57	3800	53200	620	2.25	6.8	40.50		
	1261.4	1268.2	15:42	15:53	0:11	11	0.62	199	16:17	3800	57000	627	2.25	6.8	41.00		
	1268.2	1275.0	16:00	16:15	0:15	15	0.45	200	17:13	3800	60800	627	2.25	6.8	41.00		
	1275.0	1281.5	16:57	17:15	0:18	18	0.36					644	2.25	6.5	44.00		
	1281.5	1288.0	17:18	17:40	0:22	22	0.30					644	2.25	6.5	44.00		

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
										60800		11490		137.6			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										60,800		11490		5.3	5.570%	1,091,536	
1-Oct	1288.0	1294.5	8:25	8:37	0:12	12	0.54	201	8:26	3800	3800	629	2.25	6.5	43.00		
	1294.5	1301.0	8:37	8:50	0:13	13	0.50	202	8:37	3800	7600	629	2.25	6.5	43.00		
	1301.0	1307.5	8:50	9:02	0:12	12	0.54	203	8:50	3800	11400	629	2.25	6.5	43.00		
	1307.5	1314.0	9:02	9:15	0:13	13	0.50	204	9:04	3800	15200	629	2.25	6.5	43.00		
	1314.0	1320.5	9:15	10:00	0:45	45	0.14	205	9:16	3800	19000	629	2.25	6.5	43.00		
	1320.5	1327.0	10:00					206	11:00	3800	22800	633	2.25	6.5	43.25		
	1327.0	1333.5		11:06	1:06	66	0.10	207	11:07	3800	26600	633	2.25	6.5	43.25		
	1333.5	1340.0	11:06	11:25	0:19	19	0.34	208	11:19	3800	30400	633	2.25	6.5	43.25		
	1340.0	1346.5	11:25	11:47	0:22	22	0.30	209	11:32	3800	34200	636	2.25	6.5	43.50		
										34200		5678		58.5			
Logged By: MGS																	
Segment Summary										Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
										34,200		5678		6.0	6.340%	539,425	
3-Oct	1346.5	1353.0	8:45	8:54	0:09	9	0.72	210	8:45	3800	3800	629	2.25	6.5	43.00		
	1353.0	1359.5	8:54	9:10	0:16	16	0.41	211	8:54	3800	7600	636	2.25	6.5	43.50		
	1359.5	1366.0	9:10	10:01	0:51	51	0.13	212	9:04	3800	11400	644	2.25	6.5	44.00		
	1366.0	1372.5	10:01	10:17	0:16	16	0.41	213	9:14	3800	15200	651	2.25	6.5	44.50		Strat Corner
	1372.5	1379.0	10:17					214	9:55	3800	19000	658	2.25	6.5	45.00		
	1379.0	1385.5						215	10:05	3800	22800	658	2.25	6.5	45.00		

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
	1385.5	1392.0						216	10:17	3800	26600	622	2.25	6.5	42.50		
	1392.0	1398.5						217	10:27	3800	30400	622	2.25	6.5	42.50		
	1398.5	1405.0						218	10:45	3800	34200	622	2.25	6.5	42.50		
	1405.0	1411.5						219	10:55	3800	38000	585	2.25	6.5	40.00		
	1411.5	1418.0		11:13	0:56	56	0.81	220	11:08	3800	41800	585	2.25	6.5	40.00		
	1418.0	1424.5	11:13	11:48	0:35	35	0.19	221	11:20	3800	45600	585	2.25	6.5	40.00		End Corner
	1424.5	1431.0	11:48	12:07	0:19	19	0.34	222	11:55	3800	49400	585	2.25	6.5	40.00		
	1431.0	1437.5	12:07	12:21	0:14	14	0.46	223	12:07	3800	53200	585	2.25	6.5	40.00		
	1437.5	1444.0	12:21	12:35	0:14	14	0.46	224	12:21	3800	57000	585	2.25	6.5	40.00		
	1444.0	1450.5	12:35	12:55	0:20	20	0.33	225	12:57	3800	60800	585	2.25	6.5	40.00		
	1450.5	1457.0	12:55	13:21	0:26	26	0.25	226	13:22	3800	64600	585	2.25	6.5	40.00		
	1457.0	1463.5	13:21					227	21-Sep	3800	68400	585	2.25	6.5	40.00		Bags added during first segment
	1463.5	1470.0						228	21-Sep	3800	72200	585	2.25	6.5	40.00		Bags added during first segment
	1470.0	1476.5						229	21-Sep	3800	76000	585	2.25	6.5	40.00		Bags added during first segment
	1476.5	1480.0		14:00	0:39	39	0.59					315	2.25	3.5	40.00		Overlap 14+65 to 14+80
										76000		12490		133.5			

Logged By: MGS

Segment Summary	Total Bent. Added (lbs)		Total Volume of Soil Treated in Trench (cf)		Bentonite Added (lbs/cf)	Bentonite Added in Percent of Dry Soil Weight	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	
	76,000		12490		6.1	6.405%	1,186,580	

PROJECT SUMMARY

Date Segment Completed	Starting Station	Ending Station	Total Length of Segment	Total Dry Weight of Soil Treated at 95 lb/cf (lbs)	Weight of Bentonite Added to Segment (lbs)	Bentonite Added in Percent of Dry Weight of Soil Treated	Permeability Sample Number	Perm Sample Station	Perm Results

QA/QC INFORMATION
SOIL-BENTONITE CUTOFF WALL (SBCW) CONSTRUCTION
BSB PROPERTY, KENT, WASHINGTON

Date	Starting Station	Ending Station	Time Segment Started	Time Segment Ended	Elaspsed Time For Segment	Elapsed Time as a Number for Calc.	Rate of Slurry Wall Install. (ft/min.)	Bentonite Bag Number	Time 3,800 lbs Bentonite Added to Trench	Bentonite Added (lbs)	Accm. Bentonite Added (lbs)	Cubic Feet of Soil in Trench Per Segment	Trench Width	Segment Length (ft)	Slurry Trench Depth From Key Trench Surface (ft)	Water Meter Reading (cf)	Notes
9/22/2011		1480.0		43.5		150.5		1,238,521		76,000		6.14%		SW-01		15+00	
9/23/2011		43.5		125.0		81.5		670,694		41,800		6.23%		SW-02		0+40	
9/23/2011		125.0		225.0		100.0		855,160		49,400		5.78%		SW-03		2+00	
9/23/2011		225.0		298.0		73.0		592,943		38,000		6.41%					
9/23/2011		298.0		350.0		52.0		464,105		34,200		7.37%		SW-04		3+50	
9/24/2011		350.0		446.5		96.5		937,027		57,000		6.08%					
9/25/2011		446.5		610.5		164.0		1,560,482		98,800		6.33%		SW-05		5+00	
9/26/2011		610.5		714.5		104.0		955,890		64,600		6.76%		SW-06		6+50	
9/26/2011		714.5		881.5		167.0		1,518,694		91,200		6.01%		SW-07		8+35	
9/27/2011		881.5		940.0		58.5		402,865		26,600		6.60%		SW-08		9+35	
9/27/2011		925.0		1024.5		99.5		937,668		53,200		5.67%					
9/27/2011 and 9/28/2011		1024.5		1057.0		32.5		293,158		19,000		6.48%		SW-09		10+50	
9/28/2011		1050.0		1118.0		68.0		811,716		53,200		6.55%					
9/29/2011		1118.0		1150.4		32.4		235,467		19,000		8.07%					
9/30/2011		1150.4		1288.0		137.6		1,091,536		60,800		5.57%		SW-10		12+00	
10/1/2011		1288.0		1346.5		58.5		539,425		34,200		6.34%		SW-11		13+52	
10/3/2011		1346.5		1480.0		133.5		1,186,580		76,000		6.40%					
TOTALS						**1609.0**		**14,291,929**		**893,000**		**6.25%**					

APPENDIX G

Boring Logs for New Piezometers

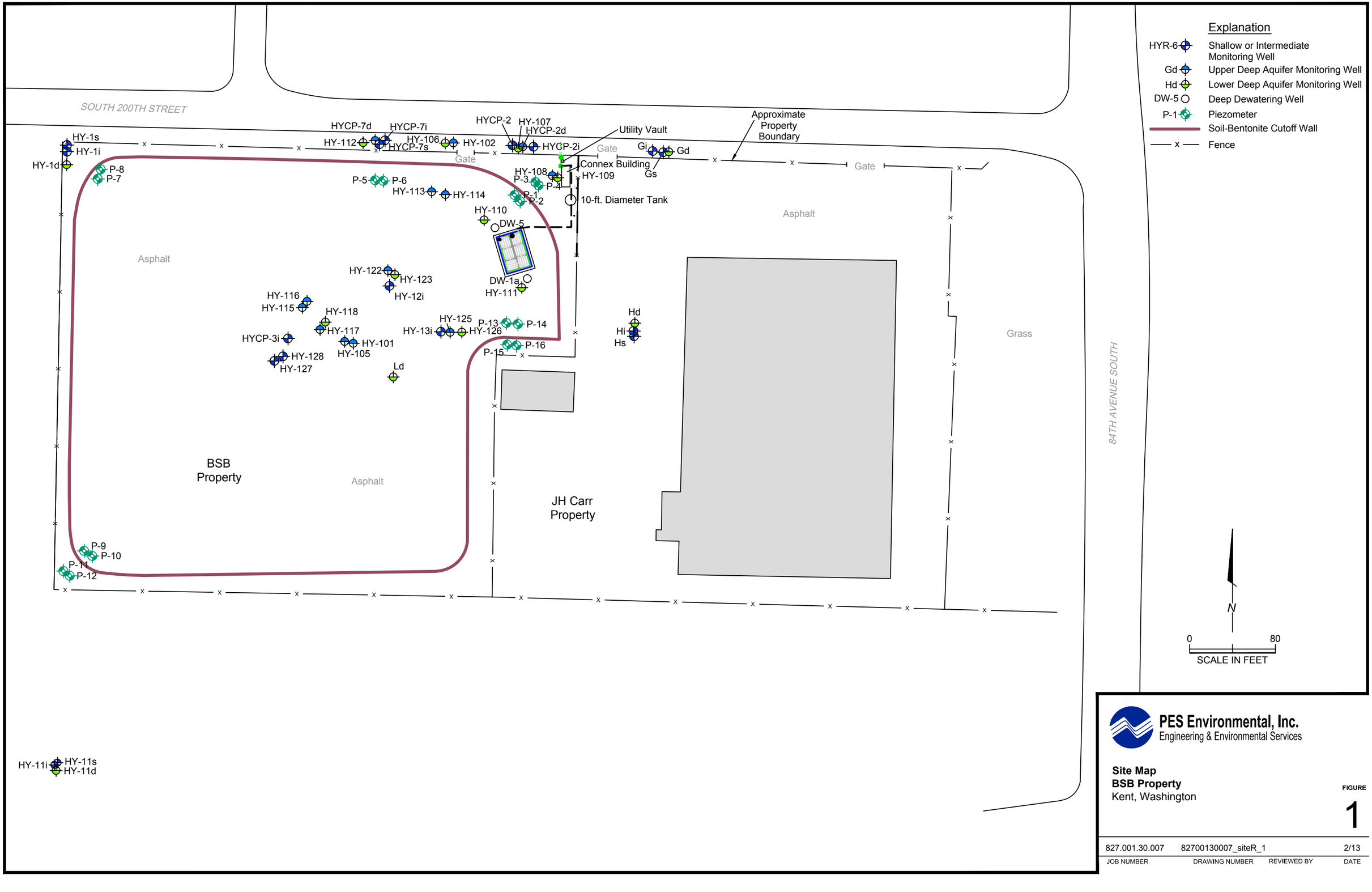
Appendix G
Monitoring Nework Completion Details Updated After Site Paving
BSB Property, Kent, Washington

Well	Date Installed	Northing	Easting	Monitoring Point Elevation	Ground Surface Elevation	Surface Casing Rim Elevation	Well Type	Monument	Boring Depth	Screen Depth	Filter Pack Depth	Seal Depth
Shallow Aquifer Zone Monitoring Wells												
Gs	7/9/87	157,364.02	1,294,758.01	26.90	27.32	27.32	2" SS, 0.010" slot size	Above	17.5	5.5 - 15.5	3.5 - 15.5	0 -3.5
Hs	7/6/87	157,192.46	1,294,730.88	25.94	26.45	26.45	2" SS, 0.010" slot size	Flush	18	5 - 15	3 - 18	0 - 3
HY-1s	6/25/82	157,370.15	1,294,202.42	30.16	29.93	30.21	2" PVC	Above	20.5	14 - 19	10 - 20.5*	0 - 10
HY-11s	12/20/85	156,795.46	1,294,193.52	31.14	31.50	31.46	2" PVC, 0.010" slots	Flush	18	8 - 18	6 - 18	0 - 6
HYCP-2	12/3/84	157,370.41	1,294,617.54	26.42	27.52	27.52	2" Sch 80 PVC, 0.010" slots	Above	28	8 - 28	6 - 28	0 - 6
HYCP-6	12/3/84	157,247.92	1,294,672.18	29.47	–	29.64	2" Sch 80 PVC, 0.010" slots	Above	28	8 - 28	6 - 28	0 - 6
HYCP-7s	12/08/11	157,371.47	1,294,493.49	26.49	26.70	26.92	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	14	9 - 14	7 - 14	0 - 7
Shallow Aquifer Zone Piezometers												
P-1	12/06/11	157,324.11	1,294,619.47	27.19	27.48	27.48	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	14	9 - 14	7 - 14	0 - 7
P-3	12/06/11	157,336.05	1,294,639.01	26.49	26.78	26.78	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	17	12 - 17	10 - 17	0 - 10
P-5	12/08/11	157,337.90	1,294,489.50	28.36	28.71	28.71	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	14	9 - 14	7 - 14	0 - 7
P-7	12/09/11	157,339.12	1,294,230.94	29.64	30.01	30.01	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	19	14 - 19	12 - 19	0 - 12
P-9	12/14/11	156,992.66	1,294,218.30	32.39	32.80	32.80	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	15	10 - 15	8 - 15	0 - 8
P-11	12/08/11	156,973.90	1,294,198.97	32.60	32.95	32.98	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	15	10 - 15	8 - 15	0 - 8
P-13	12/07/11	157,204.98	1,294,611.83	29.13	29.43	29.43	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	16	11 - 16	9 - 16	0 - 9
P-15	12/07/11	157,184.84	1,294,612.59	29.25	29.75	29.79	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	16	11 - 16	9 - 16	0 - 9
Intermediate Aquifer Zone Monitoring Wells												
Gi	7/9/87	157,365.03	1,294,748.17	27.28	27.36	27.36	2" SS, 0.010" slot size	Above	41	28 - 38	25 - 41	0 - 25
Hi	7/6/87	157,197.41	1,294,730.68	26.04	26.25	26.25	2" SS, 0.010" slot size	Flush	40	28 - 38	25 - 40	0 - 25
HY-1i	12/13/85	157,364.46	1,294,202.31	30.76	29.92	31.01	2" Sch 80 PVC, 0.010" slots	Above	80	30 - 40	28 - 42	0 - 28, 42 - 52^
HY-11i	12/20/85	156,793.43	1,294,190.90	31.12	31.23	31.42	2" Sch 80 PVC, 0.010" slot size	Flush	38	26 - 36	24 - 38	0 - 24
HY-12i	1/26/11	157,239.44	1,294,502.80	29.90	30.26	30.26	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	41.74	31.54 - 41.44	29.04 - 41.44	0 - 29.04
HY-13i	1/26/11	157,196.73	1,294,550.87	29.59	30.04	30.07	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	41.01	26.19 - 40.71	28.31 - 40.71	0 - 28.31
HYCP-2i	1/8/08	157,369.19	1,294,637.20	25.74	26.02	26.02	2" Sch 40 pre-packed PVC, 0.010" slots	Flush	35.5	24.8 - 34.8	22 - 35.5	0 - 22
HYCP-3i	12/1/84	157,190.49	1,294,408.30	30.32	30.59	30.65	2" Schedule 80 PVC	Flush	34.70	23.70 - 33.70	21.70 - 33.70	0 - 21.70
HYCP-7i	1/7/08	157,375.07	1,294,498.73	25.75	26.10	26.10	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	35	23.8 - 33.8	21 - 35	0 - 21
Intermediate Aquifer Zone Piezometers												
P-2	12/06/11	157,318.23	1,294,624.62	26.98	27.42	27.42	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	34	24 - 34	22 - 34	0 - 22
P-4	12/06/11	157,333.17	1,294,641.75	26.44	26.79	26.79	1.5" Schedule 40 pre-pack PVC, 0.010" slot size	Flush	39	29 - 39	27 - 39	0 - 27
P-6	12/08/11	157,337.32	1,294,497.12	28.25	28.66	28.66	1.5" (or 1") Schedule 40 pre-pack PVC	Flush	38	28 - 38	25 - 38	0 - 25
P-8	12/09/11	157,348.05	1,294,233.80	29.45	29.82	29.85	1.5" (or 1") Schedule 40 pre-pack PVC	Flush	38	28 - 38	25 - 38	0 - 25
P-10	12/14/11	156,987.94	1,294,225.89	32.40	32.85	32.85	1.5" (or 1") Schedule 40 pre-pack PVC	Flush	37	27 - 37	25 - 37	0 - 25
P-12	12/09/11	156,969.51	1,294,204.89	32.40	33.06	33.09	1.5" (or 1") Schedule 40 pre-pack PVC	Flush	37	27 - 37	25 - 37	0 - 25
P-14	12/07/11	157,203.95	1,294,622.57	28.91	29.36	29.36	1.5" (or 1") Schedule 40 pre-pack PVC	Flush	31	21 - 31	19 - 31	0 - 19
P-16	12/07/11	157,183.97	1,294,621.27	29.25	29.78	29.78	1.5" (or 1") Schedule 40 pre-pack PVC	Flush	31	21 - 31	19 - 31	0 - 19
Deep Aquifer Zone Monitoring Wells												
DW-1a	9/21/09	157,246.42	1,294,631.18	27.91	28.36	28.36	12" Schedule 40 PVC	Above	62.81	44.81 - 61.81	38.81 - 62.81	0 - 38.81
DW-5	9/22/09	157,293.52	1,294,601.20	27.74	28.37	28.33	12" Schedule 40 PVC	Above	66.63	47.63 - 60.63	39.63 - 62.63	0 - 39.63
Gd	7/9/87	157,364.39	1,294,763.27	26.61	25.07	27.08	2" SS, 0.010" slot size	Above	73.5	56 - 66	53 - 70	0 - 53
Hd	7/6/87	157,204.76	1,294,731.54	26.02	26.11	26.33	2" SS, 0.010" slot size	Flush	71	57 - 67	53 - 71	0 - 53
HY-1d	12/18/85	157,352.25	1,294,202.38	31.44	30.13	31.78	2" Sch 80 PVC, 0.010" slot size	Above	96.36	84.36 - 94.36	81.36 - 96.36	0 - 81.36

Appendix G
Monitoring Nework Completion Details Updated After Site Paving
BSB Property, Kent, Washington

Well	Date Installed	Northing	Easting	Monitoring Point Elevation	Ground Surface Elevation	Surface Casing Rim Elevation	Well Type	Monument	Boring Depth	Screen Depth	Filter Pack Depth	Seal Depth
HY-11d	12/20/85	156,788.15	1,294,192.19	31.08	31.37	31.46	2" Sch 80 PVC, 0.010" slot size	Flush	94.53	82.03 - 92.03	80.03 - 94.53	0 - 80.03
HY-101	12/15/09	157,185.78	1,294,469.14	30.13	30.53	28.93	2" Sch 80 PVC, 0.010" slot size	Flush	75.61	65.51 - 75.41	63.61 - 76.61	0 - 63.61
HY-102	2/12/10	157,372.56	1,294,562.45	26.01	25.86	26.20	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	62.5	44.3 - 62.1	42 - 62.5	0 - 42
HY-105	12/16/09	157,187.46	1,294,461.14	30.13	30.60	30.61	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	54.7	43.3 - 53.1	43.7 - 64.2	0 - 43.7
HY-106	2/11/10	157,372.49	1,294,554.87	25.97	25.90	26.21	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	80.5	60.0 - 77.9	58 - 79	0-58, 79-80.5
HY-107	2/10/10	157,367.91	1,294,622.92	25.86	25.92	26.16	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	76	58.7 - 73.6	57 - 75	0-57, 75-76
HY-108	2/16/10	157,342.32	1,294,654.69	26.19	26.44	26.44	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	57	43.8 - 56.3	41.5 - 57	0 - 41.5
HY-109	2/15/10	157,340.42	1,294,659.50	26.35	26.44	26.50	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	71.9	55.7 - 70.7	53.9 - 71.9	0 - 53.9
HY-110	2/8/10	157,300.98	1,294,591.26	28.28	28.62	28.62	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	75.51	60.11 - 75.21	57.91 - 75.51	0 - 57.91
HY-111	2/9/10	157,237.99	1,294,626.18	28.35	28.58	28.61	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	71.67	60.67 - 70.47	58.67 - 71.67	0 - 58.67
HY-112	5/5/10	157,372.85	1,294,478.29	27.09	27.41	27.51	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	80.5	60.7 - 78.2	58 - 80	0-58, 80-80.5
HY-113	4/30/10	157,326.93	1,294,542.21	28.20	28.46	28.50	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	60.46	45.06 - 59.96	43.96 - 60.46	0 - 43.96
HY-114	4/29/10	157,324.53	1,294,554.67	28.23	28.43	28.43	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	76.88	58.98 - 76.48	55.88 - 76.88	0 - 55.88
HY-115	5/4/10	157,219.31	1,294,421.87	30.12	30.41	30.41	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	59.62	48.92 - 55.38	46.62 - 59.62	0 - 46.62
HY-116	5/3/10	157,225.08	1,294,426.15	29.71	30.36	30.36	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	77.99	59.59 - 77.09	56.99 - 77.99	0 - 56.99
HY-117	5/13/10	157,198.62	1,294,438.32	30.11	30.58	30.58	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	57.7	48.7 - 56.3	46.7 - 56.7	0 - 46.7, 56.7 -57.7
HY-118	5/6/10	157,205.51	1,294,443.01	29.89	30.55	30.55	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	77.68	58.08 - 75.68	55.68 - 76.68	0 - 55.68
HY-119	5/12/10	157,443.95	1,294,631.07	25.23	25.58	25.59	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	58	42.9 - 57.8	42 - 58	0 - 42
HY-120	5/11/10	157,443.86	1,294,643.08	25.24	25.56	25.56	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	75	58.2 - 73.1	56 - 74	0 - 56, 74 - 75
HY-121	5/10/10	157,434.29	1,294,744.33	24.84	25.13	25.12	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	73	62.8 - 70.3	60 - 71	0 - 60, 71 - 73
HY-122	1/17/11	157,253.78	1,294,501.19	29.71	30.18	30.18	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	65.9	52.3 - 64.8	50.9 - 65.9	0 - 50.9
HY-123	1/14/11	157,249.84	1,294,507.87	29.76	30.18	30.18	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	80.98	66.78 - 79.38	64.98 - 79.98	0 - 64.98
HY-125	1/20/11	157,196.34	1,294,559.26	29.60	30.00	30.02	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	61.21	50.31 - 60.01	48.21 - 61.21	0 - 48.21
HY-126	1/19/11	157,196.45	1,294,570.21	29.59	29.87	29.87	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	72.96	60.96 - 70.66	59.96 - 72.96	0 - 59.96
HY-127	1/25/11	157,169.62	1,294,395.68	30.49	30.79	29.43	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	65.4	53 - 65.4	50.4 - 65.4	0 - 50.4
HY-128	1/24/11	157,173.89	1,294,403.66	30.32	30.75	30.79	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	86.5	66.8 - 84.6	64.5 - 86.5	0 - 64.5
HYCP-2d	1/8/08	157,369.03	1,294,627.14	25.60	25.91	30.75	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	60	49.4 - 59.4	47 - 60	0 - 47
HYCP-7d	1/7/08	157,374.91	1,294,489.46	26.05	26.27	26.50	2" Sch 40 pre-pack PVC, 0.010" slot size	Flush	60	49.0 - 59.0	47 - 60	0 - 47

Notes:
1. Northing/Easting relative to the WA State Plane System North Zone (NAD 83); based on King County survey control monuments 5832 and 5692.
2. Elevations in feet relative to the North American Vertical Datum (NAVD) of 1988; based on city of Kent benchmark #939 (elevation 27.20 ft), located at the intersection of South 200th Street and 81st Avenue South.
3. All depths shown in feet below ground surface.
4. Abbreviations:
   a. SS = stainless steel, PVC = polyvinyl chloride, Sch = schedule.
   b. Above = above-grade completion, Flush = flush-with-grade completion.
   c. – = not available.
5. Completion notes:
   a. * = lower portion of filter pack includes native material.
   b. ^ = boring wall caved in 52 - 80 feet bgs.



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Site Map
BSB Property
Kent, Washington

FIGURE
1

827.001.30.007	82700130007_siteR_1		2/13
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

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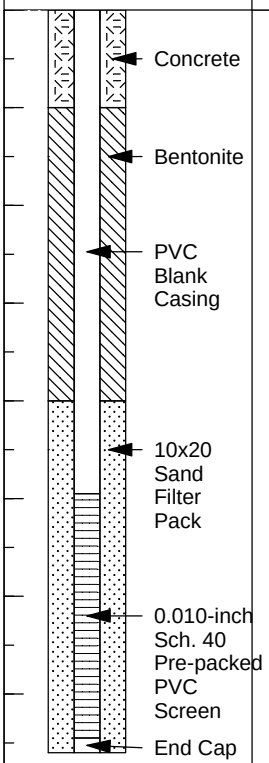
LOG OF MONITORING WELL: HY-7s



Depth (Feet)	PID (PPM)	Sample ID	Blow Count	Sample Recovery	Lithologic Description
0					Brown Silty Sand (SM), moist, loose, fine to coarse, little fine gravel, (FILL)
2				36	BROWN SILT (ML), medium plasticity, iron oxide staining throughout
					Note: 3 to 5 feet: No Recovery
4					
					@ 5 feet: wet, very soft, trace fine sand
6					
				30	
8					Note: 7.5 to 10 feet: No Recovery
					BLACK SAND (SP), wet, fine, few fines
10					
				24	
12					Note: 12 to 14 feet: No Recovery
14					
				24	
16					GRAY SILT (ML), medium plasticity
					Bottom of boring @ 16 feet.
18					Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe and a 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand.
20					Total Well Depth: 15.2 feet. Well Sump/Endcap: 14.9 to 15.2 feet. Well Screen: 9.9 to 14.9 feet. Well Blank: 0 to 9.9 feet. Filter Pack: 8 to 15.2 feet (10x20 Colorado Silica). Well Seal: 2 to 8 (hydrated bentonite chips). Surface Seal: 0.7 to 2 feet (concrete). Well Monument: Flush with grade steel monument.
22					
24					
26					
28					
30					

Project: BSB Shallow CA Start Up
Project Number: 827.001.24
Site Location: Kent, Washington
Logged By: L.Doody
Notes: Ecology Well Tag Number: BHK 263

Total Drilled Depth: 16 feet
Diameter of Boring: 3.5-inches
Drill Date: 12/08/11
Drilled By: Cascade Drilling L.P.
Drill Method: GeoProbe 6600

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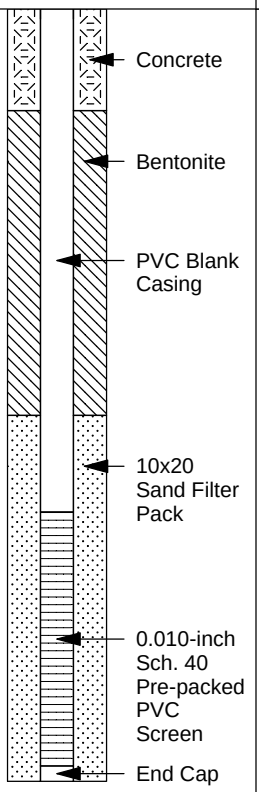
LOG OF PIEZOMETER: P-1



Sample ID	Sample Recovery	Depth (Feet)	Lithologic Description
		0	ASPHALT
			BROWN SILTY SAND WITH GRAVEL (FILL)
	24	2	BROWNISH GRAY SILTY SAND WITH GRAVEL (SM), dry, loose, little fines, few fine gravel
		4	@ 3 to 5 feet: little recovery, contact location inferred
			GRAY SILT (ML), wet, soft, medium plasticity, iron oxide staining throughout
	48	6	
		8	
		10	BLACK SAND (SP), wet, dense, fine, trace fines
		12	@ 12 feet: 6-inch interbed of gray, soft, medium plasticity silt (ML)
	60	14	@ 12.5 to 15.2 feet: few fines
		16	Bottom of boring @ 15.2 feet.
			Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand.
		18	Total Well Depth: 15.2 feet. Well Sump/Endcap: 14.9 to 15.2 feet. Well Screen: 9.9 to 14.9 feet. Well Blank: 0 to 9.9 feet. Filter Pack: 8 to 15.2 feet (10x20 Colorado Silica). Well Seal: 2 to 8 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.
		20	
		22	
		24	
		26	
		28	
		30	

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.30.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 257

Total Drilled Depth: 15.2 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/06/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-16

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
End Cap Native Material (fill)				30		
				32		Bottom of boring @ 31 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 30.4 feet. Well Sump/Endcap: 30.1 to 30.4 feet. Well Screen: 25.1 to 30.1 feet. Well Blank: 0 to 25.1 feet. Filter Pack: 23.5 to 30.4 feet (10x20 Colorado Silica). Well Seal: 2 to 23.5 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.
				34		
				36		
				38		
				40		
				42		
				44		
				46		
				48		
				50		
				52		
				54		
				56		
				58		
				60		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 259

Total Drilled Depth: 31 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/07/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-2

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
Concrete				0		ASPHALT
						BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel
Bentonite		36		2		BROWNISH GRAY SILT (ML), moist, hard, medium plasticity, iron oxide staining throughout
				4		
						@ 5 feet: 6-inch interbed of sandy silt with gravel, wet
				6		
		60		8		@ 8 feet: 6-inch interbed of sand with silt (SP) @ 8.5 feet: gray, soft, few fine sand
				10		@ 10 feet: brown, some fine sand
				12		BLACK SAND (SP), wet, fine
		48				GRAY SILT (ML), wet, soft, medium plasticity
				14		@ 13 feet: little fine sand, low plasticity
PVC Blank Casing				16		Note: 15 to 20 feet: No recovery, contact location inferred
		0		18		
				20		GRAY SILTY SAND (SM), wet, loose, fine, some fines
				22		GRAY SILT (ML), wet, soft, little fine sand, medium plasticity
		36				@ 22.5 feet: 3-inch interbed of sand (SP) Note: 23 to 26 feet: Little recovery, contact location inferred
				24		BLACK SAND (SP), wet, loose, fine to medium, few fines
				26		
		48				
10x20 Sand Filter Pack				28		
				30		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 255

Total Drilled Depth: 34.5 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/06/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
0.010-inch Sch. 40 Pre-packed PVC Screen End Cap		54		30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60		PINKISH GRAY SILT (ML), wet, very soft, sticky Bottom of boring @ 34.5 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 34.5 feet. Well Sump/Endcap: 34.2 to 34.5 feet. Well Screen: 29.2 to 34.2 feet. Well Blank: 0 to 29.2 feet. Filter Pack: 27 to 34.5 feet (10x20 Colorado Silica). Well Seal: 2 to 27 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 255

Total Drilled Depth: 34.5 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/06/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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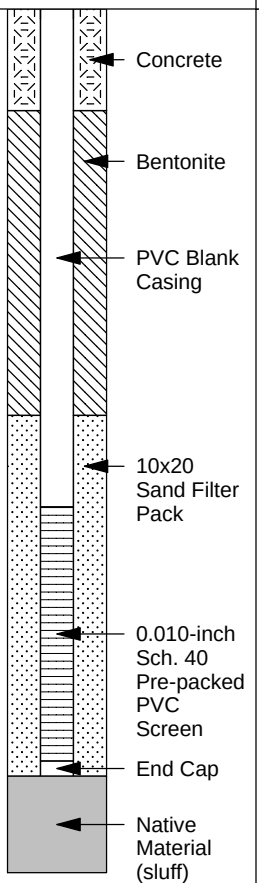
LOG OF PIEZOMETER: P-3



Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
			0		ASPHALT
			2		BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel
	42		4		BROWNISH GRAY SILTY SILTY SAND (SM), moist, loose, fine to coarse, little fines, few fine to coarse gravel @ 5 feet: few organics
			6		@ 7 feet: few fines (SP)
	54		8		GRAY SILT (ML), soft, few fine sand, medium plasticity @ 9 feet: increasing sand
			10		BLACK SAND (SP), wet, dense, fine, trace fines
	60		12		@ 12.3 feet: 8-inch interbed of gray, high plasticity silt, elastic @ 13 feet: few fines
			14		@ 14.5 feet: trace fines
	24		16		GRAY SILT (ML), soft, medium plasticity
			18		Bottom of boring @ 17 feet.
			20		Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand.
			22		Total Well Depth: 15.1 feet. Well Sump/Endcap: 14.8 to 15.1 feet. Well Screen: 9.8 to 14.8 feet. Well Blank: 0 to 9.8 feet. Filter Pack: 8 to 15.1 feet (10x20 Colorado Silica). Well Seal: 2 to 8 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.
			24		
			26		
			28		
			30		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 256

Total Drilled Depth: 17 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/06/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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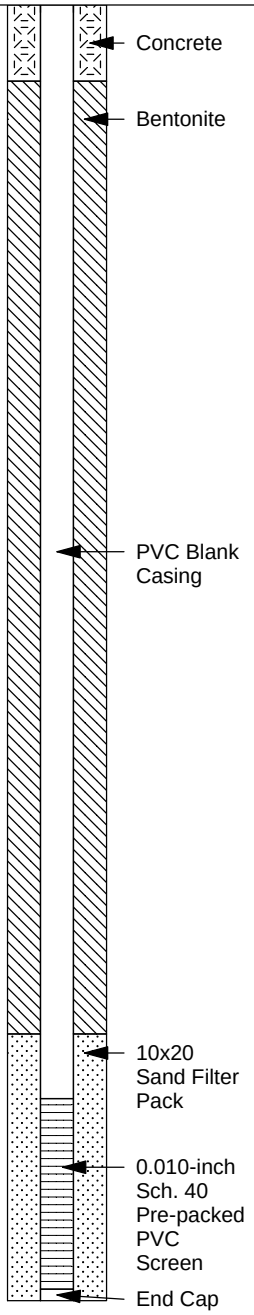
Engineering & Environmental Services

LOG OF PIEZOMETER: P-4

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
				0		Boring not logged for lithology. See adjacent boring P-4A for lithology. Drove 3.5 inch casing with steel tip to 34 feet below ground surface (bgs) and installed piezometer. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 34 feet. Well Sump/Endcap: 33.7 to 34 feet. Well Screen: 28.7 to 33.7 feet. Well Blank: 0 to 28.7 feet. Filter Pack: 27 to 34 feet (10x20 Colorado Silica). Well Seal: 2 to 27 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.
				34		Bottom of boring @ 34 feet.

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number: BHK 254

Total Drilled Depth: 34 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/06/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-4A

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
				0		ASPHALT
						BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel
		26		2		GRAY SILTY SAND (SM), wet, loose, fine to coarse, some fines, trace gravel
				4		
				6		
		24		8		
← Bentonite				10		
				12		
		0		14		
				16		
				18		
		0		20		
				22		
		24				Note: 22 to 25 feet: Little recovery, contact location inferred
				24		BLACK SAND WITH SILT (SP), wet, dense, fine, few fines
				26		
		36		28		
				30		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Boring abandoned with bentonite chips.

Total Drilled Depth: 39 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/06/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-4A

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
		36		30		
				32		
				34		Note: 3-inches of pinkish gray, sticky silt at bottom of sample from 30 to 35 feet.
		48		36		
				38		
				40		Bottom of boring @ 39 feet. Boring abandoned with bentonite chips. Moved 2.5 feet to the NW of P-4A and installed P-4 from 29 to 34 feet, see P-4 boring log for well completion details.
				42		
				44		
				46		
				48		
				50		
				52		
				54		
				56		
				58		
				60		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Boring abandoned with bentonite chips.

Total Drilled Depth: 39 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/06/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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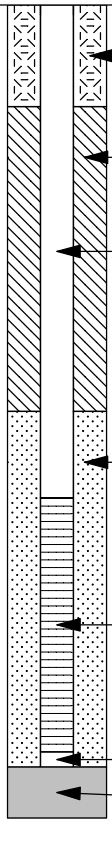
LOG OF PIEZOMETER: P-5

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
		60 60 60		0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30		ASPHALT BROWN SILTY SAND (SM), moist, loose, little fines BROWN SILT (ML), iron oxide staining throughout @ 8 feet: gray BLACK SAND (SP), wet, fine to medium, trace fines GRAY SILT (ML), wet, medium plasticity GRAY SILTY SAND (SM), wet, fine to medium, some fines BLACK SAND (SP), wet, fine to medium, trace fines Bottom of boring @ 16 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 15 feet. Well Sump/Endcap: 14.7 to 15 feet. Well Screen: 9.7 to 14.7 feet. Well Blank: 0 to 9.7 feet. Filter Pack: 8 to 15 feet (10x20 Colorado Silica). Well Seal: 2 to 8 (hydrated bentonite chips). Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 264

Total Drilled Depth: 16 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/08/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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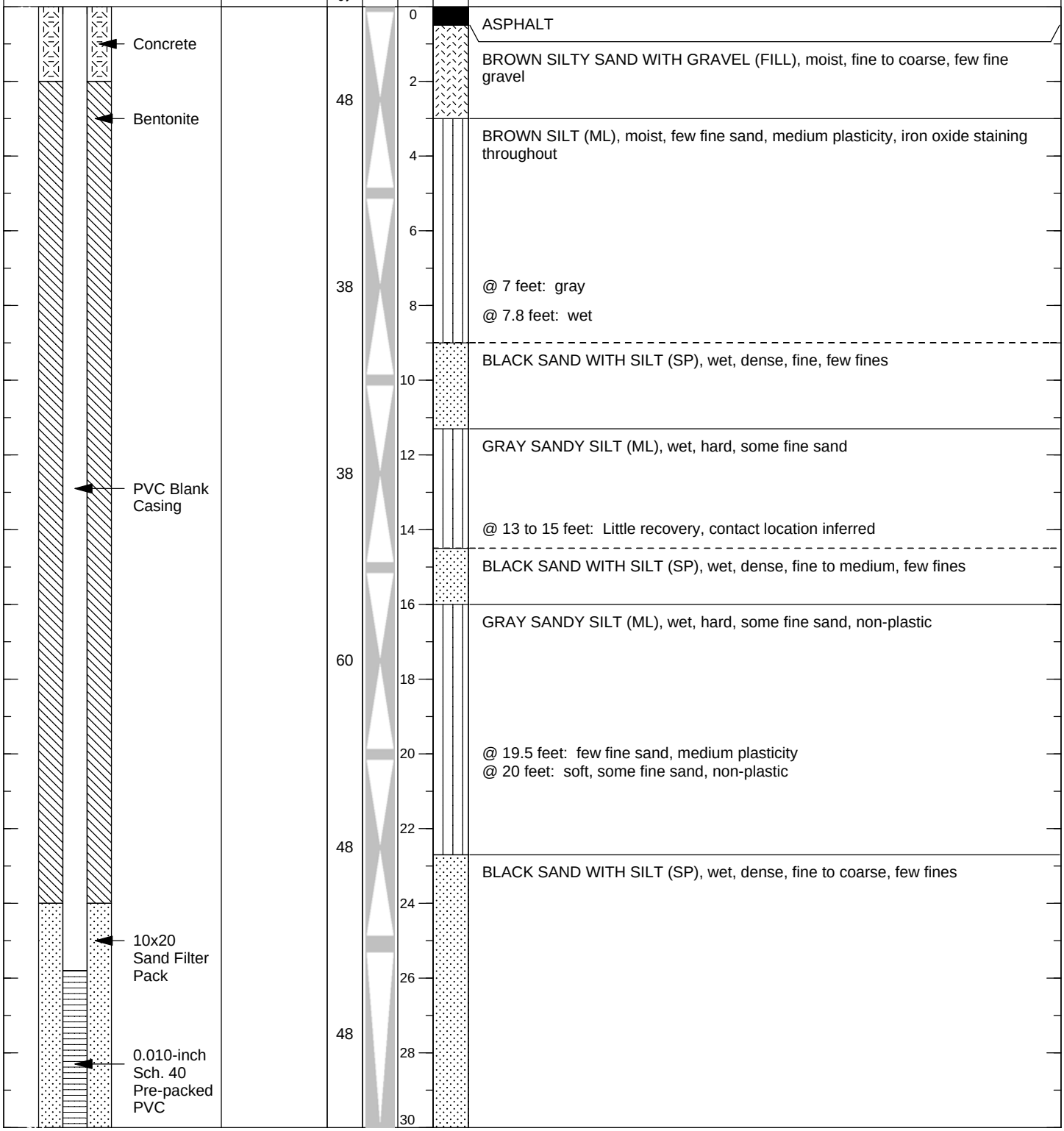
LOG OF PIEZOMETER: P-6



Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.30.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 262

Total Drilled Depth: 38 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/08/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-6

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
Screen End Cap 10x20 Sand Native Material (sluff)		48 24		30 32 34 36 38		@ 35.7 feet: 6-inch interbed of pinkish gray, sticky silt (ML)
				40 42 44 46 48 50 52 54 56 58 60		Bottom of boring @ 38 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 31.1 feet. Well Sump/Endcap: 30.8 to 31.1 feet. Well Screen: 25.8 to 30.8 feet. Well Blank: 0 to 25.8 feet. Filter Pack: 24 to 35 feet (10x20 Colorado Silica). Well Seal: 2 to 24 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.30.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 262

Total Drilled Depth: 38 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/08/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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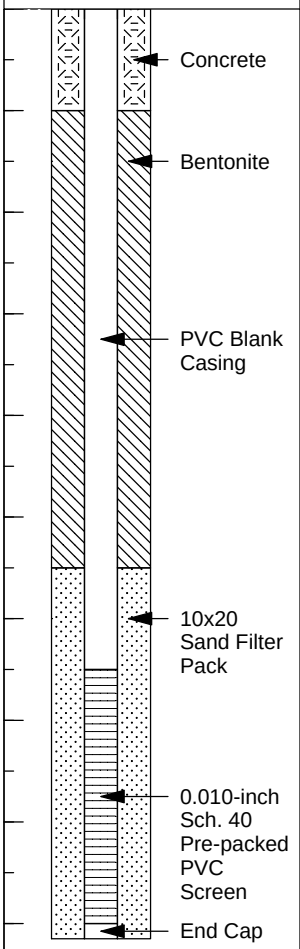
LOG OF PIEZOMETER: P-7

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
		60		0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30		Note: Boring not sampled from 0 to 13 feet. See adjacent boring P-8 for lithology from 0 to 13 feet. BLACK SAND (SP), wet, dense, fine to medium, trace fines Bottom of boring @ 18.3 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 18.3 feet. Well Sump/Endcap: 18 to 18.3 feet. Well Screen: 13 to 18 feet. Well Blank: 0 to 13 feet. Filter Pack: 11 to 18.3 feet (10x20 Colorado Silica). Well Seal: 2 to 11 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 277

Total Drilled Depth: 18.3 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/09/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-8

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
Concrete				0		ASPHALT
				2		BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel
Bentonite		48				LIGHT BROWN SANDY SILT (ML), dry, some fine sand, low plasticity
				4		
				6		@ 6.5 feet: bluish gray
		48		8		@ 8 feet: wet, soft, medium plasticity, trace organic material
				10		@ 10 feet: pinkish gray
				12		@ 12 feet: bluish gray
PVC Blank Casing		48		14		BLACK SAND (SP), wet, loose, fine to medium, trace fines
				16		
		54		18		@ 17.5 feet: grading to silty sand
				20		BROWNISH GRAY SILT (ML), wet, soft, medium plasticity, abundant organic material @ 20 feet: 6-inch interbed of blackish brown organic material
				22		BLACK SAND (SP), wet, dense, fine, trace fines
		30		24		
				26		
10x20 Sand Filter Pack		42		28		
				30		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 276

Total Drilled Depth: 38.3 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/09/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
0.010-inch Sch. 40 Pre-packed PVC Screen End Cap		48 36		30 32 34 36 38		@ 35.5 to 36.3 feet: interbedded sand and silt
				40 42 44 46 48 50 52 54 56 58 60		Bottom of boring @ 38.3 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 38.3 feet. Well Sump/Endcap: 28 to 38 feet. Well Screen: 28 to 38 feet. Well Blank: 0 to 28 feet. Filter Pack: 26 to 38 feet (10x20 Colorado Silica). Well Seal: 2 to 26 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 276

Total Drilled Depth: 38.3 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/09/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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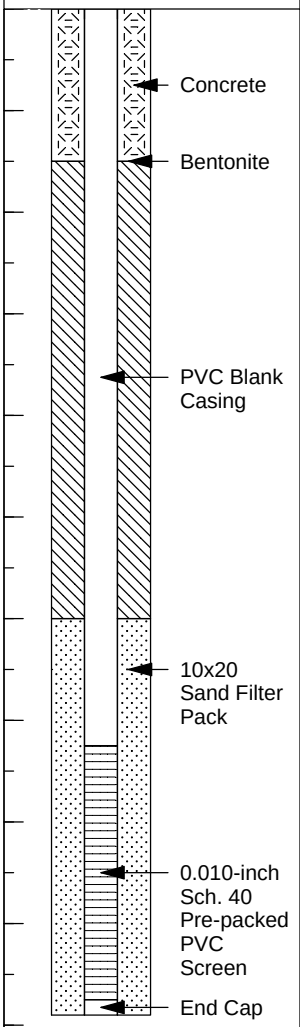
LOG OF PIEZOMETER: P-9

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
				0		Boring not logged for lithology. See adjacent boring P-10 for lithology.
				2		
				4		
				6		
				8		
				10		
				12		
				14		
				16		
				18		
				20		Piezometer installed with a hollow stem auger with wood plug. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 19.8 feet. Well Sump/Endcap: 19.5 to 19.8 feet. Well Screen: 14.5 to 19.5 feet. Well Blank: 0 to 14.5 feet. Filter Pack: 12 to 19.8 feet (10x20 Colorado Silica). Well Seal: 3 to 12 (hydrated bentonite chips) Surface Seal: 0 to 3 feet (concrete). Well Monument: Flush with grade steel monument.
				22		
				24		
				26		
				28		
				30		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number: BHK 283

Total Drilled Depth: 19.8 feet
Diameter of Boring: 9 inches
Drill Date: 12/14/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Hollow Stem Auger

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LOG OF PIEZOMETER: P-10

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
Concrete				0		ASPHALT
		60		2		BROWN SILTY SAND (SM), dry, very dense, fine to medium, little fines, strong organic odor Note: 0 to 8 feet: solidified fill material from former holding pond
Bentonite				4		
				6		
		60		8		@ 7 feet: wet @ 7.5 to 8 feet: grades to silt
						BROWN SILT (ML), wet, medium plasticity, iron oxide staining throughout
				10		BROWN SILTY SAND (SM), wet, fine to medium, little to some fines
		60		12		BROWN SILT (ML), wet, medium plasticity, iron oxide staining throughout, sticky
PVC Blank Casing				14		GRAY SAND WITH SILT (SP), wet, dense, fine, few fines
				16		
		60		18		BLUISH GRAY SILT (ML), wet, soft, high plasticity, clay-like
				20		BLACK SAND WITH SILT (SP), wet, dense, fine to medium, few fines
		48		22		
				24		
				26		
		48		28		
10x20 Sand Filter Pack				30		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number: BHK 282

Total Drilled Depth: 37 feet
Diameter of Boring: 9 inches
Drill Date: 12/14/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Hollow Stem Auger

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LOG OF PIEZOMETER: P-10

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
0.010-inch Sch. 40 Pre-packed PVC Screen; End Cap; Native Material (sluff)		42		30		@ 30 feet: trace organic material
				32		
				34		@ 33.5 feet: 3-inch interbed of silt with organics
		24		36		GRAY SILT (ML), wet, soft, trace fine sand, medium plasticity @ 36.3 feet: 4-inch interbed of sticky pinkish gray silt
				38		Bottom of boring @ 37 feet.
				40		Note: Initial boring drilled with geoprobe on 12/8/12. Piezometer installed with a hollow stem auger on 12/14/12.
				42		Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand.
				44		Total Well Depth: 35.5 feet. Well Sump/Endcap: 35.2 to 35.5 feet. Well Screen: 30.2 to 35.2 feet. Well Blank: 0 to 30.2 feet. Filter Pack: 28 to 35.5 feet (10x20 Colorado Silica). Well Seal: 3 to 28 (hydrated bentonite chips) Surface Seal: 0 to 3 feet (concrete). Well Monument: Flush with grade steel monument.
				46		
				48		
				50		
				52		
				54		
				56		
				58		
				60		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number: BHK 282

Total Drilled Depth: 37 feet
Diameter of Boring: 9 inches
Drill Date: 12/14/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Hollow Stem Auger

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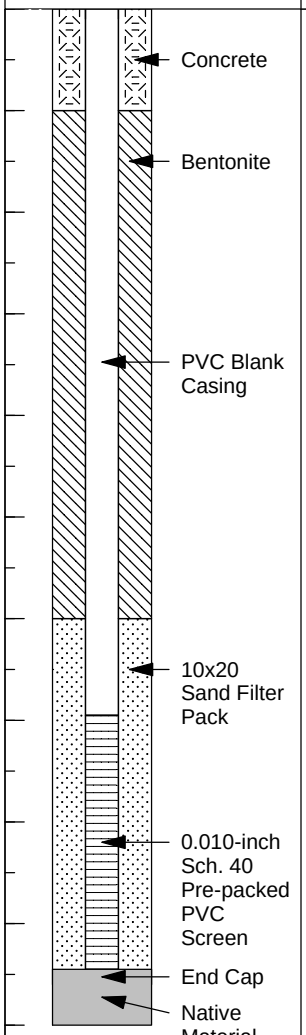
LOG OF PIEZOMETER: P-11



Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
			0		ASPHALT
			2		BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel
	60				BROWN SILTY SAND (SM), moist, dense, fine, some fines
			4		
			6		
	36		8		@ 7 feet: wet
			10		Note: 8 to 10 feet: Little recovery, contact location inferred BROWN SILT (ML), wet, soft, little fines, non-plastic
	48		12		
			14		
			16		INTERBEDDED SILTY SAND (SM) AND SILT (ML)
	24		18		DARK GRAY SAND WITH SILT (SP), wet, dense, fine, few fines
	36		20		Bottom of boring @ 20 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 19.2 feet. Well Sump/Endcap: 18.9 to 19.2 feet. Well Screen: 14.9 to 18.9 feet. Well Blank: 0 to 14.9 feet. Filter Pack: 12 to 19.2 feet (10x20 Colorado Silica). Well Seal: 2 to 12 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.
			22		
			24		
			26		
			28		
			30		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 265

Total Drilled Depth: 19.2 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/08/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-12

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
Concrete				0		ASPHALT
				2		BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel
Bentonite		36				BROWN SILTY SAND (SM), moist, dense, fine, some fines
				4		
				6		
		42				BROWN SILT (ML), wet, medium plasticity, iron oxide staining throughout
				8		
				10		BROWN SILTY SAND (SM), wet, fine, little fines
		48		12		
				14		DARK GRAY SAND WITH SILT (SP), wet, dense, fine, few fines
PVC Blank Casing				16		
		60		18		
				20		
		60		22		
				24		
				26		@ 25 feet: fine to medium, trace fines
		42		28		
10x20 Sand Filter Pack				30		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 275

Total Drilled Depth: 37 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/09/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-12

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
0.010-inch Sch. 40 Pre-packed PVC Screen; End Cap; Native Material (sluff)		42		30		
				32		
				34		
		24		36		GRAY SILT (ML), wet, soft, trace fine sand, medium plasticity
				38		Bottom of boring @ 37 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 35.2 feet. Well Sump/Endcap: 34.9 to 35.2 feet. Well Screen: 29.9 to 34.9 feet. Well Blank: 0 to 29.9 feet. Filter Pack: 28 to 35.2 feet (10x20 Colorado Silica). Well Seal: 2 to 28 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.
				40		
				42		
				44		
				46		
				48		
				50		
				52		
				54		
				56		
				58		
				60		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 275

Total Drilled Depth: 37 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/09/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-13

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
Concrete; Bentonite; PVC Blank Casing; 10x20 Sand Filter Pack; 0.010-inch Sch. 40 Pre-packed PVC Screen; End Cap		58 60 60 36		0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30		ASPHALT BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel BROWN SILTY SAND (SM), moist, fine to coarse, little fines, few fine gravel BROWN GRAVEL WITH SAND (GP), wet, fine, some fine to coarse sand BROWN SILT (ML), wet, soft, medium plasticity, iron oxide staining throughout GRAYISH BROWN SAND (SP), wet, dense, fine, trace fines BLUISH GRAY SILT (ML), wet, medium plasticity, sticky @ 12.5 to 13 feet: 6-inch interbed of sand (SP) BLACK SAND (SP), wet, fine, few fines Bottom of boring @ 19 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 19 feet. Well Sump/Endcap: 18.7 to 19 feet. Well Screen: 13.7 to 18.7 feet. Well Blank: 0 to 13.7 feet. Filter Pack: 12 to 19 feet (10x20 Colorado Silica). Well Seal: 2 to 12 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 261

Total Drilled Depth: 19 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/07/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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LOG OF PIEZOMETER: P-14

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
Concrete				0		ASPHALT
				2		BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel
Bentonite		36				
				4		BROWN GRAVEL WITH SAND (GP), wet, fine, some fine to coarse sand Note: 3 to 5 feet: No Recovery
				6		BROWN SILT (ML), wet, soft, medium plasticity, iron oxide staining throughout
		48		8		
				10		BLACK SAND (SP), wet, dense, fine, few fines GRAY SILTY SAND (SM), wet, loose, fine, little some fines
				12		BLUEISH GRAY SILT (ML), wet, very soft, high plasticity, trace fine sand GRAY SILTY SAND (SM), wet, dense, fine, little fines
PVC Blank Casing		36				Note: 13 to 15 feet: Little recovery, contact location inferred
				14		BLACK SAND WITH SAND (SP), wet, dense, fine, few fines
				16		
		38		18		@ 18 feet: little fines
				20		GRAY SILT (ML), wet, soft, few fine sand, trace organics, medium plasticity
				22		
		54		24		@ 24.5 feet: some fine sand
10x20 Sand Filter Pack						BLACK SAND WITH SILT (SP), wet, dense, fine to medium, few fines
				26		
0.010-inch Sch. 40 Pre-packed PVC Screen		54		28		
				30		GRAY SILT (ML), wet, soft, medium plasticity @ 30 to 30.5 feet: 6-inch interbed of sand (SP)

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 258

Total Drilled Depth: 31 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/07/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

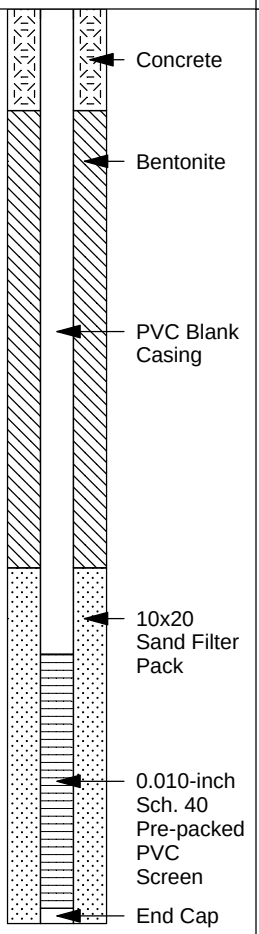
Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
End Cap Native Material (sluff)		12		30		
				32		Bottom of boring @ 31 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 30.4 feet. Well Sump/Endcap: 30.1 to 30.4 feet. Well Screen: 25.1 to 30.1 feet. Well Blank: 0 to 25.1 feet. Filter Pack: 23.5 to 30.4 feet (10x20 Colorado Silica). Well Seal: 2 to 23.5 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.
				34		
				36		
				38		
				40		
				42		
				44		
				46		
				48		
				50		
				52		
				54		
				56		
				58		
				60		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 258

Total Drilled Depth: 31 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/07/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

PES Environmental, Inc.
Engineering & Environmental Services

LOG OF PIEZOMETER: P-15



Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
			0		ASPHALT
			2		BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel
	48				BROWN SILTY SAND (SM), moist, fine to coarse, little fines, few fine gravel
			4		BROWN GRAVEL WITH SAND (GP), wet, fine, some fine to coarse sand
			6		BROWN SILT (ML), wet, soft, medium plasticity, iron oxide staining throughout
	48		8		BLACK SAND (SP), wet, dense, fine, trace fines
			10		
	54		12		BLUISH GRAY SILT (ML), wet, medium plasticity
			14		BLACK SAND (SP), wet, fine, few fines
	36		16		
			18		@ 17 feet: 6-inch interbed of gray, very soft silt (ML)
			20		Bottom of boring @ 18 feet. Well Completion Details: Well constructed with 1.5-inch i.d. Schedule 40 PVC pipe with 0.010-inch machine slotted screen, pre-packed with 20x40 Colorado Silica Sand. Total Well Depth: 18 feet. Well Sump/Endcap: 17.7 to 18 feet. Well Screen: 12.7 to 17.7 feet. Well Blank: 0 to 12.7 feet. Filter Pack: 11 to 18 feet (10x20 Colorado Silica). Well Seal: 2 to 11 (hydrated bentonite chips) Surface Seal: 0 to 2 feet (concrete). Well Monument: Flush with grade steel monument.
			22		
			24		
			26		
			28		
			30		

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 260

Total Drilled Depth: 18 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/07/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

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Engineering & Environmental Services

LOG OF PIEZOMETER: P-16

Well Completion	Sample ID	Sample Recovery	Sample Interval	Depth (Feet)	Graphic Log	Lithologic Description
Concrete				0		ASPHALT
				2		BROWN SILTY SAND WITH GRAVEL (FILL), moist, fine to coarse, few fine gravel
Bentonite		48				
				4		BROWN SILTY SAND (GP), wet, fine to coarse, little fines, few fine gravel Note: 5 to 6 feet: Not Sampled, contact location inferred
				6		BROWN SILT (ML), wet, soft, medium plasticity, iron oxide staining throughout
		42		8		GRAY SILTY SAND (SM), wet, dense, fine, little fines
				10		
PVC Blank Casing				12		BLUEISH GRAY SILT (ML), wet, very soft, high plasticity, trace fine sand
		60		14		BLACK SAND WITH SAND (SP), wet, dense, fine, few fines @ 14.5 feet: 7-inch interbed of silty sand (SM)
				16		
		60		18		
				20		
				22		GRAY SILT (ML), wet, soft, few fine sand, trace organics, medium plasticity
		42		24		BLACK SAND WITH SILT (SP), wet, dense, fine, few fines
10x20 Sand Filter Pack				26		
0.010-inch Sch. 40 Pre-packed PVC Screen		60		28		
				30		GRAY SANDY SILT (ML), wet, soft, some fine sand, @ 29.5 to 30.5 feet: 12-inch interbed of sand (SP)

Project: BSB Shallow Aquifer CA Startup
Project Number: 827.001.24.006
Site Location: Kent, Washington
Logged By: Leora Doody
Notes: Ecology Well Tag Number BHK 259

Total Drilled Depth: 31 feet
Diameter of Boring: 3.5 inches
Drill Date: 12/07/11
Drilled By: Cascade Drilling, L.P.
Drill Method: Geoprobe 6600

APPENDIX H

HWA GeoSciences Test Reports on SBCW Slurry

HWA GeoSciences Inc.
Geotechnical & Pavement Engineering • Hydrogeology • Geoenvironmental • Planning & Permitting • Inspection & Testing

October 14, 2011
HWA Project No. 2011-103

PES Environmental, Inc.
1215 Fourth Avenue, Suite 1350
Seattle, WA 98161

Attention: Mr. Brian O'Neal, PE

Subject: **MATERIALS LABORATORY REPORT NO. 1**
SOIL-BENTONITE SLURRY EVALUATION
BSB Diversified Property
Kent, Washington

Dear Mr. O'Neal:

As requested, HWA GeoSciences Inc. (HWA) performed laboratory testing for the subject project. Herein we present the results of our laboratory analyses, which are summarized on the attached Tables and Figures. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE INFORMATION: Samples were delivered to our laboratory on September 23 and 26, 2011, by PES Personnel. These samples were delivered in four, 5-gallon buckets. Based on manual-visual methods, the soil descriptions for the samples are as follows:

SW-1, 15+00	Gray, clayey SAND (SC)
SW-2, 0+30	Gray, clayey SAND (SC)
SW-3, 2+00	Gray, clayey SAND (SC)
SW-4, 3+50	Gray, clayey SAND (SC)

TESTING PROGRAM: We understand that these materials consist of soil-bentonite slurry that was mixed on-site and is being used to construct a vertical hydraulic cut-off wall at the BSB Diversified Property. The intent of this testing program is to measure the engineering properties of the slurry including: moisture content, Atterberg Limits, particle size distribution, bulk specific gravity and unit weight using a mud balance, and hydraulic conductivity.

MOISTURE CONTENT OF SOIL: The "as-received" moisture content of each slurry sample (percent by dry mass) was determined in general accordance with ASTM D 2216. Moisture content samples were taken from each bucket after the contents were re-mixed thoroughly. The results are shown on Figure 1.

21312 30th Drive SE
Suite 110
Bothell, WA 98021.7010

Tel: 425.774.0106
Fax: 425.774.2714
www.hwageo.com

PARTICLE SIZE ANALYSIS OF SOILS: The slurry samples were tested to determine their respective particle size distributions in general accordance with ASTM D422. The individual particle-size components are summarized on Figure 1. Particle Size distributions for each sample are shown on the attached Particle Size Analysis reports shown on Figures 2 and 3, which also provide information regarding the classification of the sample, Atterberg limits and the moisture content of the soil at the time of testing.

BULK SPECIFIC GRAVITY AND BULK DENSITY OF SLURRY: The bulk specific gravity and bulk unit weight of each slurry sample was determined using a mud balance per API specification 13B-1, Section 1. The results are summarized in Figure 1.

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): The slurry samples were tested using method ASTM D4318, multi-point method. Testing was conducted on the fine-grained portion of each sample that passed the U.S. No. 40 sieve after being air-dried. The results are summarized on Figure 1, and plotted on the attached Liquid Limit, Plastic Limit, and Plasticity Index report on Figure 4.

HYDRAULIC CONDUCTIVITY OF SOIL (FLEXI-WALL TRIAXIAL CHAMBER METHOD): The hydraulic conductivity (also commonly referred to as coefficient of permeability) of each slurry sample was measured in general accordance with method ASTM D5084. The specimen dimensions and weight were recorded prior to encapsulation within a flexible membrane and placement within a triaxial pressure chamber. An effective confining pressure of 15.0 psi was applied to simulate mid-trench subsurface conditions as requested by the client. Flow was induced by subjecting the test specimen to a gradient ranging from 10.9 to 18.6 generated by a back-pressure differential of 2 psi. Testing was conducted until inflow was approximately equal to outflow and the hydraulic conductivity was essentially steady. The test results are summarized on Figure 1 and presented in detail on Figures 5 through 8.

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CLOSURE: Experience has shown that laboratory test values for soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested sample may represent. HWA also makes no warranty as to how representative either the sample tested or the test results obtained are to actual field conditions. It is a well established fact that sampling methods present varying degrees of disturbance or variance that affect sample representativeness.

No copy should be made of this report except in its entirety.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

Sincerely,

HWA GEOSCIENCES INC.

Steven E. Greene, L.G., L.E.G.
Senior Engineering Geologist
Vice-President

for Harold Benny
Laboratory Manager

SEG:gm;seg

Attachments:

Figure 1	Material Summary
Figures 2 & 3	Particle-Size Analysis of Soils
Figure 4	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
Figures 5 through 8	Hydraulic Conductivity Test Reports

SAMPLE LOCATION	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% SILT	% CLAY	MUD BALANCE		HYDRAULIC CONDUCTIVITY (cm/sec)	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
		LL	PL	PI					BULK SPECIFIC GRAVITY	BULK UNIT WEIGHT (PCF)			
SW-01, 15+00	39	43	17	26	2.2	59.5	27.6	10.7	1.795	112.1	$1.1x10^{-8}$	SC	Gray, clayey SAND
SW-02, 0+30	35	40	18	22	0.9	58.8	30.2	10.0	1.850	116.0	$1.2x10^{-8}$	SC	Gray, clayey SAND
SW-03, 2+00	32	30	22	8	5.4	52.6	36.0	6.1	1.865	116.8	$8.0x10^{-8}$	SC	Gray, clayey SAND
SW-04, 3+50	37	33	20	13	0.6	61.3	29.4	8.7	1.830	114.0	$7.7x10^{-9}$	SC	Gray, clayey SAND

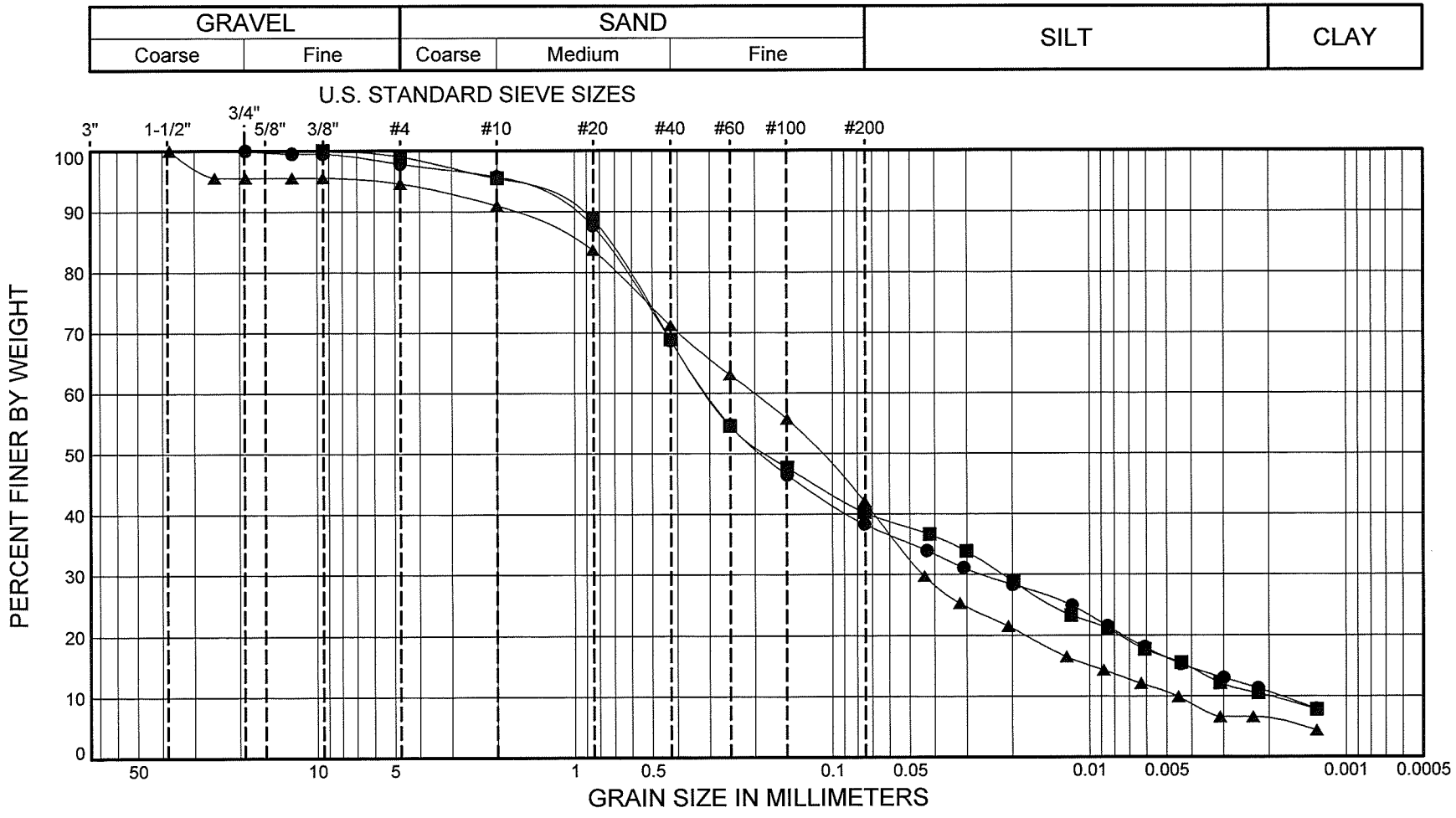
Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables.

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

SUMMARY OF
MATERIAL PROPERTIES

PROJECT NO.: 2011-103 FIGURE: 1



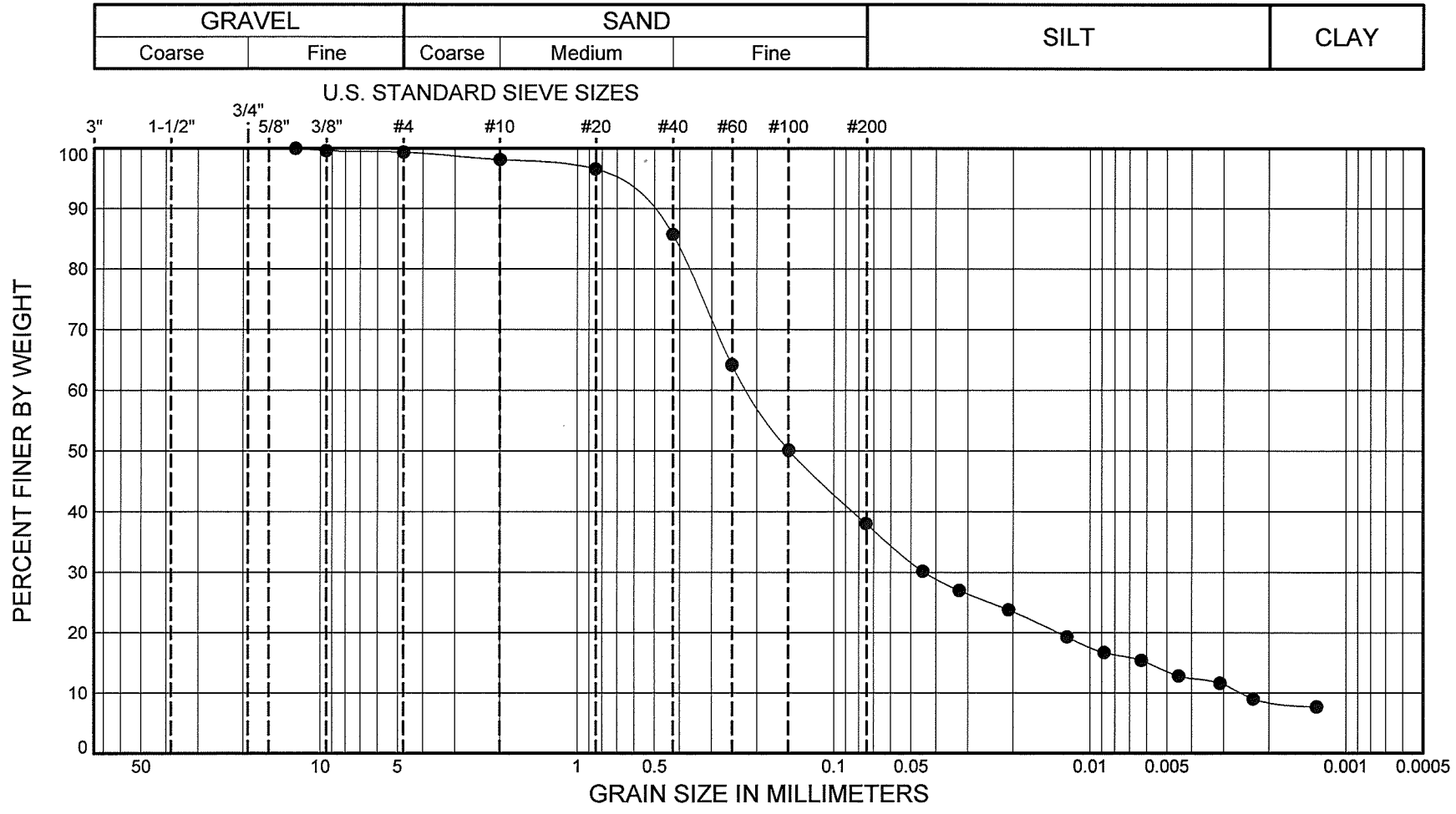
SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	SW-01	15+00	0.0 - 0.0	(SC) Gray, clayey SAND	39	43	17	26	2.2	59.5	38.3
■	SW-02	0+30	0.0 - 0.0	(SC) Gray, clayey SAND	35	40	18	22	0.9	58.8	40.3
▲	SW-03	2+00	0.0 - 0.0	(SC) Gray, clayey SAND	32	30	22	8	5.4	52.6	42.0

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2011-103 FIGURE: 2



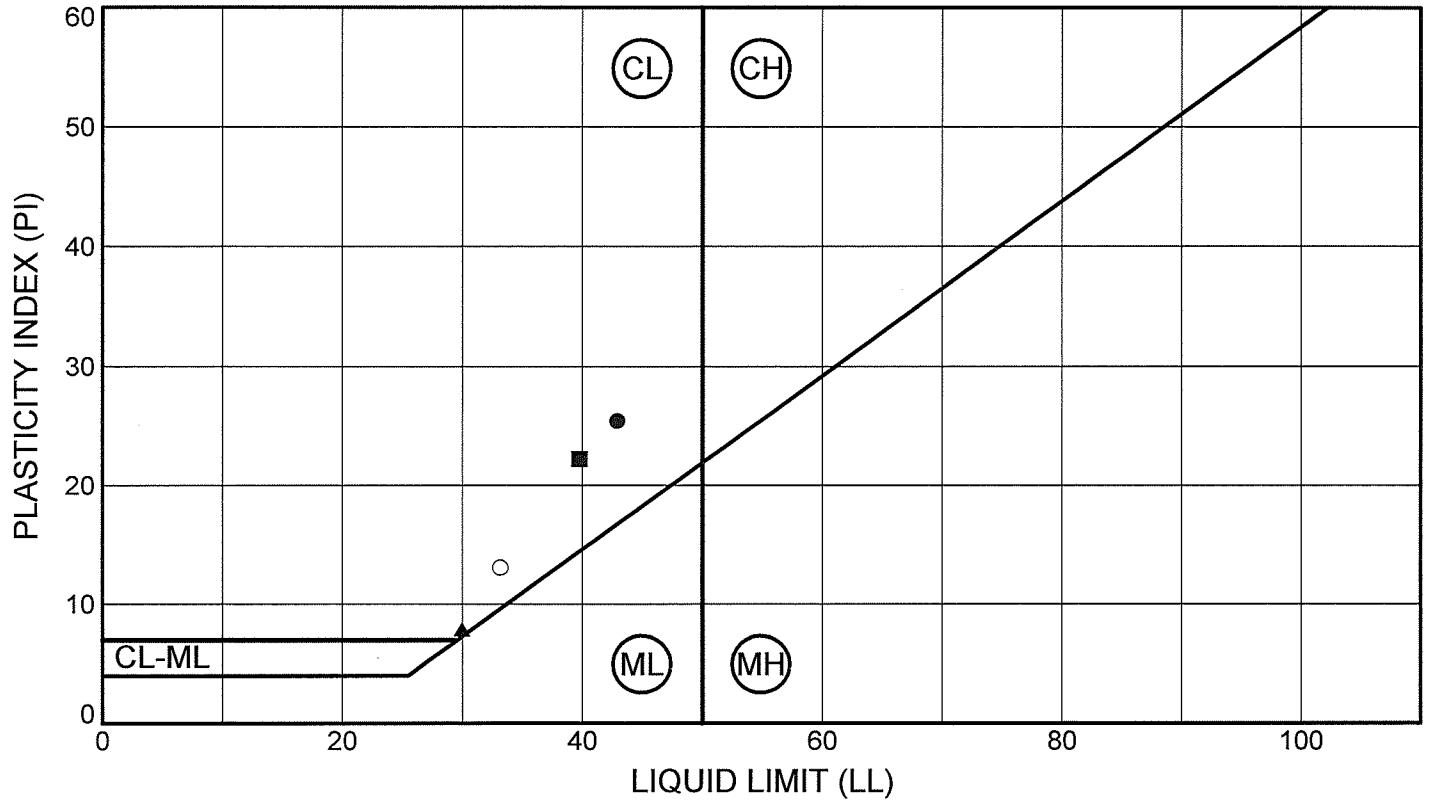
SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	SW-04	3+50	0.0 - 0.0	(SC) Gray, clayey SAND	37	33	20	13	0.6	61.3	38.1

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2011-103 FIGURE: 3



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	SW-01	15+00	0.0 - 0.0	(SC) Gray, clayey SAND	39	43	17	26	38.3
■	SW-02	0+30	0.0 - 0.0	(SC) Gray, clayey SAND	35	40	18	22	40.3
▲	SW-03	2+00	0.0 - 0.0	(SC) Gray, clayey SAND	32	30	22	8	42.0
○	SW-04	3+50	0.0 - 0.0	(SC) Gray, clayey SAND	37	33	20	13	38.1

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2011-103 FIGURE: 4

Hydraulic Conductivity (a.k.a. Permeability) Test Report

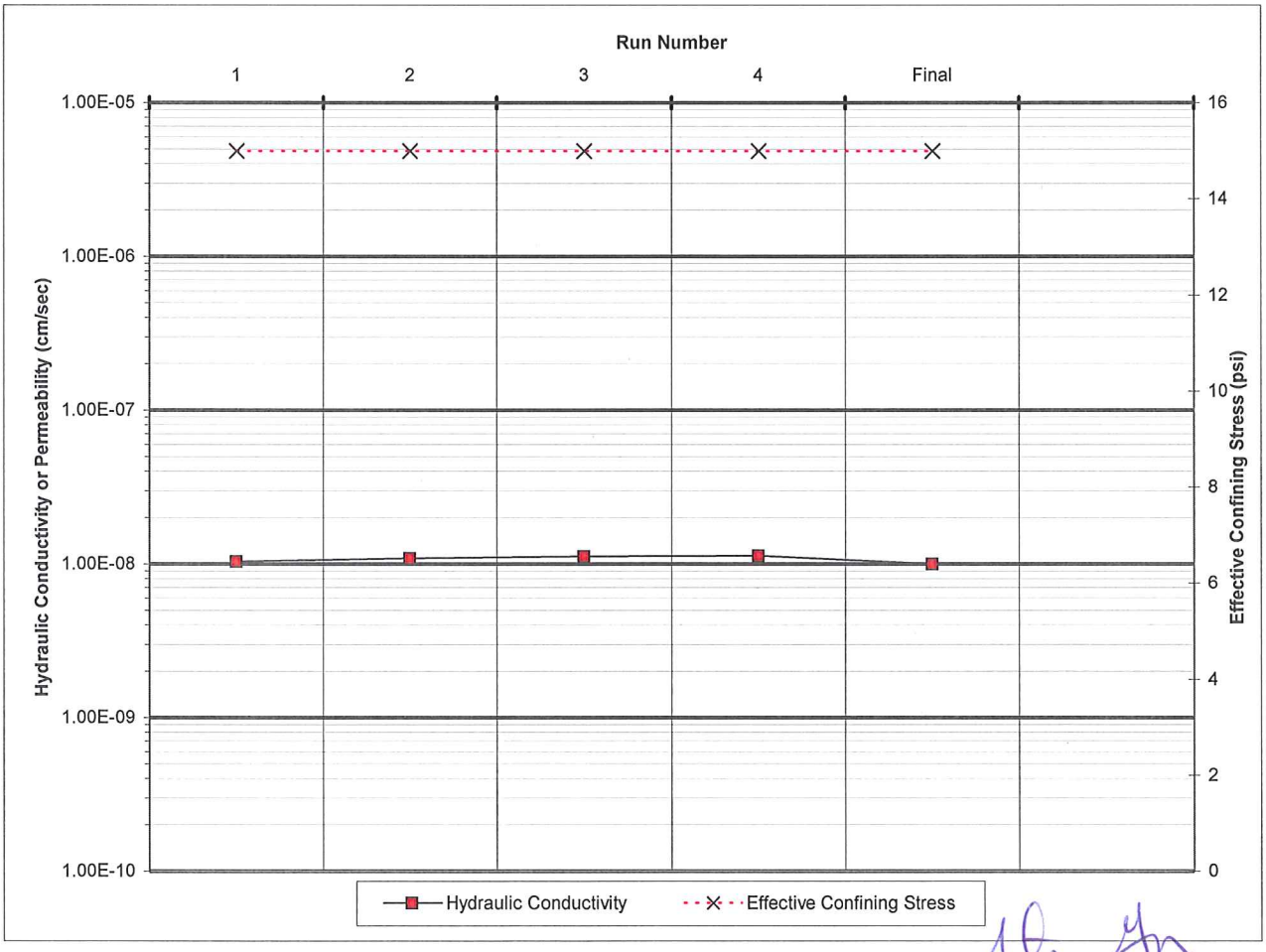
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	BSB Diversified Site
Client	PES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 15+00
Sample number	SW-01
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	81.07	Final Sample Area (cm2)	60.18
Initial Sample Length (cm)	10.16	Final Sample Length (cm)	8.46
Initial Sample Volume (cc)	823.7	Final Sample Volume (cc)	509.3
Initial moisture (%)	38.7	Final moisture (%)	23.4
Initial wet unit wt. (pcf)	95.2	Final wet unit weight (pcf)	136.8
Initial dry unit wt. (pcf)	68.6	Final dry unit weight (pcf)	110.9
Initial void ratio	1.455	Final void ratio	0.519
Initial porosity	0.593	Final porosity	0.342
Initial saturation (%)	71.8	Final saturation (%)	121.4

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	1.0E-08	n.a.		1.57	15	Maximum Gradient 17.6
2	1.1E-08	n.a.		1.33	15	
3	1.1E-08	n.a.		1.00	15	Minimum Gradient 16.5
4	1.1E-08	1.1E-08	5.0%	1.00	15	Max. Back Pressure (psi) 28.0
Final	1.0E-08	**1.1E-08**	7.6%	0.80	15	Min. Back Pressure (psi) 28.0



Checked by: _____

FIGURE: 5

Hydraulic Conductivity (a.k.a. Permeability) Test Report

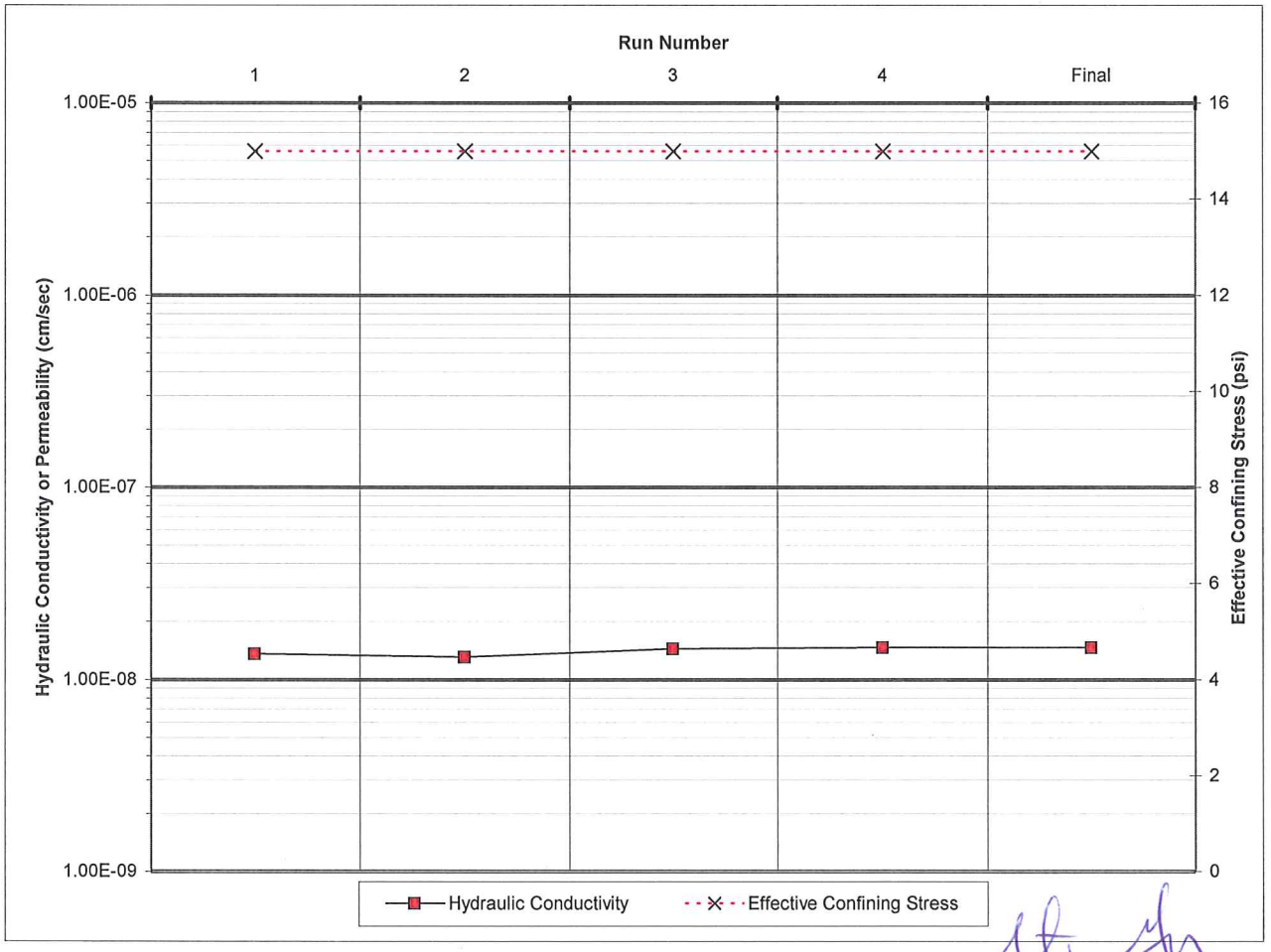
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	BSB Diversified Site
Client	PES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 0+30
Sample number	SW-02
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	81.07	Final Sample Area (cm2)	64.95
Initial Sample Length (cm)	10.16	Final Sample Length (cm)	9.59
Initial Sample Volume (cc)	823.7	Final Sample Volume (cc)	623.0
Initial moisture (%)	35.0	Final moisture (%)	22.5
Initial wet unit wt. (pcf)	115.5	Final wet unit weight (pcf)	136.9
Initial dry unit wt. (pcf)	85.6	Final dry unit weight (pcf)	111.7
Initial void ratio	0.968	Final void ratio	0.508
Initial porosity	0.492	Final porosity	0.337
Initial saturation (%)	97.5	Final saturation (%)	119.8

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	1.4E-08	n.a.		1.81	15	Maximum Gradient 15.6
2	1.3E-08	n.a.		1.00	15	
3	1.4E-08	n.a.		1.43	15	Minimum Gradient 13.6
4	1.5E-08	1.4E-08	5.9%	1.00	15	Max. Back Pressure (psi) 28.0
Final	1.5E-08	**1.4E-08**	7.7%	1.09	15	Min. Back Pressure (psi) 28.0



Checked by: _____

FIGURE: 6

Hydraulic Conductivity (a.k.a. Permeability) Test Report

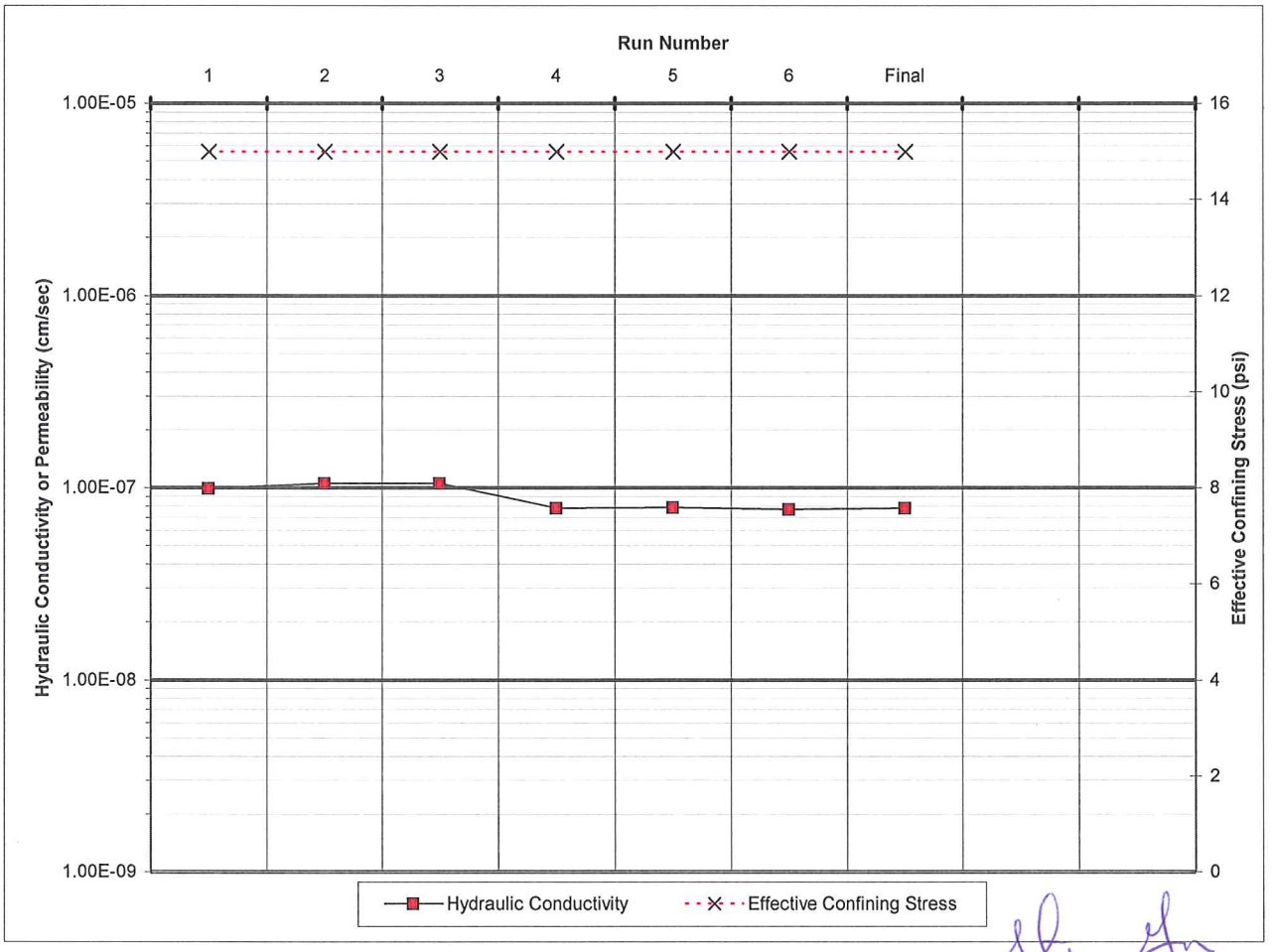
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	BSB Diversified Site
Client	PES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 2+00
Sample number	SW-03
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	81.07	Final Sample Area (cm2)	66.30
Initial Sample Length (cm)	10.16	Final Sample Length (cm)	8.00
Initial Sample Volume (cc)	823.7	Final Sample Volume (cc)	530.5
Initial moisture (%)	33.6	Final moisture (%)	22.6
Initial wet unit wt. (pcf)	94.2	Final wet unit weight (pcf)	134.3
Initial dry unit wt. (pcf)	70.5	Final dry unit weight (pcf)	109.5
Initial void ratio	1.388	Final void ratio	0.538
Initial porosity	0.581	Final porosity	0.350
Initial saturation (%)	65.3	Final saturation (%)	113.6

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	9.9E-08	n.a.		1.03	15	Maximum Gradient
2	1.1E-07	n.a.		0.99	15	18.6
3	1.1E-07	n.a.		1.00	15	Minimum Gradient
4	7.8E-08	9.7E-08	19.3%	0.98	15	10.9
5	7.9E-08	9.2E-08	14.9%	1.00	15	Max. Back Pressure (psi)
6	7.7E-08	8.5E-08	24.0%	0.91	15	28.0
Final	7.8E-08	**7.8E-08**	1.1%	0.95	15	Min. Back Pressure (psi)
						28.0



Checked by: _____

FIGURE: 7

Hydraulic Conductivity (a.k.a. Permeability) Test Report

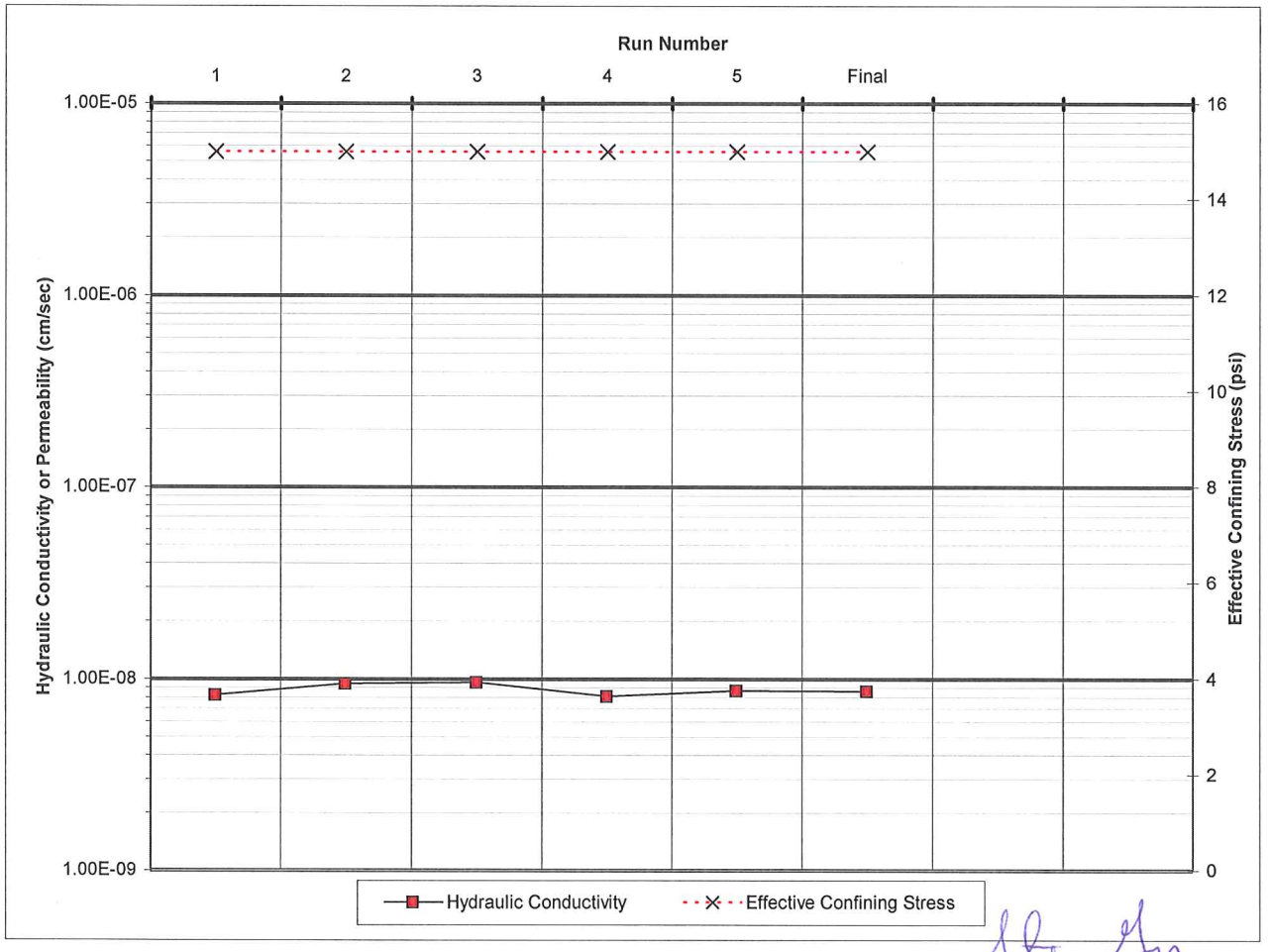
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	BSB Diversified Site
Client	PES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 3+50
Sample number	SW-04
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	81.07	Final Sample Area (cm2)	67.64
Initial Sample Length (cm)	10.16	Final Sample Length (cm)	9.39
Initial Sample Volume (cc)	823.7	Final Sample Volume (cc)	635.3
Initial moisture (%)	37.0	Final moisture (%)	24.0
Initial wet unit wt. (pcf)	111.0	Final wet unit weight (pcf)	133.5
Initial dry unit wt. (pcf)	81.0	Final dry unit weight (pcf)	107.6
Initial void ratio	1.080	Final void ratio	0.565
Initial porosity	0.519	Final porosity	0.361
Initial saturation (%)	92.5	Final saturation (%)	114.7

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	8.2E-09	n.a.		4.50	15	Maximum Gradient
2	9.5E-09	n.a.		1.57	15	16.0
3	9.6E-09	n.a.		1.00	15	Minimum Gradient
4	8.1E-09	8.8E-09	8.2%	1.11	15	14.4
5	8.7E-09	9.0E-09	9.3%	1.14	15	Max. Back Pressure (psi)
Final	8.6E-09	**8.7E-09**	9.4%	1.23	15	28.0
						Min. Back Pressure (psi)
						28.0



Checked by: _____

FIGURE: 8

HWA GeoSciences Inc.
Geotechnical & Pavement Engineering • Hydrogeology • Geoenvironmental • Planning & Permitting • Inspection & Testing

October 17, 2011
HWA Project No. 2011-103

PES Environmental, Inc.
1215 Fourth Avenue, Suite 1350
Seattle, WA 98161

Attention: Mr. Brian O'Neal, PE

Subject: **MATERIALS LABORATORY REPORT NO. 2**
SOIL-BENTONITE SLURRY EVALUATION
BSB Diversified Property
Kent, Washington

Dear Mr. O'Neal:

As requested, HWA GeoSciences Inc. (HWA) performed laboratory testing for the subject project. Herein we present the results of our laboratory analyses, which are summarized on the attached Tables and Figures. Figure 1 provides a cumulative summary of laboratory testing completed to date and contains results that were reported previously in Report No. 1. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE INFORMATION: Samples were delivered to our laboratory on September 27, 2011, by PES Personnel. These samples were delivered in four, 5-gallon buckets. Based on manual-visual methods, the soil descriptions for the samples are as follows:

SW-5, 6+50	Gray, clayey SAND with gravel (SC)
SW-6, 5+00	Dark grayish brown, clayey SAND (SC)
SW-7, 8+35	Gray, clayey SAND (SC)
SW-8, 9+35	Gray, clayey SAND (SC)

TESTING PROGRAM: We understand that these materials consist of soil-bentonite slurry that was mixed on-site and is being used to construct a vertical hydraulic cut-off wall at the BSB Diversified Property. The intent of this testing program is to measure the engineering properties of the slurry including: moisture content, Atterberg Limits, particle size distribution, bulk specific gravity and unit weight using a mud balance, and hydraulic conductivity.

MOISTURE CONTENT OF SOIL: The "as-received" moisture content of each slurry sample (percent by dry mass) was determined in general accordance with ASTM D 2216. Moisture content samples were taken from each bucket after the contents were re-mixed thoroughly. The results are shown on Figure 1.

21312 30th Drive SE
Suite 110
Bothell, WA 98021.7010

Tel: 425.774.0106
Fax: 425.774.2714
www.hwageo.com

PARTICLE SIZE ANALYSIS OF SOILS: The slurry samples were tested to determine their respective particle size distributions in general accordance with ASTM D422. The individual particle-size components are summarized on Figure 1. Particle Size distributions for each sample are shown on the attached Particle Size Analysis reports shown on Figures 2 and 3, which also provide information regarding the classification of the sample, Atterberg limits and the moisture content of the soil at the time of testing.

BULK SPECIFIC GRAVITY AND BULK DENSITY OF SLURRY: The bulk specific gravity and bulk unit weight of each slurry sample was determined using a mud balance per API specification 13B-1, Section 1. The results are summarized in Figure 1.

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): The slurry samples were tested using method ASTM D4318, multi-point method. Testing was conducted on the fine-grained portion of each sample that passed the U.S. No. 40 sieve after being air-dried. The results are summarized on Figure 1, and plotted on the attached Liquid Limit, Plastic Limit, and Plasticity Index report on Figure 4.

HYDRAULIC CONDUCTIVITY OF SOIL (FLEXI-WALL TRIAXIAL CHAMBER METHOD): The hydraulic conductivity (also commonly referred to as coefficient of permeability) of each slurry sample was measured in general accordance with method ASTM D5084. The specimen dimensions and weight were recorded prior to encapsulation within a flexible membrane and placement within a triaxial pressure chamber. An effective confining pressure of 15.0 psi was applied to simulate mid-trench subsurface conditions as requested by the client. Flow was induced by subjecting the test specimen to a gradient ranging from 14.2 to 21.4 generated by a back-pressure differential of 2 psi. Testing was conducted until inflow was approximately equal to outflow and the hydraulic conductivity was essentially steady. The test results are summarized on Figure 1 and presented in detail on Figures 5 through 8.

CLOSURE: Experience has shown that laboratory test values for soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested sample may represent. HWA also makes no warranty as to how representative either the sample tested or the test results obtained are to actual field conditions. It is a well established fact that sampling methods present varying degrees of disturbance or variance that affect sample representativeness.

No copy should be made of this report except in its entirety.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

Sincerely,

HWA GEOSCIENCES INC.

Steven E. Greene, L.G., L.E.G.
Senior Engineering Geologist
Vice-President

Harold Benny
Laboratory Manager

SEG:gm;seg

Attachments:

Figure 1	Material Summary (cumulative results for entire project)
Figures 2 & 3	Particle-Size Analysis of Soils
Figure 4	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
Figures 5 through 8	Hydraulic Conductivity Test Reports

SAMPLE LOCATION	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% SILT	% CLAY	MUD BALANCE		HYDRAULIC CONDUCTIVITY (cm/sec)	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
		LL	PL	PI					BULK SPECIFIC GRAVITY	BULK UNIT WEIGHT (PCF)			
SW-01, 15+00	39	43	17	26	2.2	59.5	27.6	10.7	1.795	112.1	$1.1x10^{-8}$	SC	Gray, clayey SAND
SW-02, 0+30	35	40	18	22	0.9	58.8	30.2	10.0	1.850	116.0	$1.2x10^{-8}$	SC	Gray, clayey SAND
SW-03, 2+00	32	30	22	8	5.4	52.6	36.0	6.1	1.865	116.8	$8.0x10^{-8}$	SC	Gray, clayey SAND
SW-04, 3+50	37	33	20	13	0.6	61.3	29.4	8.7	1.830	114.0	$7.7x10^{-9}$	SC	Gray, clayey SAND
SW-05, 6+50	40	34	19	15	17.7	38.4	33.7	10.1	1.810	113.0	$1.3x10^{-8}$	SC	Gray, clayey SAND with gravel
SW-06, 5+00	39	39	18	21	1.2	58.0	31.3	9.5	1.840	115.0	$1.8x10^{-8}$	SC	Dark grayish brown, clayey SAND
SW-07, 8+35	34	32	18	14	4.9	47.2	37.0	10.9	1.870	117.0	$2.3x10^{-8}$	SC	Gray, clayey SAND
SW-08, 9+35	36	33	18	15	3.6	50.4	34.4	11.7	1.830	114.5	$1.0x10^{-8}$	SC	Gray, clayey SAND

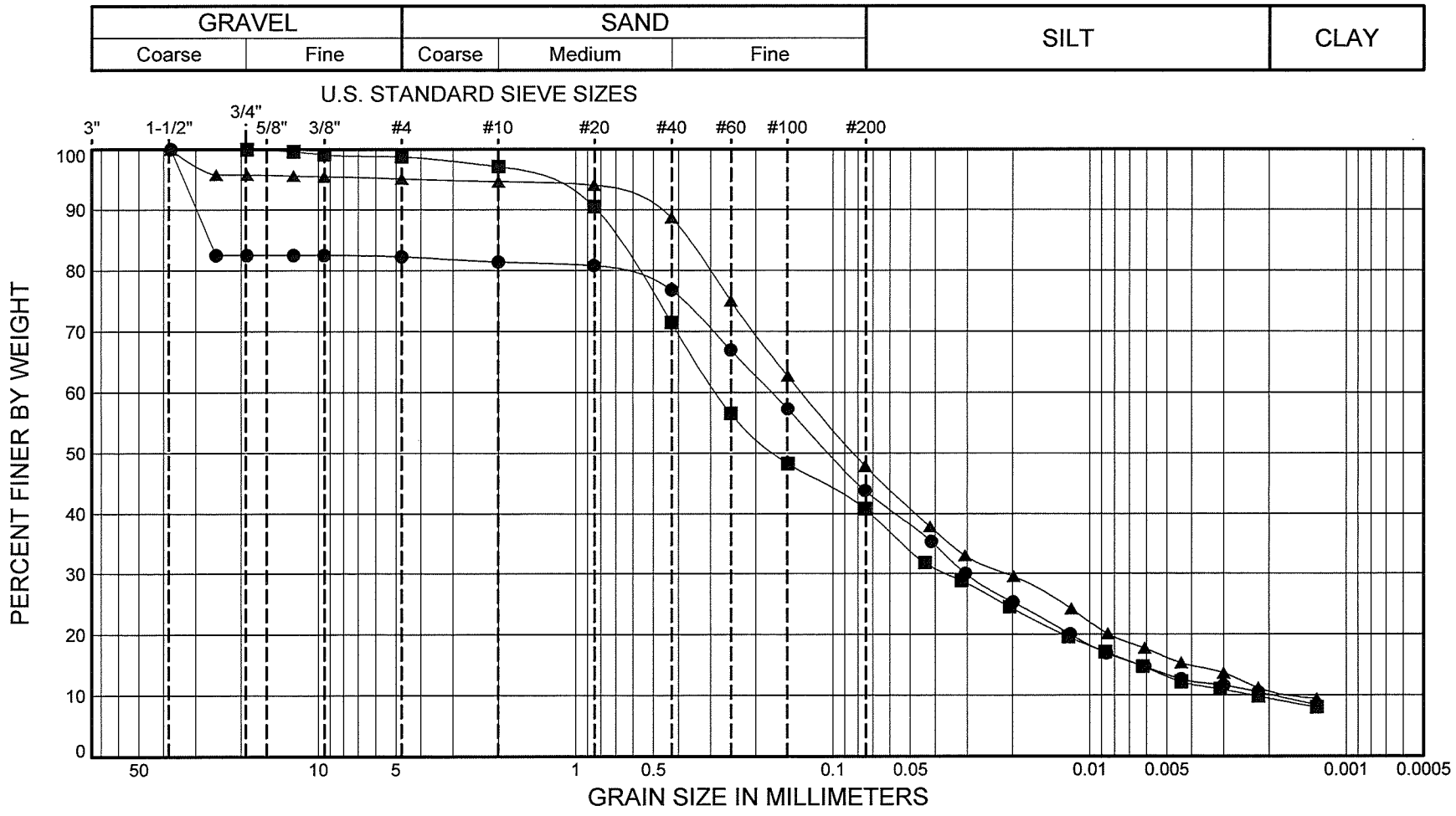
Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables.

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

SUMMARY OF
MATERIAL PROPERTIES

PROJECT NO.: 2011-103 FIGURE: 1



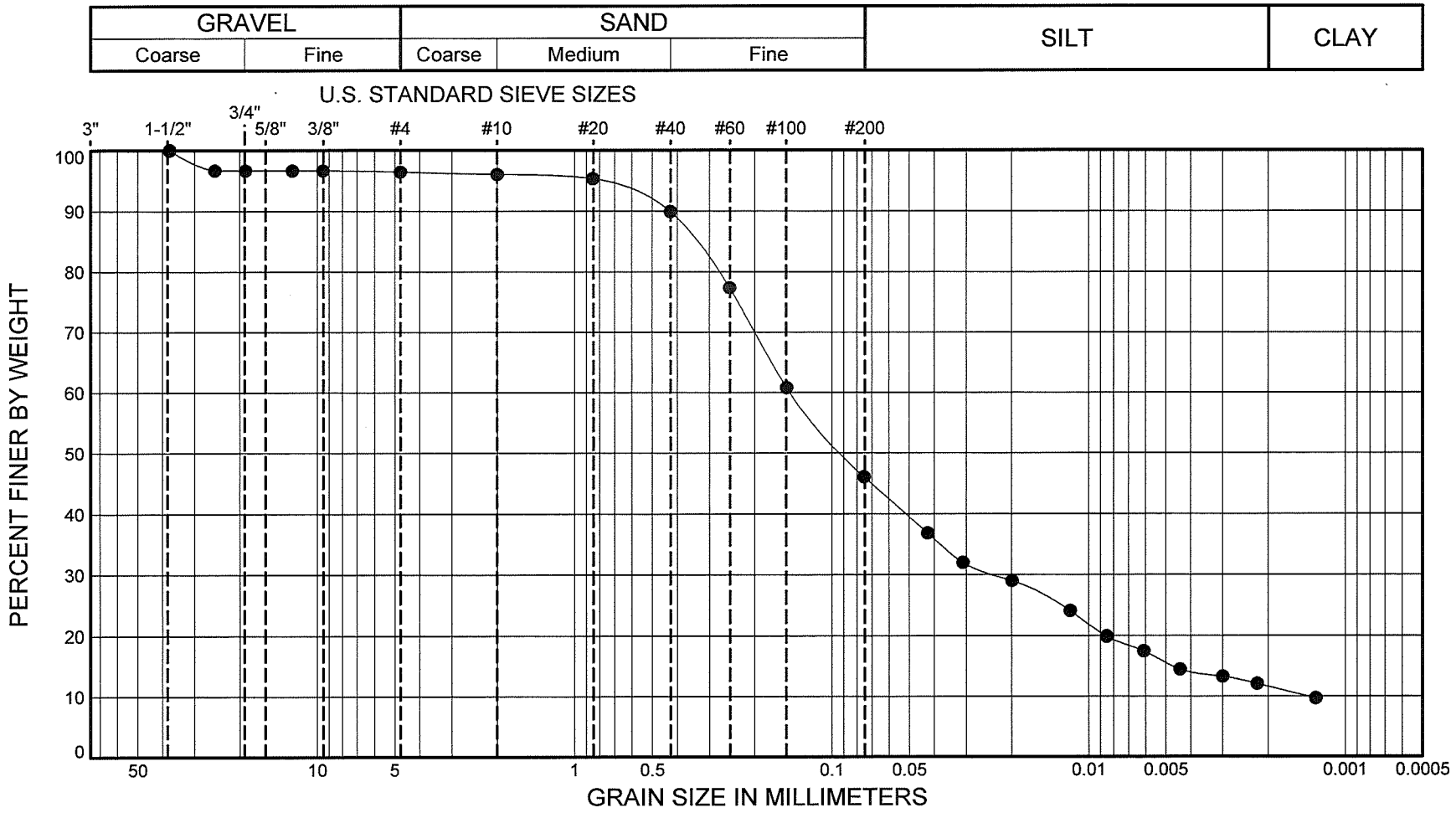
SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	SW-05	6+50	0.0 - 0.0	(SC) Gray, clayey SAND with gravel	40	34	19	15	17.7	38.4	43.8
■	SW-06	5+00	0.0 - 0.0	(SC) Dark grayish brown, clayey SAND	39	39	18	21	1.2	58.0	40.8
▲	SW-07	8+35	0.0 - 0.0	(SC) Gray, clayey SAND	34	32	18	14	4.9	47.2	47.9

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2011-103 FIGURE: 2



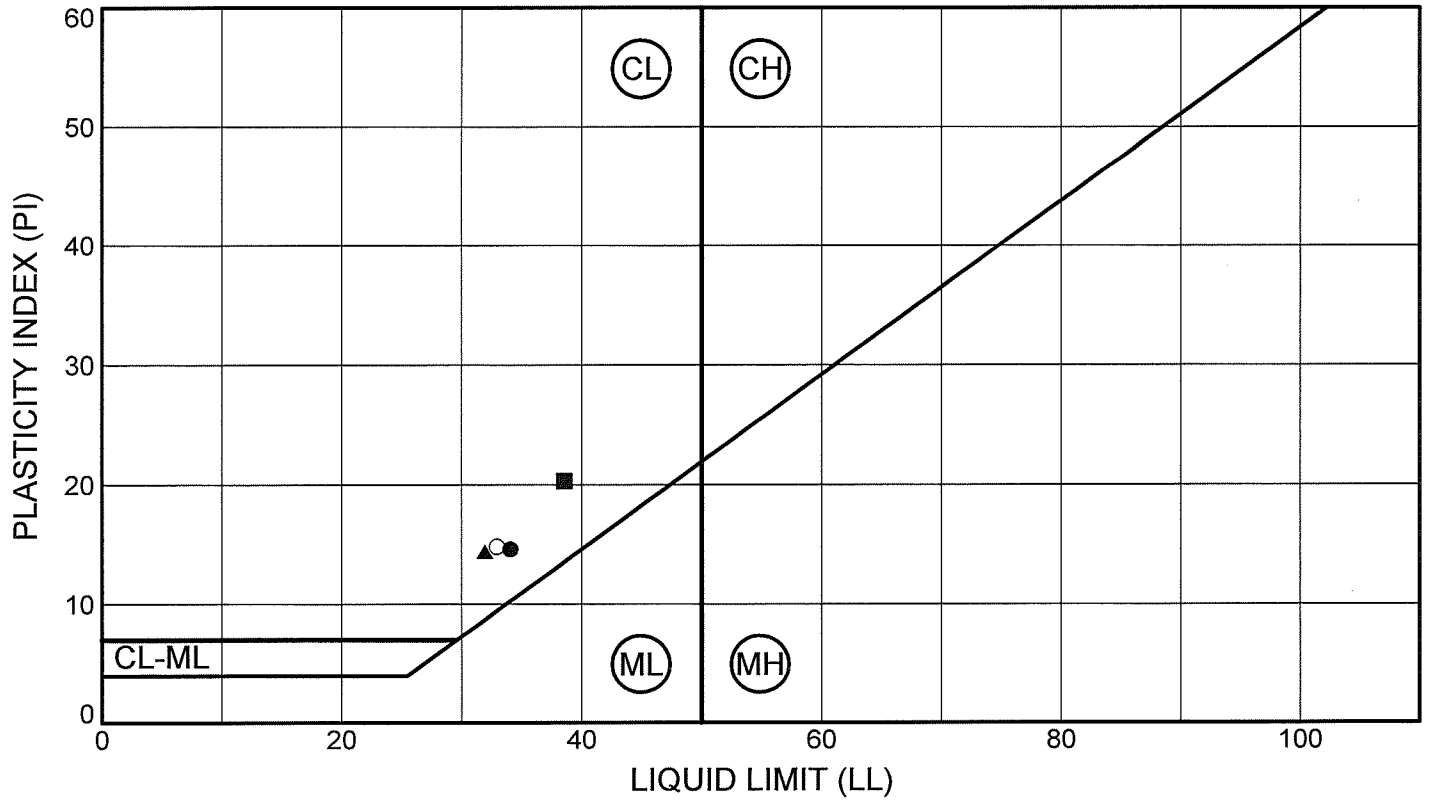
SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	SW-08	9+35	0.0 - 0.0	(SC) Gray, clayey SAND	36	33	18	15	3.6	50.4	46.1

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2011-103 FIGURE: 3



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	SW-05	6+50	0.0 - 0.0	(SC) Gray, clayey SAND with gravel	40	34	19	15	43.8
■	SW-06	5+00	0.0 - 0.0	(SC) Dark grayish brown, clayey SAND	39	39	18	21	40.8
▲	SW-07	8+35	0.0 - 0.0	(SC) Gray, clayey SAND	34	32	18	14	47.9
○	SW-08	9+35	0.0 - 0.0	(SC) Gray, clayey SAND	36	33	18	15	46.1

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

LIQUID LIMIT, PLASTIC LIMIT AND
PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2011-103 FIGURE: 4

Hydraulic Conductivity (a.k.a. Permeability) Test Report

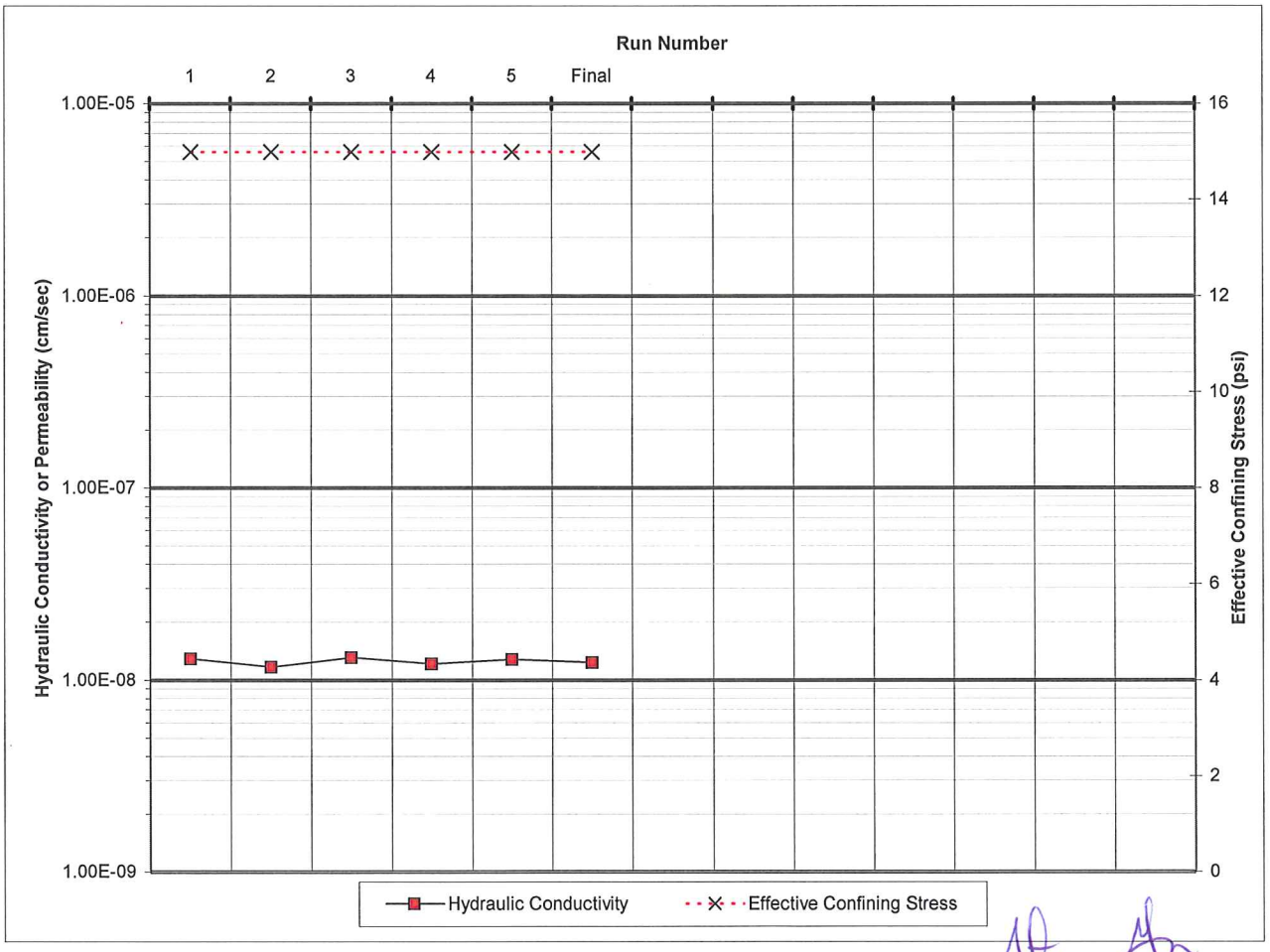
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	SB Diversified Site
Client	ES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 6+50
Sample number	SW-05
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	39.73	Final Sample Area (cm2)	34.64
Initial Sample Length (cm)	8.13	Final Sample Length (cm)	7.90
Initial Sample Volume (cc)	322.9	Final Sample Volume (cc)	273.6
Initial moisture (%)	39.8	Final moisture (%)	24.3
Initial wet unit wt. (pcf)	106.4	Final wet unit weight (pcf)	121.5
Initial dry unit wt. (pcf)	76.1	Final dry unit weight (pcf)	97.7
Initial void ratio	1.214	Final void ratio	0.724
Initial porosity	0.548	Final porosity	0.420
Initial saturation (%)	88.5	Final saturation (%)	90.6

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	1.3E-08	n.a.		2.17	15	Maximum Gradient 19.2
2	1.2E-08	n.a.		1.32	15	
3	1.3E-08	n.a.		1.10	15	Minimum Gradient 15.2
4	1.2E-08	1.2E-08	6.3%	1.14	15	Max. Back Pressure (psi) 28.0
5	1.3E-08	1.2E-08	6.2%	1.17	15	
Final	1.2E-08	**1.3E-08**	3.9%	1.00	15	Min. Back Pressure (psi) 28.0



Checked by: _____

FIGURE: 5

Hydraulic Conductivity (a.k.a. Permeability) Test Report

Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	SB Diversified Site
Client	ES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 5+00
Sample number	SW-06
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	81.07	Final Sample Area (cm2)	70.37
Initial Sample Length (cm)	10.16	Final Sample Length (cm)	7.99
Initial Sample Volume (cc)	823.7	Final Sample Volume (cc)	562.0
Initial moisture (%)	38.6	Final moisture (%)	21.9
Initial wet unit wt. (pcf)	106.1	Final wet unit weight (pcf)	130.4
Initial dry unit wt. (pcf)	76.6	Final dry unit weight (pcf)	106.9
Initial void ratio	1.201	Final void ratio	0.576
Initial porosity	0.546	Final porosity	0.366
Initial saturation (%)	86.7	Final saturation (%)	102.8

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	1.5E-08	n.a.		1.56	15	Maximum Gradient 19.1
2	1.8E-08	n.a.		1.14	15	
3	1.8E-08	n.a.		1.08	15	Minimum Gradient 14.2
4	2.0E-08	1.8E-08	14.7%	1.11	15	Max. Back Pressure (psi) 28.0
5	1.7E-08	1.8E-08	9.0%	0.83	15	
Final	1.9E-08	**1.8E-08**	7.7%	1.00	15	Min. Back Pressure (psi) 28.0

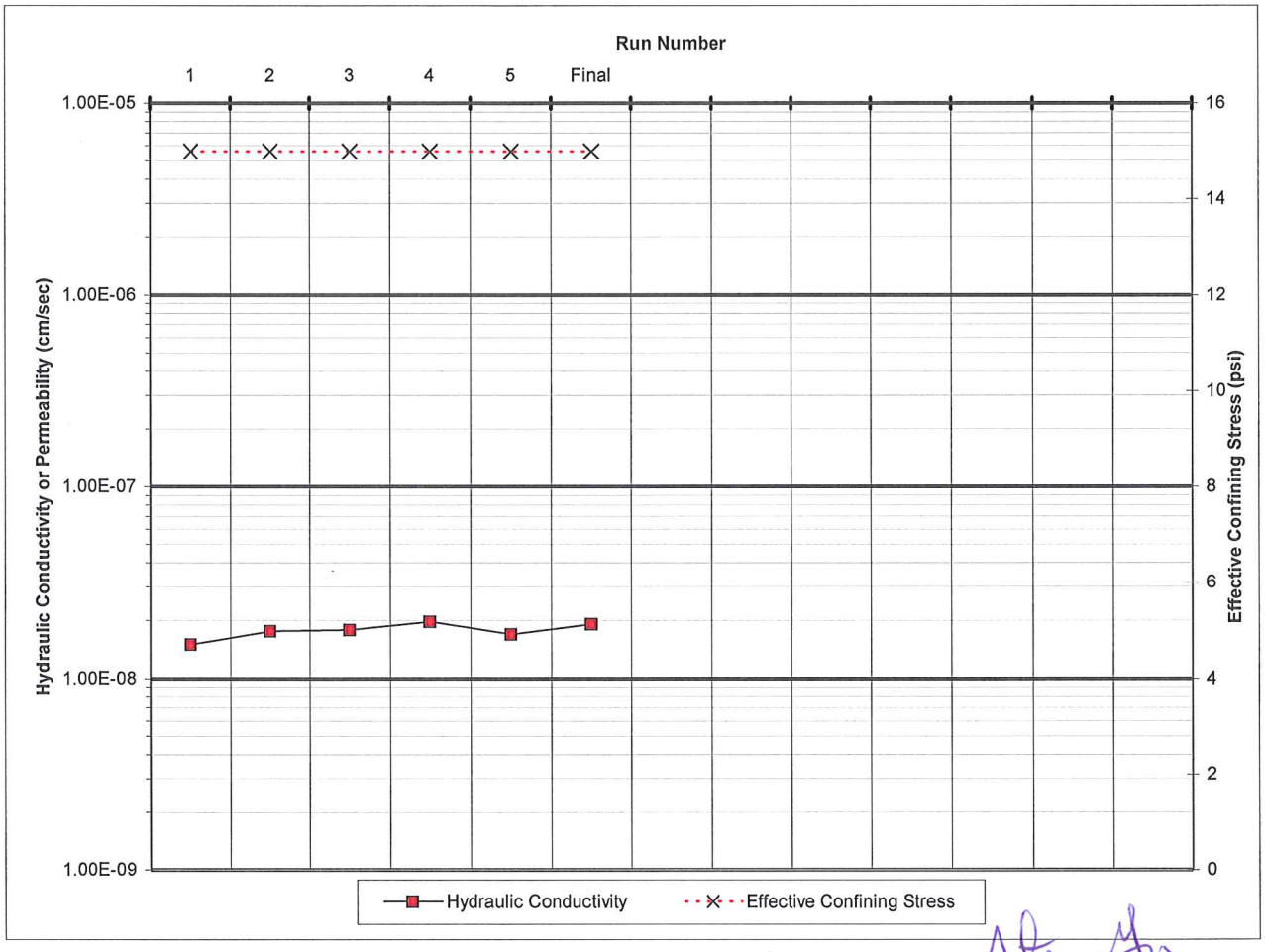


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FIGURE: 6

Hydraulic Conductivity (a.k.a. Permeability) Test Report

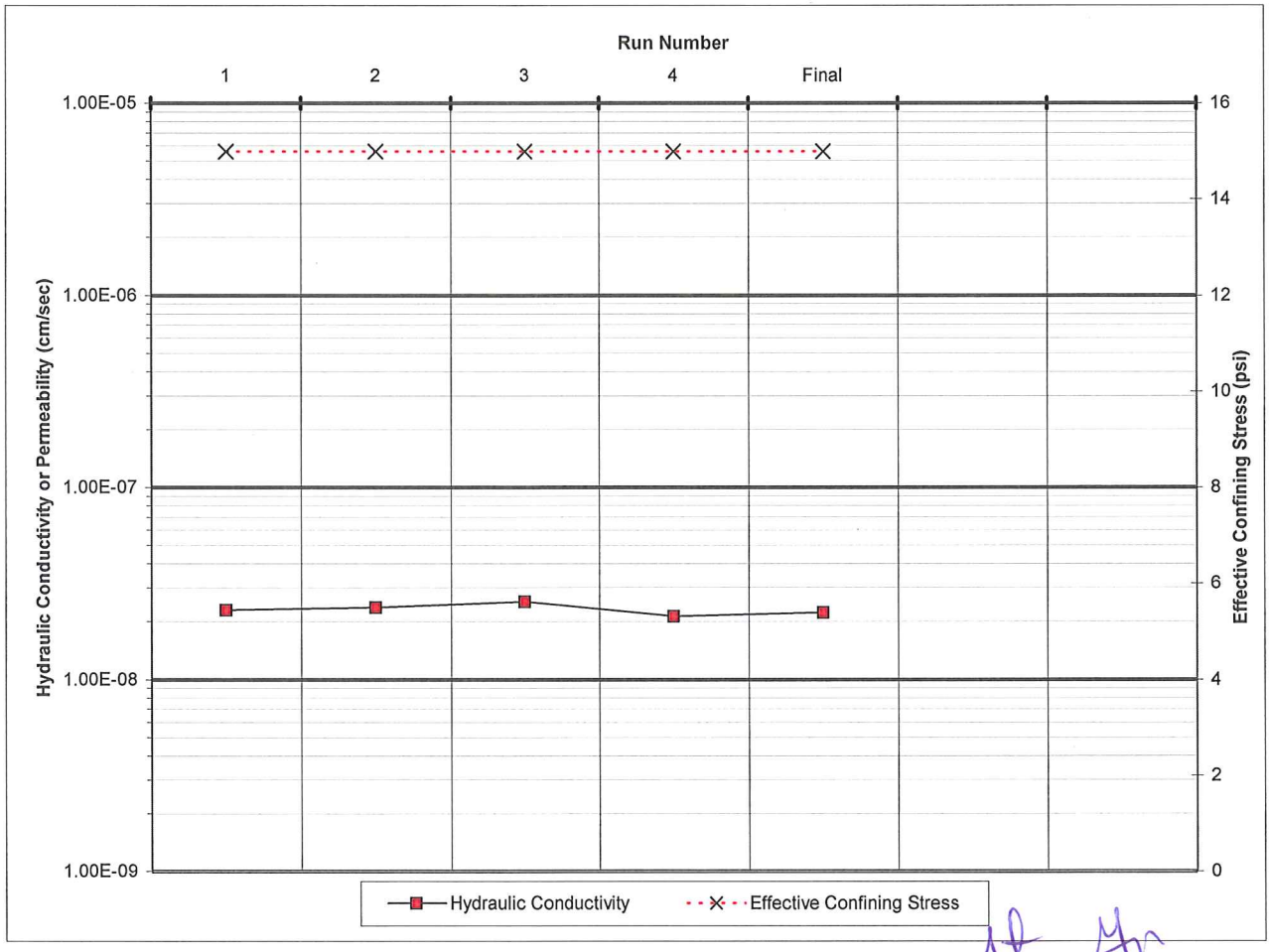
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	SB Diversified Site
Client	ES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 8+35
Sample number	SW-07
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	39.73	Final Sample Area (cm2)	32.92
Initial Sample Length (cm)	7.62	Final Sample Length (cm)	7.40
Initial Sample Volume (cc)	302.7	Final Sample Volume (cc)	243.7
Initial moisture (%)	34.0	Final moisture (%)	24.0
Initial wet unit wt. (pcf)	117.8	Final wet unit weight (pcf)	133.3
Initial dry unit wt. (pcf)	87.9	Final dry unit weight (pcf)	107.5
Initial void ratio	0.917	Final void ratio	0.567
Initial porosity	0.478	Final porosity	0.362
Initial saturation (%)	100.0	Final saturation (%)	114.2

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	2.3E-08	n.a.		1.40	15	Maximum Gradient 18.4
2	2.4E-08	n.a.		1.00	15	
3	2.5E-08	n.a.		1.00	15	Minimum Gradient 16.6
4	2.1E-08	2.3E-08	9.0%	1.00	15	Max. Back Pressure (psi) 28.0
Final	2.2E-08	**2.3E-08**	9.5%	0.91	15	Min. Back Pressure (psi) 28.0



Checked by:

FIGURE: 7

Hydraulic Conductivity (a.k.a. Permeability) Test Report

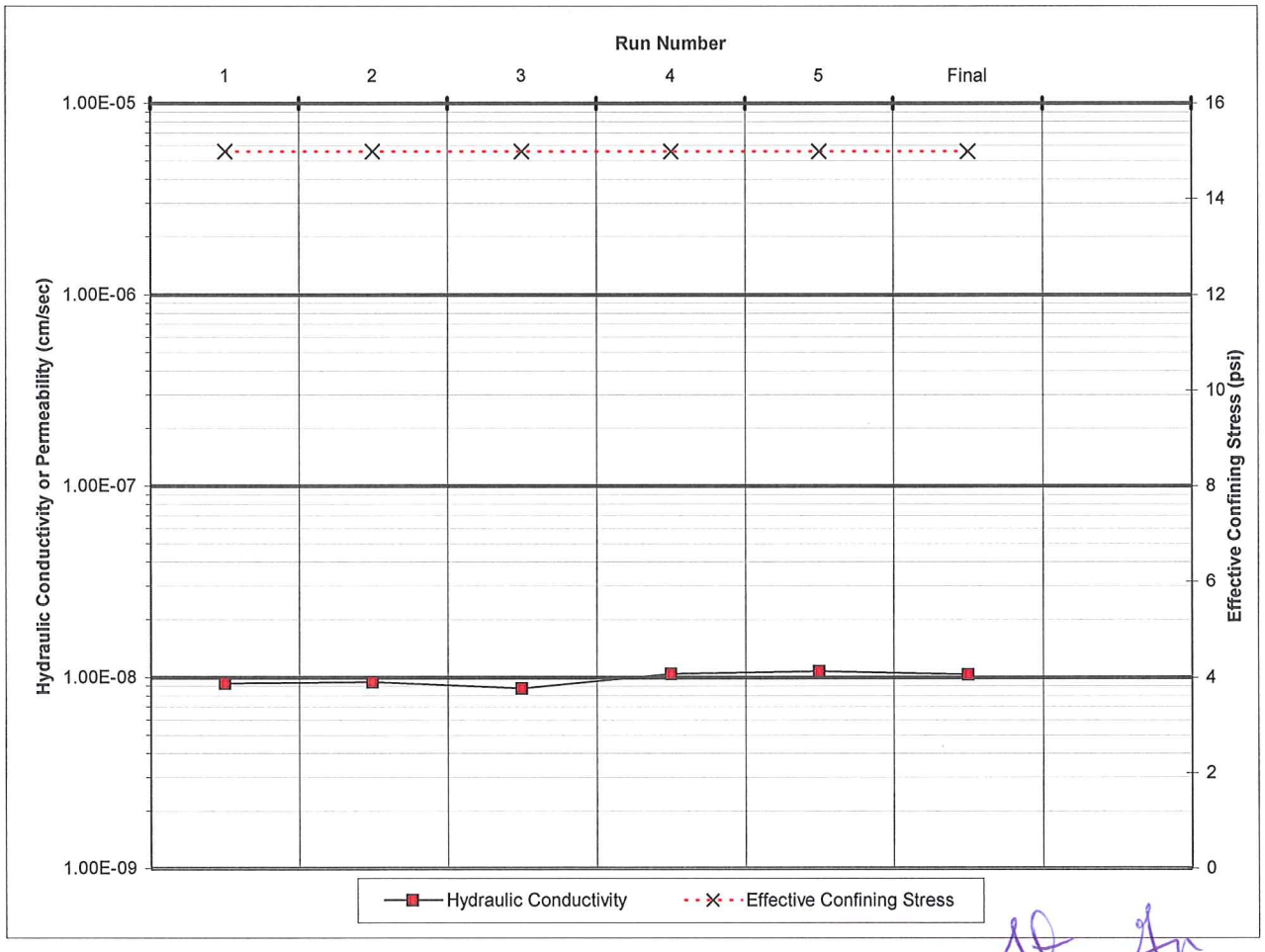
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	SB Diversified Site
Client	ES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 9+35
Sample number	SW-08
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	39.73	Final Sample Area (cm2)	32.05
Initial Sample Length (cm)	7.62	Final Sample Length (cm)	6.89
Initial Sample Volume (cc)	302.7	Final Sample Volume (cc)	220.7
Initial moisture (%)	36.1	Final moisture (%)	23.6
Initial wet unit wt. (pcf)	110.5	Final wet unit weight (pcf)	136.4
Initial dry unit wt. (pcf)	81.2	Final dry unit weight (pcf)	110.3
Initial void ratio	1.075	Final void ratio	0.527
Initial porosity	0.518	Final porosity	0.345
Initial saturation (%)	90.7	Final saturation (%)	121.1

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	9.3E-09	n.a.		0.91	15	Maximum Gradient 21.4
2	9.4E-09	n.a.		1.00	15	
3	8.7E-09	n.a.		1.25	15	Minimum Gradient 19.1
4	1.0E-08	9.5E-09	10.3%	1.00	15	
5	1.1E-08	9.8E-09	11.4%	1.00	15	Max. Back Pressure (psi) 28.0
Final	1.0E-08	**1.0E-08**	13.4%	1.00	15	
						Min. Back Pressure (psi) 28.0



Checked by: _____

FIGURE: 8

HWA GeoSciences Inc.
Geotechnical & Pavement Engineering • Hydrogeology • Geoenvironmental • Planning & Permitting • Inspection & Testing

October 18, 2011
HWA Project No. 2011-103

PES Environmental, Inc.
1215 Fourth Avenue, Suite 1350
Seattle, Washington 98161

Attention: Mr. Brian O'Neal, PE

Subject: **MATERIALS LABORATORY REPORT NO. 3**
SOIL-BENTONITE SLURRY EVALUATION
BSB Diversified Property
Kent, Washington

Dear Mr. O'Neal:

As requested, HWA GeoSciences Inc. (HWA) performed laboratory testing for the subject project. Herein we present the results of our laboratory analyses, which are summarized on the attached Tables and Figures. Figure 1 provides a cumulative summary of laboratory testing completed to date and contains results that were reported previously in Reports No. 1 and No. 2. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE INFORMATION: Samples were delivered to our laboratory on October 3, 2011, by PES Personnel. These samples were delivered in two, 5-gallon buckets. Based on manual-visual methods, the soil descriptions for the samples are as follows:

SW-10, 12+00	Gray, clayey SAND (SC)
SW-11, 13+52	Gray, clayey SAND (SC)

TESTING PROGRAM: We understand that these materials consist of soil-bentonite slurry that was mixed on-site and is being used to construct a vertical hydraulic cut-off wall at the BSB Diversified Property. The intent of this testing program is to measure the engineering properties of the slurry including: moisture content, Atterberg Limits, particle size distribution, bulk specific gravity and unit weight using a mud balance, and hydraulic conductivity.

MOISTURE CONTENT OF SOIL: The "as-received" moisture content of each slurry sample (percent by dry mass) was determined in general accordance with ASTM D 2216. Moisture content samples were taken from each bucket after the contents were re-mixed thoroughly. The results are shown on Figure 1.

21312 30th Drive SE
Suite 110
Bothell, WA 98021.7010

Tel: 425.774.0106
Fax: 425.774.2714
www.hwageo.com

PARTICLE SIZE ANALYSIS OF SOILS: The slurry samples were tested to determine their respective particle size distributions in general accordance with ASTM D422. The individual particle-size components are summarized on Figure 1. Particle Size distributions for each sample are shown on the attached Particle Size Analysis reports shown on Figure 2, which also provide information regarding the classification of the sample, Atterberg limits and the moisture content of the soil at the time of testing.

BULK SPECIFIC GRAVITY AND BULK DENSITY OF SLURRY: The bulk specific gravity and bulk unit weight of each slurry sample was determined using a mud balance per API specification 13B-1, Section 1. The results are summarized in Figure 1.

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): The slurry samples were tested using method ASTM D4318, multi-point method. Testing was conducted on the fine-grained portion of each sample that passed the U.S. No. 40 sieve after being air-dried. The results are summarized on Figure 1, and plotted on the attached Liquid Limit, Plastic Limit, and Plasticity Index report on Figure 3.

HYDRAULIC CONDUCTIVITY OF SOIL (FLEXI-WALL TRIAXIAL CHAMBER METHOD): The hydraulic conductivity (also commonly referred to as coefficient of permeability) of each slurry sample was measured in general accordance with method ASTM D5084. The specimen dimensions and weight were recorded prior to encapsulation within a flexible membrane and placement within a triaxial pressure chamber. An effective confining pressure of 15.0 psi was applied to simulate mid-trench subsurface conditions as requested by the client. Flow was induced by subjecting the test specimen to a gradient ranging from 15.8 to 20.1 generated by a back-pressure differential of 2 psi. Testing was conducted until inflow was approximately equal to outflow and the hydraulic conductivity was essentially steady. The test results are summarized on Figure 1 and presented in detail on Figures 4 and 5.

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CLOSURE: Experience has shown that laboratory test values for soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested sample may represent. HWA also makes no warranty as to how representative either the sample tested or the test results obtained are to actual field conditions. It is a well established fact that sampling methods present varying degrees of disturbance or variance that affect sample representativeness.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

Sincerely,

HWA GEOSCIENCES INC.

Steven E. Greene, L.G., L.E.G.
Senior Engineering Geologist
Vice-President

Harold Benny
Laboratory Manager

SEG:gm;seg

Attachments:

Figure 1	Material Summary (cumulative results for entire project)
Figure 2	Particle-Size Analysis of Soils
Figure 3	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
Figures 4 & 5	Hydraulic Conductivity Test Reports

SAMPLE LOCATION	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% SILT	% CLAY	MUD BALANCE		HYDRAULIC CONDUCTIVITY (cm/sec)	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
		LL	PL	PI					BULK SPECIFIC GRAVITY	BULK UNIT WEIGHT (PCF)			
SW-01, 15+00	39	43	17	26	2.2	59.5	27.6	10.7	1.795	112.1	$1.1x10^{-8}$	SC	Gray, clayey SAND
SW-02, 0+30	35	40	18	22	0.9	58.8	30.2	10.0	1.850	116.0	$1.2x10^{-8}$	SC	Gray, clayey SAND
SW-03, 2+00	32	30	22	8	5.4	52.6	36.0	6.1	1.865	116.8	$8.0x10^{-6}$	SC	Gray, clayey SAND
SW-04, 3+50	37	33	20	13	0.6	61.3	29.4	8.7	1.830	114.0	$7.7x10^{-9}$	SC	Gray, clayey SAND
SW-05, 6+50	40	34	19	15	17.7	38.4	33.7	10.1	1.810	113.0	$1.3x10^{-8}$	SC	Gray, clayey SAND with gravel
SW-06, 5+00	39	39	18	21	1.2	58.0	31.3	9.5	1.840	115.0	$1.8x10^{-8}$	SC	Dark grayish brown, clayey SAND
SW-07, 8+35	34	32	18	14	4.9	47.2	37.0	10.9	1.870	117.0	$2.3x10^{-8}$	SC	Gray, clayey SAND
SW-08, 9+35	36	33	18	15	3.6	50.4	34.4	11.7	1.830	114.5	$1.0x10^{-8}$	SC	Gray, clayey SAND
SW-10, 12+00	34	36	16	20	9.6	41.8	38.7	9.9	1.850	115.5	$9.7x10^{-9}$	SC	Gray, clayey SAND
SW-11, 13+52	32	30	16	14	1.1	55.2	34.1	9.7	1.880	117.0	$1.3x10^{-8}$	SC	Gray, clayey SAND

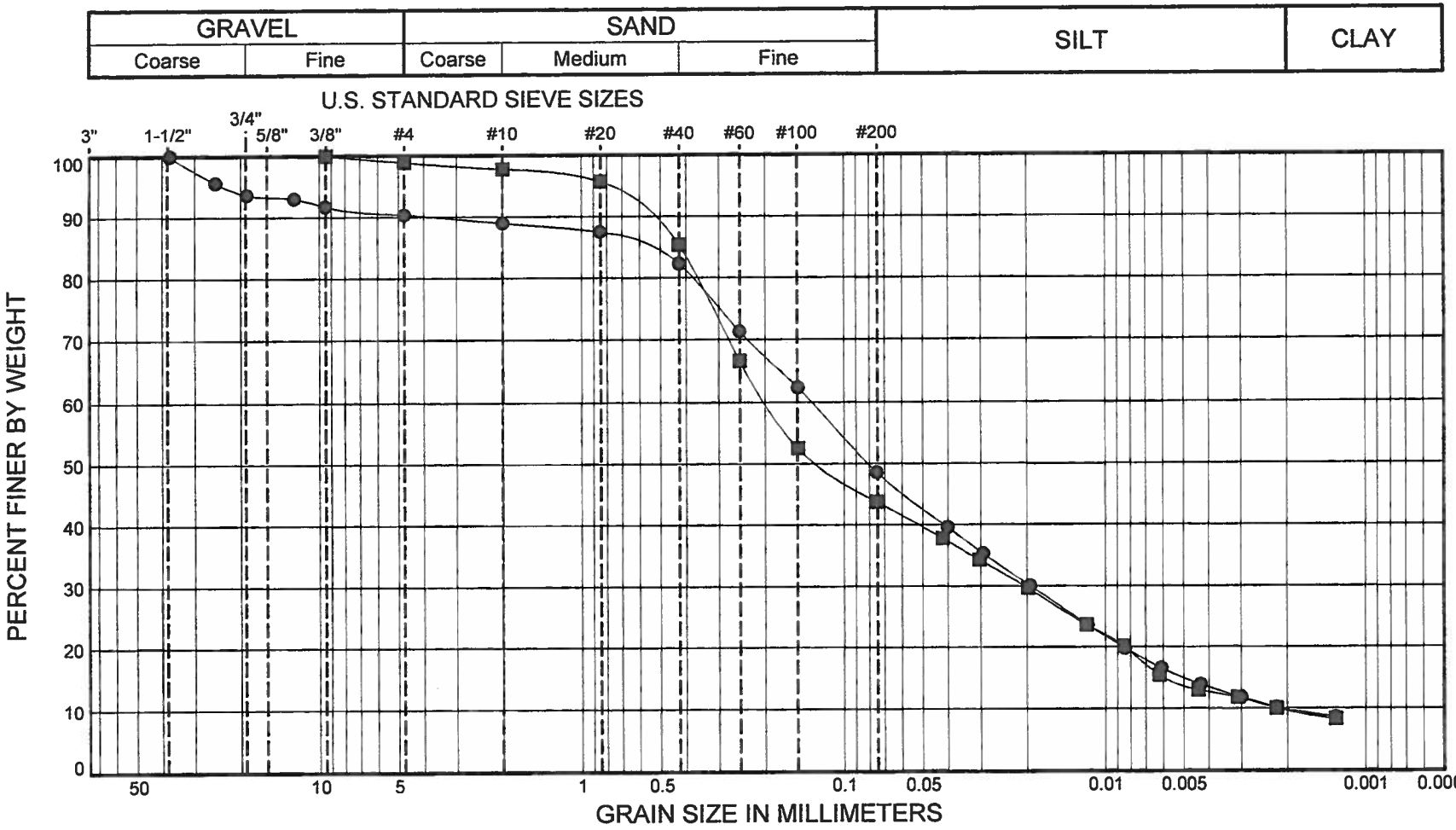
Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables.

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

SUMMARY OF
MATERIAL PROPERTIES

PROJECT NO.: 2011-103 FIGURE: 1



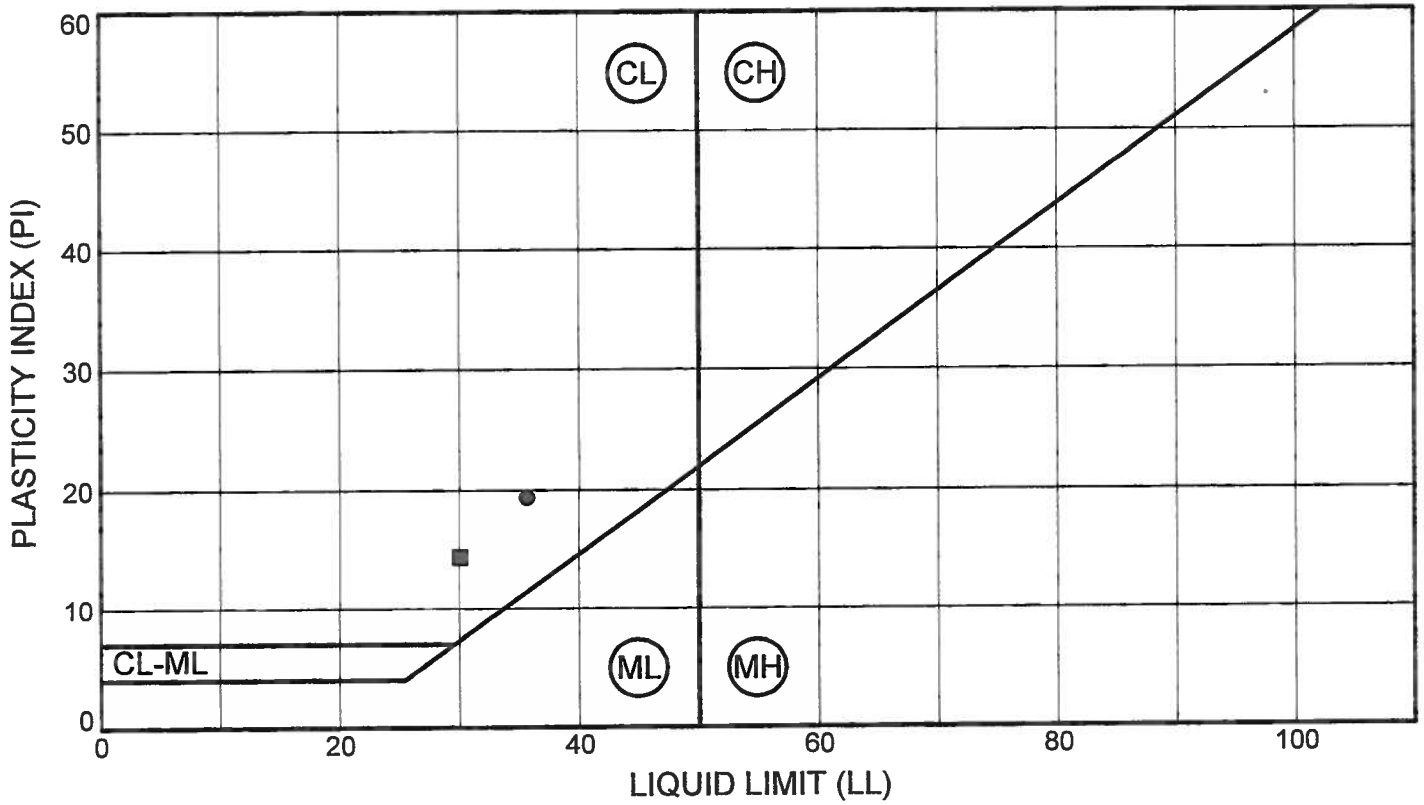
SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	SW-10	12+00	0.0 - 0.0	(SC) Gray, clayey SAND	34	36	16	20	9.6	41.8	48.6
■	SW-11	13+52	0.0 - 0.0	(SC) Gray, clayey SAND	32	30	16	14	1.1	55.2	43.8

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2011-103 FIGURE: 2



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	SW-10	12+00	0.0 - 0.0	(SC) Gray, clayey SAND	34	36	16	20	48.6
■	SW-11	13+52	0.0 - 0.0	(SC) Gray, clayey SAND	32	30	16	14	43.8

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS METHOD ASTM D4318

PROJECT NO.: 2011-103 FIGURE: 3

Hydraulic Conductivity (a.k.a. Permeability) Test Report

Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	BSB Diversified Site
Client	PES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 12+00
Sample number	SW-10
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	81.07	Final Sample Area (cm2)	65.92
Initial Sample Length (cm)	7.62	Final Sample Length (cm)	7.35
Initial Sample Volume (cc)	617.8	Final Sample Volume (cc)	484.4
Initial moisture (%)	34.2	Final moisture (%)	24.0
Initial wet unit wt. (pcf)	112.0	Final wet unit weight (pcf)	130.7
Initial dry unit wt. (pcf)	83.4	Final dry unit weight (pcf)	105.4
Initial void ratio	1.020	Final void ratio	0.598
Initial porosity	0.505	Final porosity	0.374
Initial saturation (%)	90.7	Final saturation (%)	108.4

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)
1	9.9E-09	n.a.		1.71	15
2	1.1E-08	n.a.		0.70	15
3	9.4E-09	n.a.		1.06	15
4	9.6E-09	9.9E-09	8.1%	1.00	15
Final	9.2E-09	9.7E-09	9.9%	0.87	15
					15

Other information
Maximum Gradient 20.1
Minimum Gradient 17.9
Max. Back Pressure (psi) 28.0
Min. Back Pressure (psi) 28.0

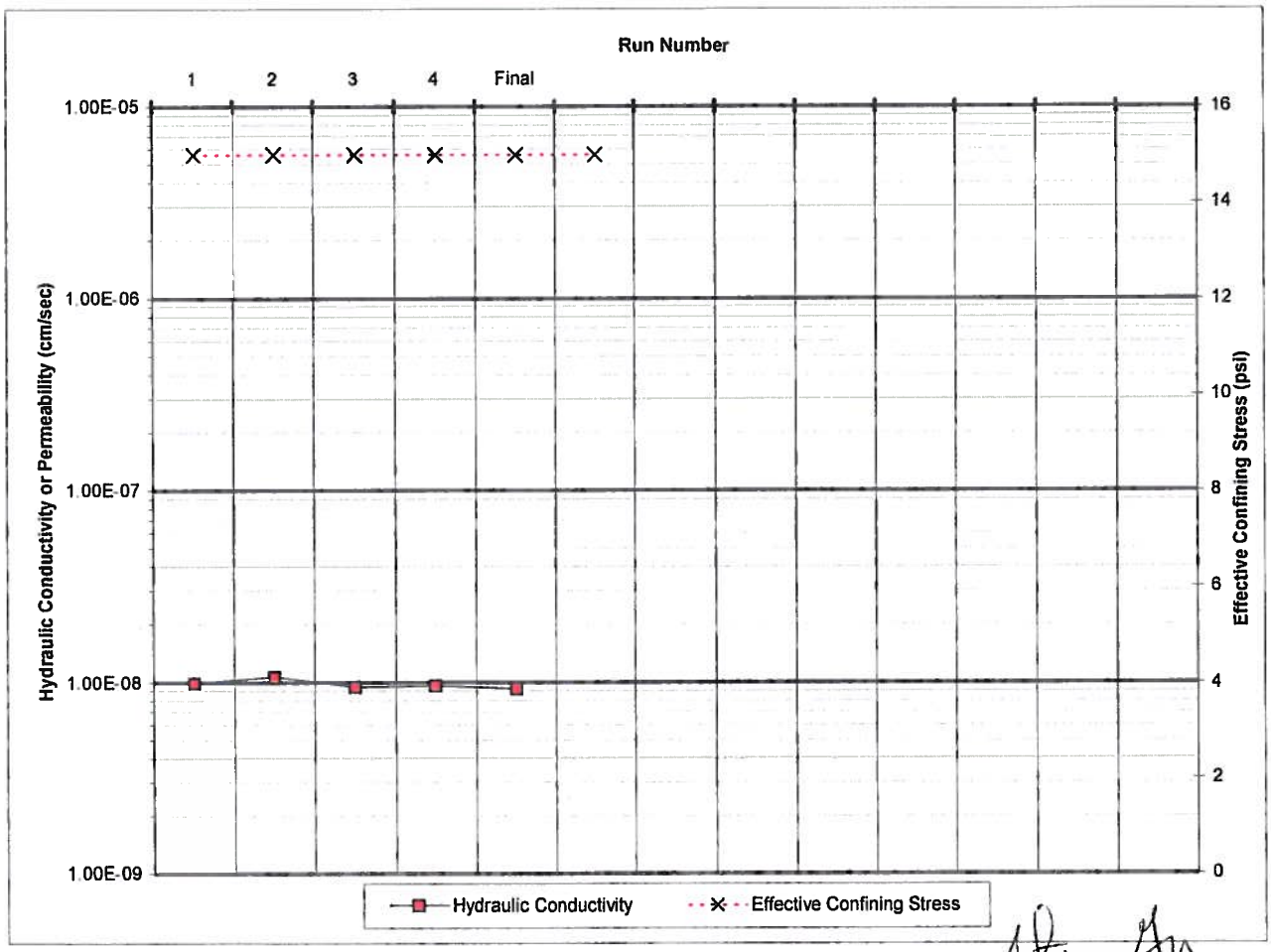


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FIGURE: 4

Hydraulic Conductivity (a.k.a. Permeability) Test Report

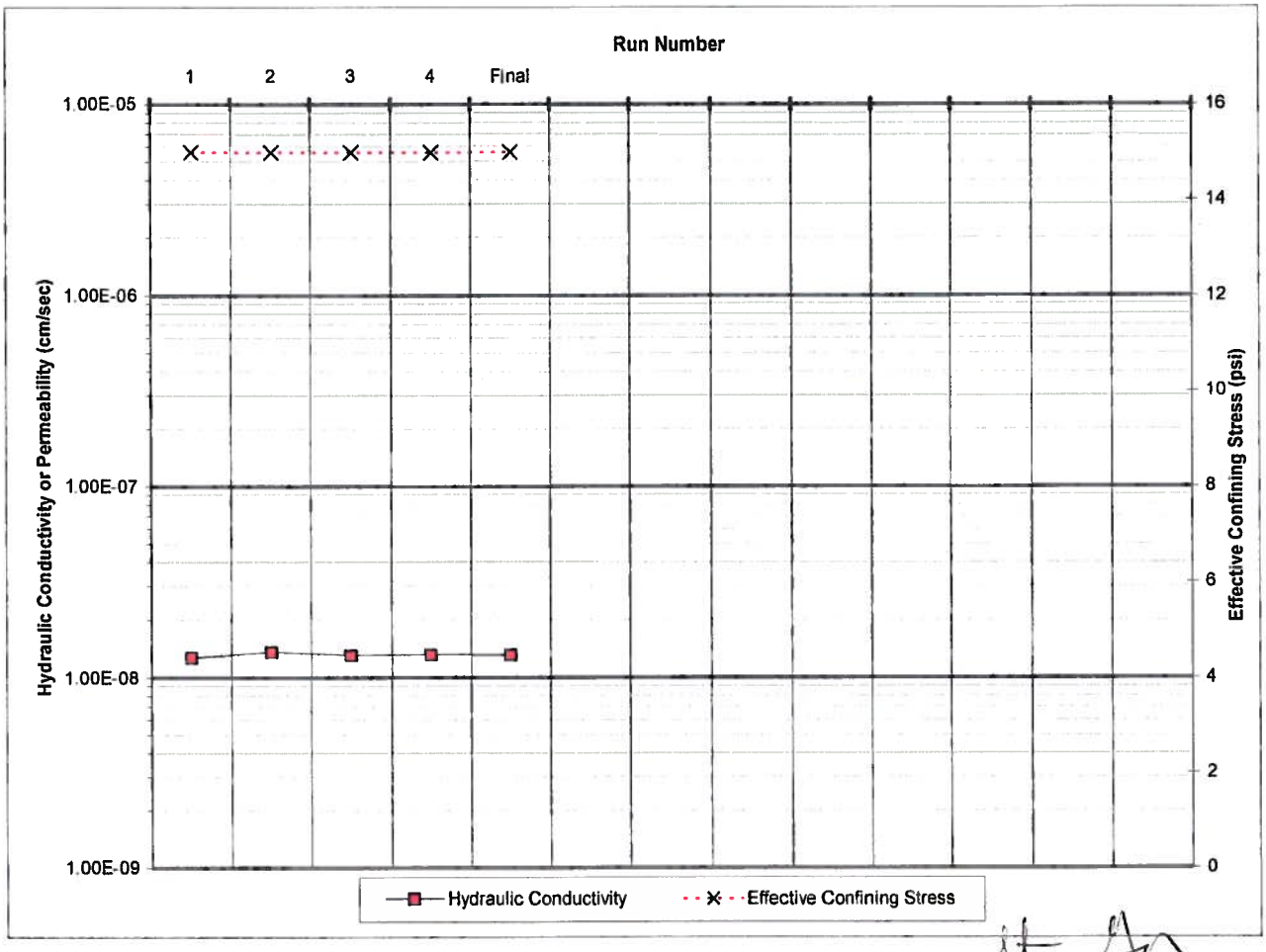
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	BSB Diversified Site
Client	PES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 13+52
Sample number	SW-11
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.70		
Initial Sample Area (cm2)	81.07	Final Sample Area (cm2)	70.30
Initial Sample Length (cm)	8.38	Final Sample Length (cm)	7.65
Initial Sample Volume (cc)	679.6	Final Sample Volume (cc)	537.9
Initial moisture (%)	31.5	Final moisture (%)	22.3
Initial wet unit wt. (pcf)	111.8	Final wet unit weight (pcf)	128.9
initial dry unit wt. (pcf)	85.0	Final dry unit weight (pcf)	105.4
Initial void ratio	0.983	Final void ratio	0.598
Initial porosity	0.496	Final porosity	0.374
Initial saturation (%)	86.7	Final saturation (%)	100.6

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	1.3E-08	n.a.		1.50	15	Maximum Gradient 19.4
2	1.4E-08	n.a.		1.20	15	Minimum Gradient 15.8
3	1.3E-08	n.a.		1.00	15	Max. Back Pressure (psi) 28.0
4	1.3E-08	1.3E-08	3.2%	1.00	15	Min. Back Pressure (psi) 28.0
Final	1.3E-08	1.3E-08	2.5%	0.93	15	



Checked by: _____

FIGURE: 5

HWA GEOSCIENCES INC.
Geotechnical & Pavement Engineering • Hydrogeology • Geoenvironmental • Planning & Permitting • Inspection & Testing

October 24, 2011
HWA Project No. 2011-103

PES Environmental, Inc.
1215 Fourth Avenue, Suite 1350
Seattle, Washington 98161

Attention: Mr. Brian O'Neal, PE

Subject: **MATERIALS LABORATORY REPORT NO. 4**
SOIL-BENTONITE SLURRY EVALUATION
BSB Diversified Property
Kent, Washington

Dear Mr. O'Neal:

As requested, HWA GeoSciences Inc. (HWA) performed laboratory testing for the subject project. Herein we present the results of our laboratory analyses, which are summarized on the attached Tables and Figures. Figure 1 provides a cumulative summary of laboratory testing completed to date and contains results that were reported previously in Reports No. 1, No. 2 and No. 3. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE INFORMATION: This sample was delivered to our laboratory on October 3, 2011, by PES Personnel. This sample was delivered in one, 5-gallon bucket. Based on manual-visual methods, the soil descriptions for the sample is as follows:

SW-9, 10+50 Gray, sandy lean CLAY (CL)

TESTING PROGRAM: We understand that these materials consist of soil-bentonite slurry that was mixed on-site and is being used to construct a vertical hydraulic cut-off wall at the BSB Diversified Property. The intent of this testing program is to measure the engineering properties of the slurry including: moisture content, Atterberg Limits, particle size distribution, bulk specific gravity and unit weight using a mud balance, and hydraulic conductivity.

MOISTURE CONTENT OF SOIL: The "as-received" moisture content of the slurry sample (percent by dry mass) was determined in general accordance with ASTM D 2216. Moisture content of the sample was taken from the bucket after the contents were re-mixed thoroughly. The results are shown on Figure 1.

21312 30th Drive SE
Suite 110
Bothell, WA 98021.7010
Tel: 425.774.0106
Fax: 425.774.2714
www.hwageo.com

PARTICLE SIZE ANALYSIS OF SOILS: The slurry sample was tested to determine its particle size distribution in general accordance with ASTM D422. The individual particle-size components are summarized on Figure 1. Particle Size distribution of the sample is shown on the attached Particle Size Analysis report, Figure 2, which also provides information regarding the classification of the sample, Atterberg limits and the moisture content of the soil at the time of testing.

BULK SPECIFIC GRAVITY AND BULK DENSITY OF SLURRY: The bulk specific gravity and bulk unit weight of the slurry sample was determined using a mud balance per API specification 13B-1, Section 1. The results are summarized in Figure 1.

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): The slurry sample was tested using method ASTM D4318, multi-point method. Testing was conducted on the fine-grained portion of the sample that passed the U.S. No. 40 sieve after being air-dried. The results are summarized on Figure 1, and plotted on the attached Liquid Limit, Plastic Limit, and Plasticity Index report on Figure 3.

HYDRAULIC CONDUCTIVITY OF SOIL (FLEXI-WALL TRIAXIAL CHAMBER METHOD): The hydraulic conductivity (also commonly referred to as coefficient of permeability) of the slurry sample was measured in general accordance with method ASTM D5084. The specimen dimensions and weight were recorded prior to encapsulation within a flexible membrane and placement within a triaxial pressure chamber. An effective confining pressure of 15.0 psi was applied to simulate mid-trench subsurface conditions as requested by the client. Flow was induced by subjecting the test specimen to a gradient ranging from 15.0 to 18.0 generated by a back-pressure differential of 2 psi. Testing was conducted until inflow was approximately equal to outflow and the hydraulic conductivity was essentially steady. The test results are summarized on Figure 1 and presented in detail on Figure 4.

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CLOSURE: Experience has shown that laboratory test values for soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested sample may represent. HWA also makes no warranty as to how representative either the sample tested or the test results obtained are to actual field conditions. It is a well established fact that sampling methods present varying degrees of disturbance or variance that affect sample representativeness.

October 24, 2011
HWA Project No. 2011-103

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

Sincerely,

HWA GEOSCIENCES INC.

Steven E. Greene, L.G., L.E.G.
Senior Engineering Geologist
Vice-President

Harold Benny
Laboratory Manager

SEG:gm;seg

Attachments:

Figure 1	Material Summary (cumulative results for entire project)
Figure 2	Particle-Size Analysis of Soils
Figure 3	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
Figure 4	Hydraulic Conductivity Test Report

SAMPLE LOCATION	MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			% GRAVEL	% SAND	% SILT	% CLAY	MUD BALANCE		HYDRAULIC CONDUCTIVITY (cm/sec)	ASTM SOIL CLASSIFICATION	SAMPLE DESCRIPTION
		LL	PL	PI					BULK SPECIFIC GRAVITY	BULK UNIT WEIGHT (PCF)			
SW-01, 15+00	39	43	17	26	2.2	59.5	27.6	10.7	1.795	112.1	$1.1x10^{-8}$	SC	Gray, clayey SAND
SW-02, 0+30	35	40	18	22	0.9	58.8	30.2	10.0	1.850	116.0	$1.2x10^{-8}$	SC	Gray, clayey SAND
SW-03, 2+00	32	30	22	8	5.4	52.6	36.0	6.1	1.865	116.8	$8.0x10^{-8}$	SC	Gray, clayey SAND
SW-04, 3+50	37	33	20	13	0.6	61.3	29.4	8.7	1.830	114.0	$7.7x10^{-9}$	SC	Gray, clayey SAND
SW-05, 6+50	40	34	19	15	17.7	38.4	33.7	10.1	1.810	113.0	$1.3x10^{-8}$	SC	Gray, clayey SAND with gravel
SW-06, 5+00	39	39	18	21	1.2	58.0	31.3	9.5	1.840	115.0	$1.8x10^{-8}$	SC	Dark grayish brown, clayey SAND
SW-07, 8+35	34	32	18	14	4.9	47.2	37.0	10.9	1.870	117.0	$2.3x10^{-8}$	SC	Gray, clayey SAND
SW-08, 9+35	36	33	18	15	3.6	50.4	34.4	11.7	1.830	114.5	$1.0x10^{-8}$	SC	Gray, clayey SAND
SW-09, 10+50	38	38	18	20	2.3	39.8	45.7	12.2	1.810	113.0	$7.5x10^{-9}$	CL	Gray, sandy lean CLAY
SW-10, 12+00	34	36	16	20	9.6	41.8	38.7	9.9	1.850	115.5	$9.7x10^{-9}$	SC	Gray, clayey SAND
SW-11, 13+52	32	30	16	14	1.1	55.2	34.1	9.7	1.880	117.0	$1.3x10^{-8}$	SC	Gray, clayey SAND

Notes: 1. This table summarizes information presented elsewhere in the report and should be used in conjunction with the report text, other graphs and tables.

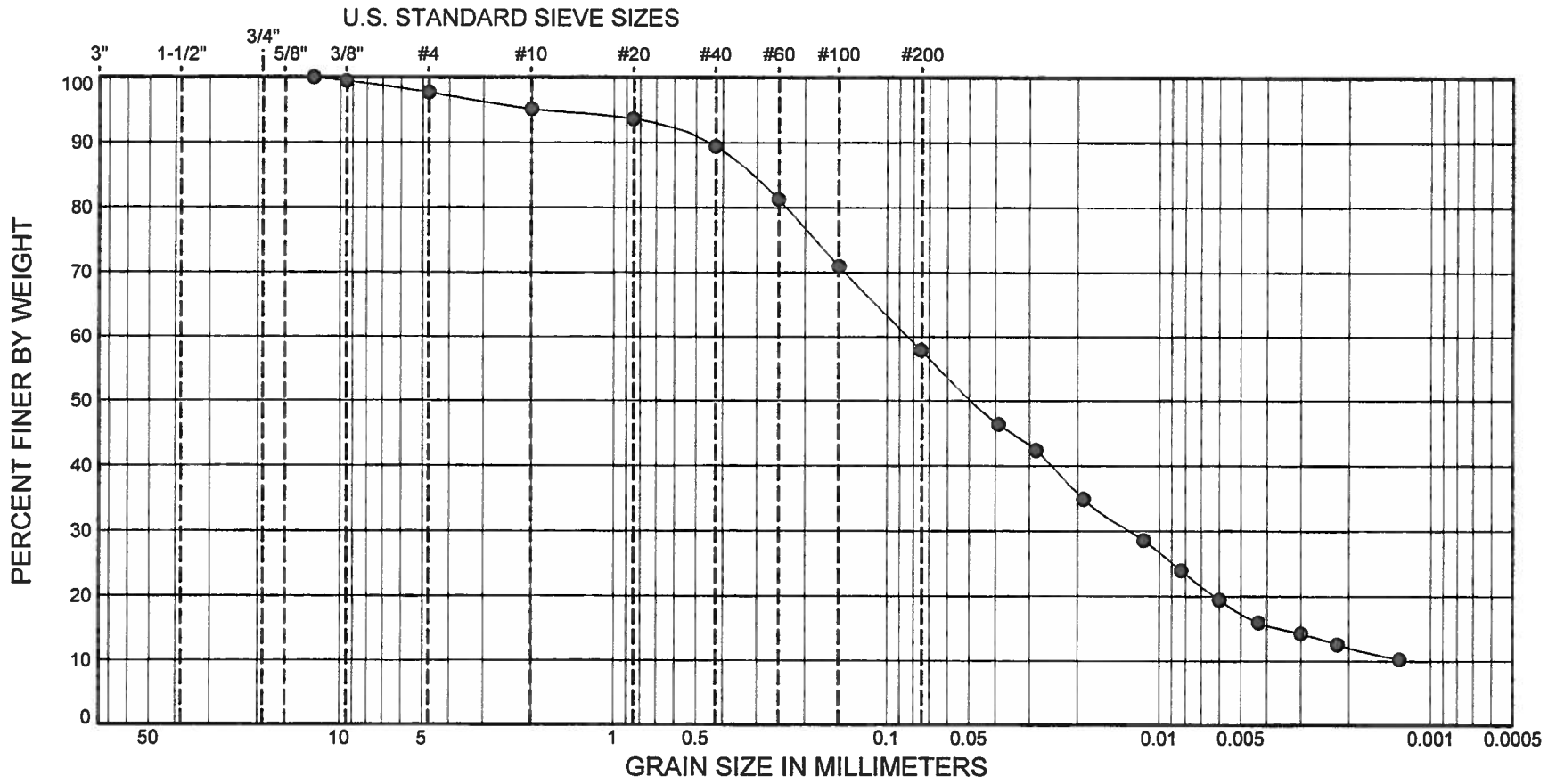
HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

SUMMARY OF
MATERIAL PROPERTIES

PROJECT NO.: 2011-103 FIGURE: 1

GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		



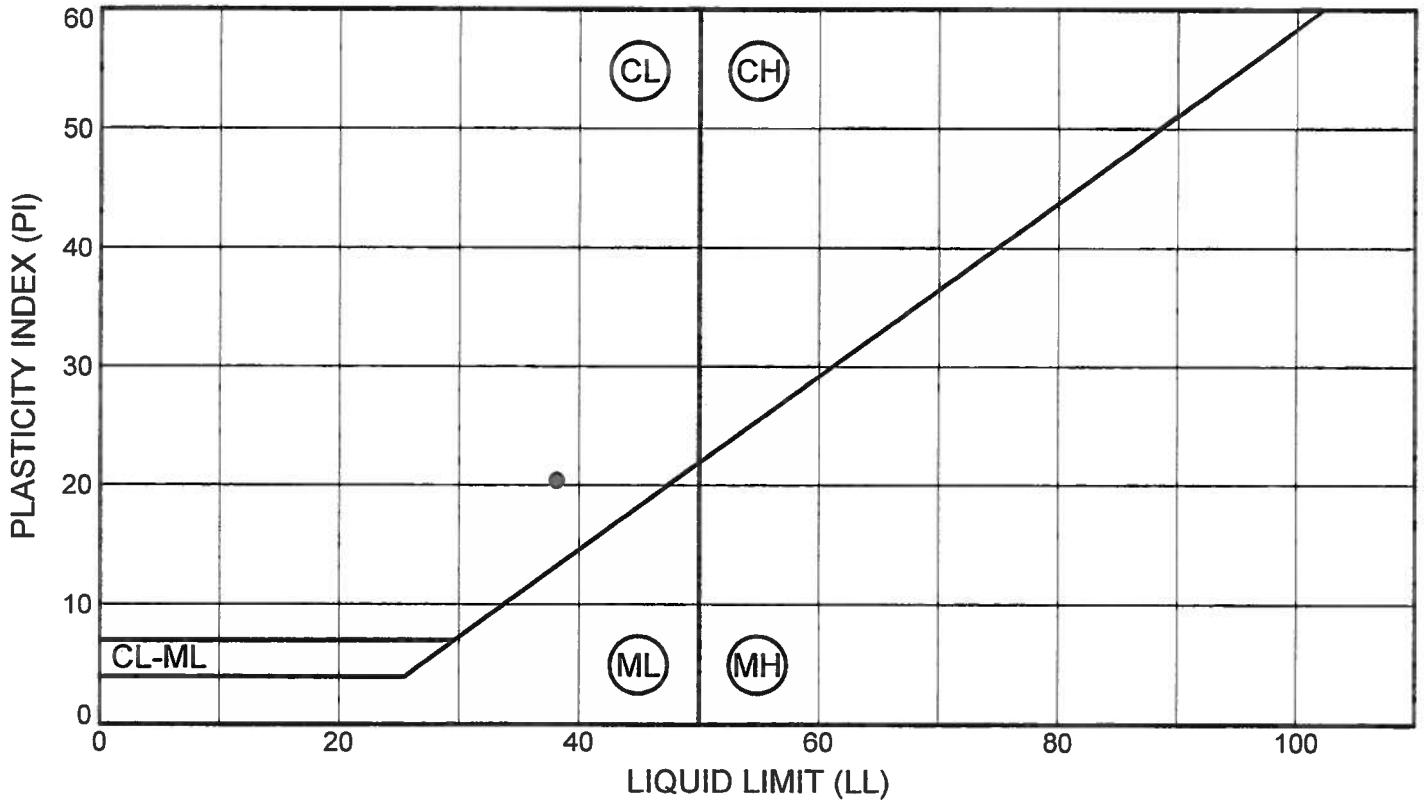
SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	SW-09	10+50	0.0 - 0.0	(CL) Gray, sandy lean CLAY	38	38	18	20	2.3	39.8	57.9

HWA GeoSciences Inc.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2011-103 FIGURE: 2



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	SW-09	10+50	0.0 - 0.0	(CL) Gray, sandy lean CLAY	38	38	18	20	57.9

HWA GeoSciences Inc.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2011-103 FIGURE: 3

Hydraulic Conductivity (a.k.a. Permeability) Test Report

Method ASTM D 5084

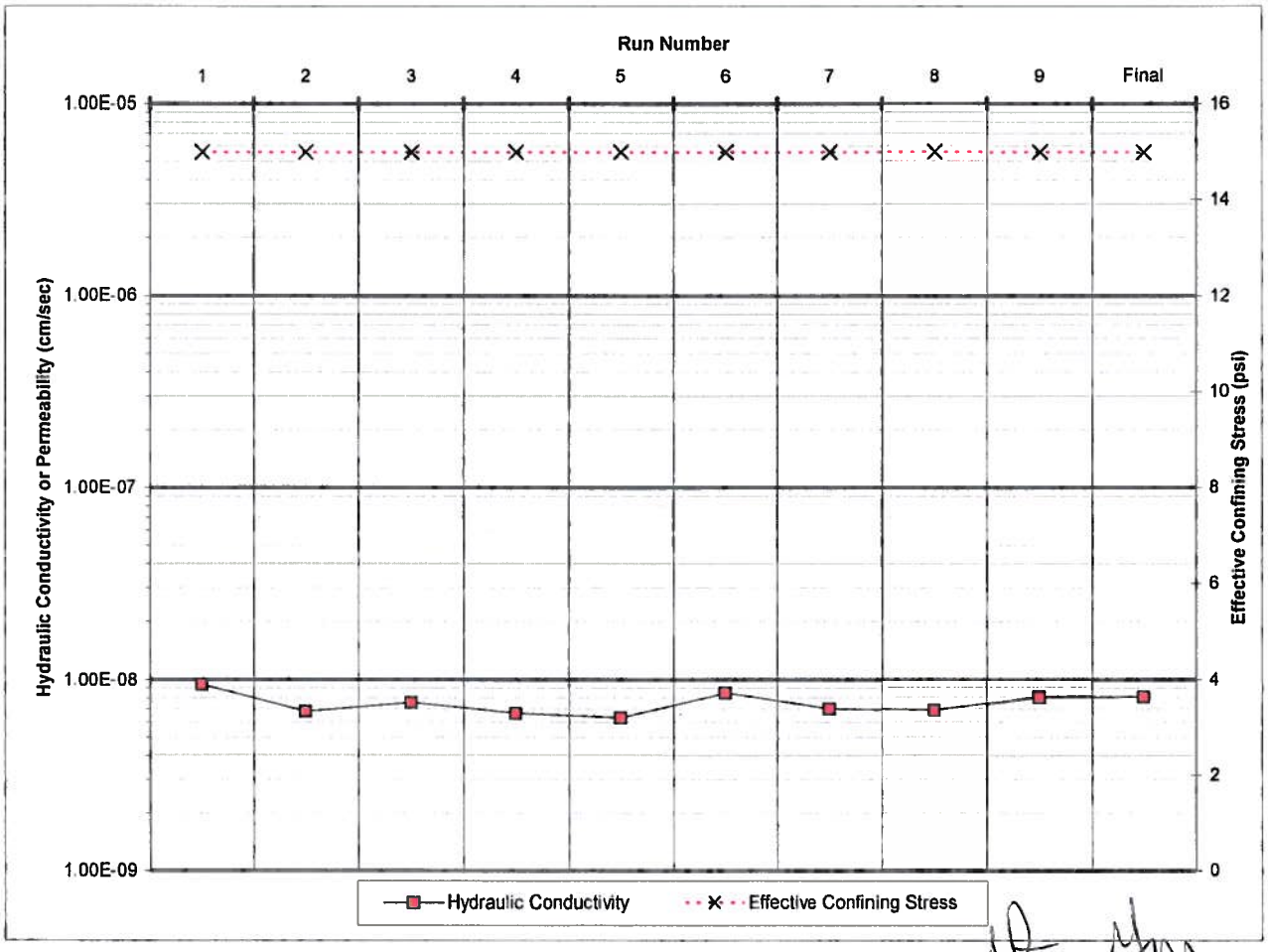
HWA GEOSCIENCES INC.

Project	BSB Diversified Site
Client	PES Environmental
Project number	2011-103
Date	9/30/2011
Technician	HB
Sample point	Station 10+50
Sample number	SW-09
Sample depth	NA
Sample description	SB Slurry

Assumed Specific Gravity	2.65		
Initial Sample Area (cm2)	81.07	Final Sample Area (cm2)	70.02
Initial Sample Length (cm)	9.40	Final Sample Length (cm)	8.29
Initial Sample Volume (cc)	761.9	Final Sample Volume (cc)	580.8
Initial moisture (%)	37.8	Final moisture (%)	24.3
Initial wet unit wt. (pcf)	113.0	Final wet unit weight (pcf)	133.1
Initial dry unit wt. (pcf)	82.0	Final dry unit weight (pcf)	107.1
Initial void ratio	1.018	Final void ratio	0.544
Initial porosity	0.504	Final porosity	0.352
Initial saturation (%)	98.5	Final saturation (%)	118.2

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)
1	9.4E-09	n.a.		2.50	15
2	6.8E-09	n.a.		5.25	15
3	7.6E-09	n.a.		2.12	15
4	6.7E-09	7.6E-09	23.4%	2.60	15
5	6.3E-09	6.8E-09	10.9%	0.33	15
6	8.5E-09	7.2E-09	16.7%	0.70	15
7	7.0E-09	7.1E-09	19.0%	0.90	15
8	6.9E-09	7.2E-09	18.2%	0.86	15
9	8.1E-09	7.6E-09	11.2%	1.00	15
Final	8.1E-09	7.5E-09	8.5%	1.00	15

Other Information
Maximum Gradient 18.0
Minimum Gradient 15.0
Max. Back Pressure (psi) 28.0
Min. Back Pressure (psi) 28.0



Checked by:

FIGURE: 4

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October 31, 2011
HWA Project No. 2011-103

PES Environmental, Inc.
1215 Fourth Avenue, Suite 1350
Seattle, WA 98161

Attention: Mr. Brian O'Neal, PE

Subject: **MATERIALS LABORATORY REPORT NO. 5**
SOIL-BENTONITE SLURRY EVALUATION
BSB Diversified Property
Kent, Washington

Dear Mr. O'Neal:

As requested, HWA GeoSciences Inc. (HWA) performed laboratory testing for the subject project. Herein we present the results of our laboratory analyses, which are summarized on the attached Tables and Figures. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE INFORMATION: Samples were picked up at the site and delivered to our laboratory on September 21, 2011, by HWA Personnel. These samples were delivered in 5-gallon buckets and large plastic bags. Based on manual-visual methods, the soil descriptions for the samples are as follows:

Site Soil	Dark brown silty clayey SAND with gravel (SC-SM)
Drain Rock	Poorly graded Gravel (GP)
Bentonite	Finely graded commercial Bentonite

BENTONITE SLURRY TESTING PROGRAM: We prepared soil-Bentonite-cement slurries, using the proportions provided by the client. The site soils were screened over a ¾ inch sieve to remove large gravel particles and to blend the soils from each bucket together. After determining the soil moisture content, about 20 lbs of moist site soil was weighed out into a 5-gallon bucket. Six percent Bentonite, based on the dry soil weight, was added to the bucket, along with water. The materials were mixed using a paddle mixer attached to an electric drill. Water was added until the resulting slurry had a slump that was visually estimated at about 5-6 inches. LaFarge Portland type I/II cement was then added at 5% of the dry soil weight. The slurry was mixed until a uniform mixture was obtained. The material was then scooped into four by eight inch concrete cylinder molds. The slurry was consolidated to remove air bubbles. Three additional batches were then prepared in a similar manner using 8%, 11%, and 14% cement by dry weight of soil.

21312 30th Drive SE
Suite 110
Bothell, WA 98021.7010
Tel: 425.774.0106
Fax: 425.774.2714
www.hwageo.com

MOISTURE CONTENT OF SOIL: The "as-received" moisture content of the site soil (percent by dry mass) was determined in general accordance with ASTM D 2216. The moisture content sample was taken from the bucket after the contents were re-mixed thoroughly. The results are shown on Figure 1.

PARTICLE SIZE ANALYSIS OF SOILS: The site soil sample was tested to determine the particle size distribution in general accordance with ASTM D422. The results are shown on the attached Particle Size Analysis report shown on Figure 1, which also provide information regarding the classification of the sample, and the moisture content at the time of testing.

SIEVE ANALYSIS OF AGGREGATE: The particle size distribution of the drain rock sample was determined by sieving, in general accordance with ASTM C136. The results are reported on the attached Figure 2.

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): The site soil sample was tested using method ASTM D4318, multi-point method. Testing was conducted on the fine-grained portion of the sample that passed the U.S. No. 40 sieve after being air-dried. The results are summarized on the attached Liquid Limit, Plastic Limit, and Plasticity Index report on Figure 3.

PERMEABILITY OF GRANULAR SOILS (WSDOT FALLING HEAD METHOD): The coefficient of permeability (also commonly referred to as hydraulic conductivity) of the drain rock was measured in general accordance with WSDOT method 605. The sample was placed in the test apparatus and compacted by tamping. The material was so permeable that accurate readings were not possible. The permeability was estimated to be greater than or equal to 12,000 inches per hour.

UNCONFINED COMPRESSION TEST: The specimens were cured in a water bath at 70° F until tested. At specified ages, the compressive strength specimens were removed from the bath, stripped from their molds and tested for unconfined compressive strength in general accordance with ASTM C39. The samples were loaded until failure. The compressive strength is reported as calculated, without rounding to the nearest 10 pounds. The results are summarized in Table 1, below:

Table 1. Compressive Strength of Cement-Bentonite-Soil Slurry

Age	Strength at 3 days, psf	Strength at 7 days, psf	Strength at 14 days, psf
5% Cement	4.1	6.9	6.6
8% Cement	21.4	20.9	20.1
11% Cement	35.9	40.2	40.6
14% Cement	51.3	58.4	60.0

CLOSURE: Experience has shown that laboratory test values for soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested sample may represent. HWA also makes no warranty as to how representative either the sample tested or the test results obtained are to actual field conditions. It is a well established fact that sampling methods present varying degrees of disturbance or variance that affect sample representativeness.

No copy should be made of this report except in its entirety.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

Sincerely,

HWA GEOSCIENCES INC.

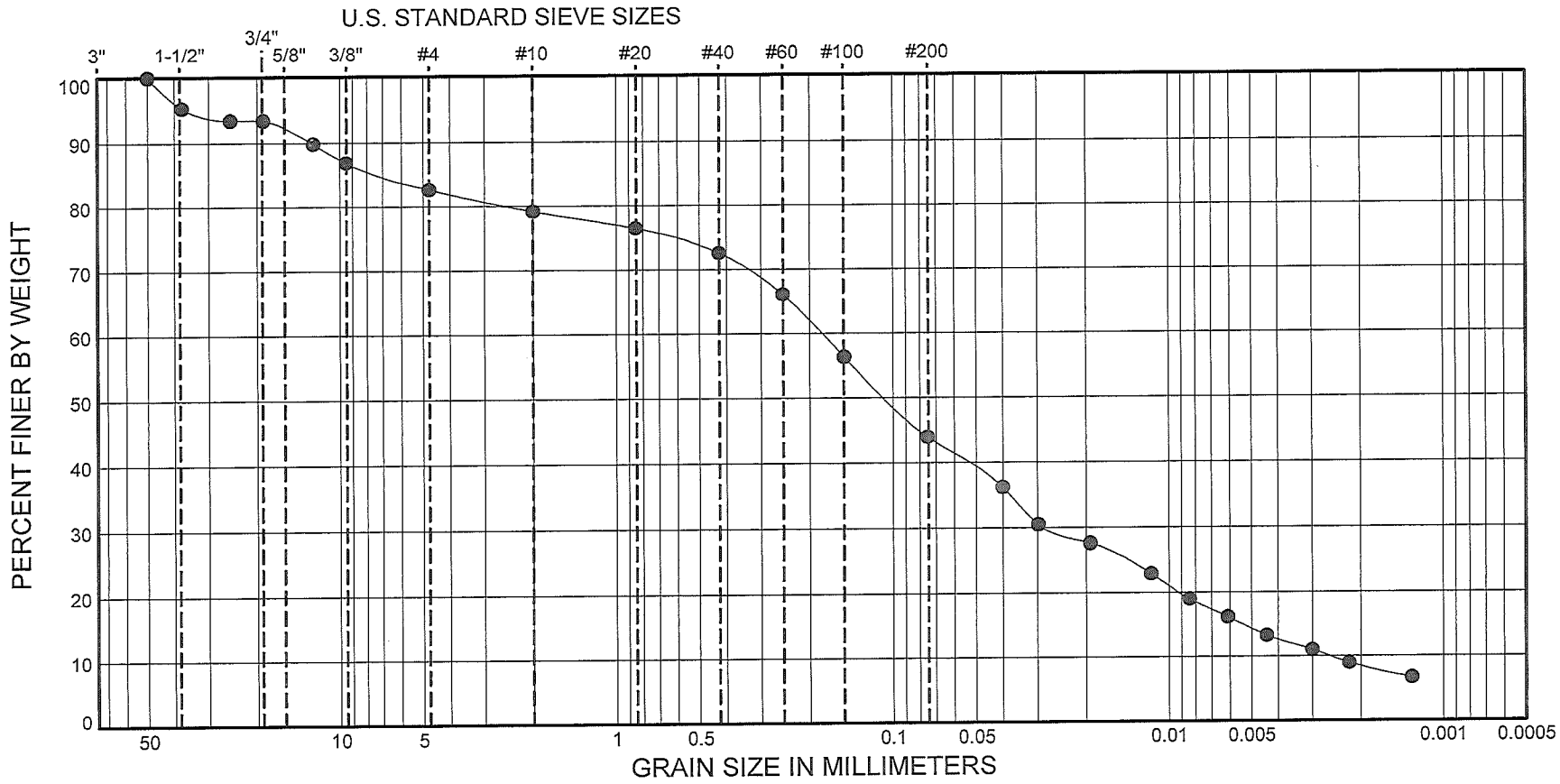
Harold Benny
Laboratory Manager

Steven E. Greene, L.G., L.E.G.
Vice President

Attachments:

Figure 1 Particle-Size Analysis of Soils
Figure 2 Sieve Analysis of Aggregate
Figure 3 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	Site Soil			(SC-SM) Dark brown, silty, clayey SAND with gravel	15	26	21	5	17.3	38.7	44.0

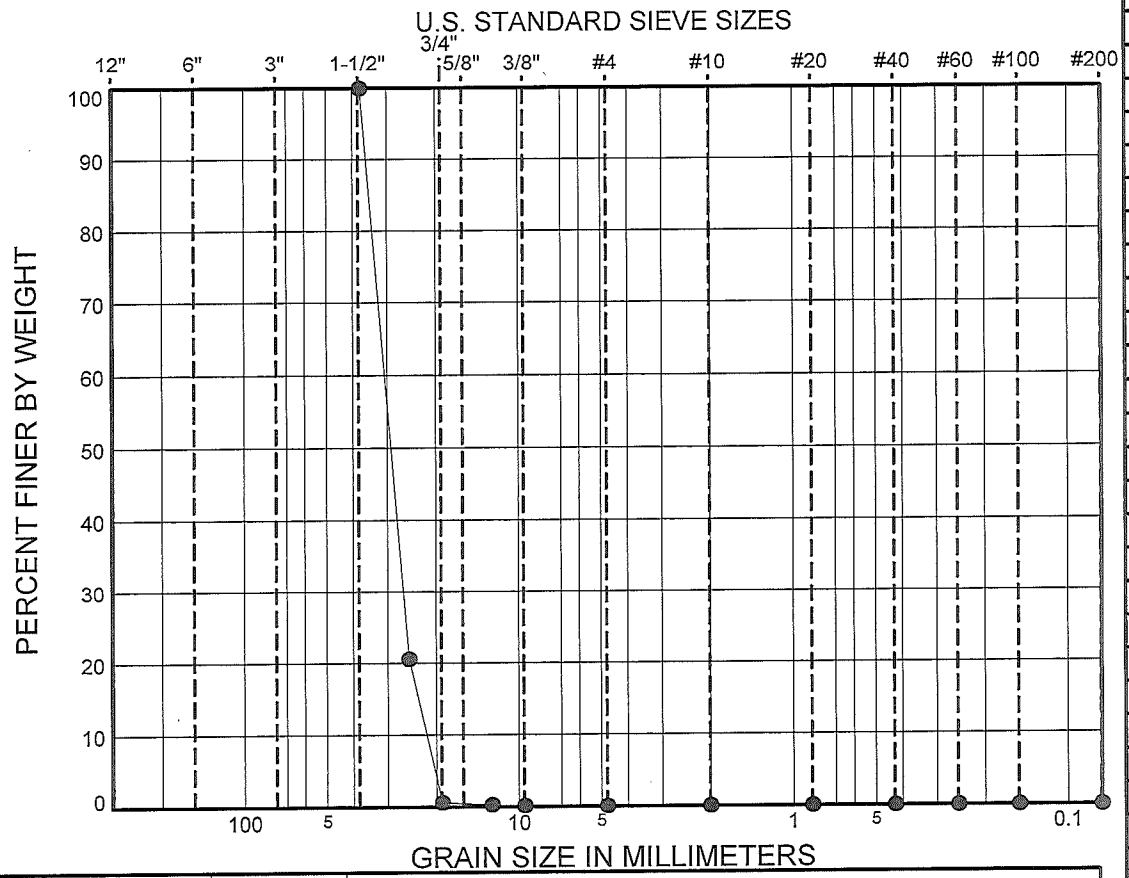
HWA GeoSciences Inc.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2011-103 FIGURE: 1

COBBLES	GRAVEL		SAND		
	Coarse	Fine	Coarse	Medium	Fine



SAMPLE ID	DATE SAMPLED	SAMPLED FROM
DRAIN ROCK		

Sieve Size	Percent Passing	Specification Limits
8 Inch		
7 Inch		
6 Inch		
5 Inch		
4 Inch		
3 Inch		
2 1/2 Inch		
2 Inch		
1 1/2 Inch	100%	
1 1/4 Inch		
1 Inch	21%	
3/4 Inch	1%	
5/8 Inch		
1/2 Inch	0%	
3/8 Inch	0%	
1/4 Inch		
No. 4	0%	
No. 8		
No. 10	0%	
No. 16		
No. 20	0%	
No. 30		
No. 40	0%	
No. 50		
No. 60	0%	
No. 80		
No. 100	0%	
No. 200	0.0%	

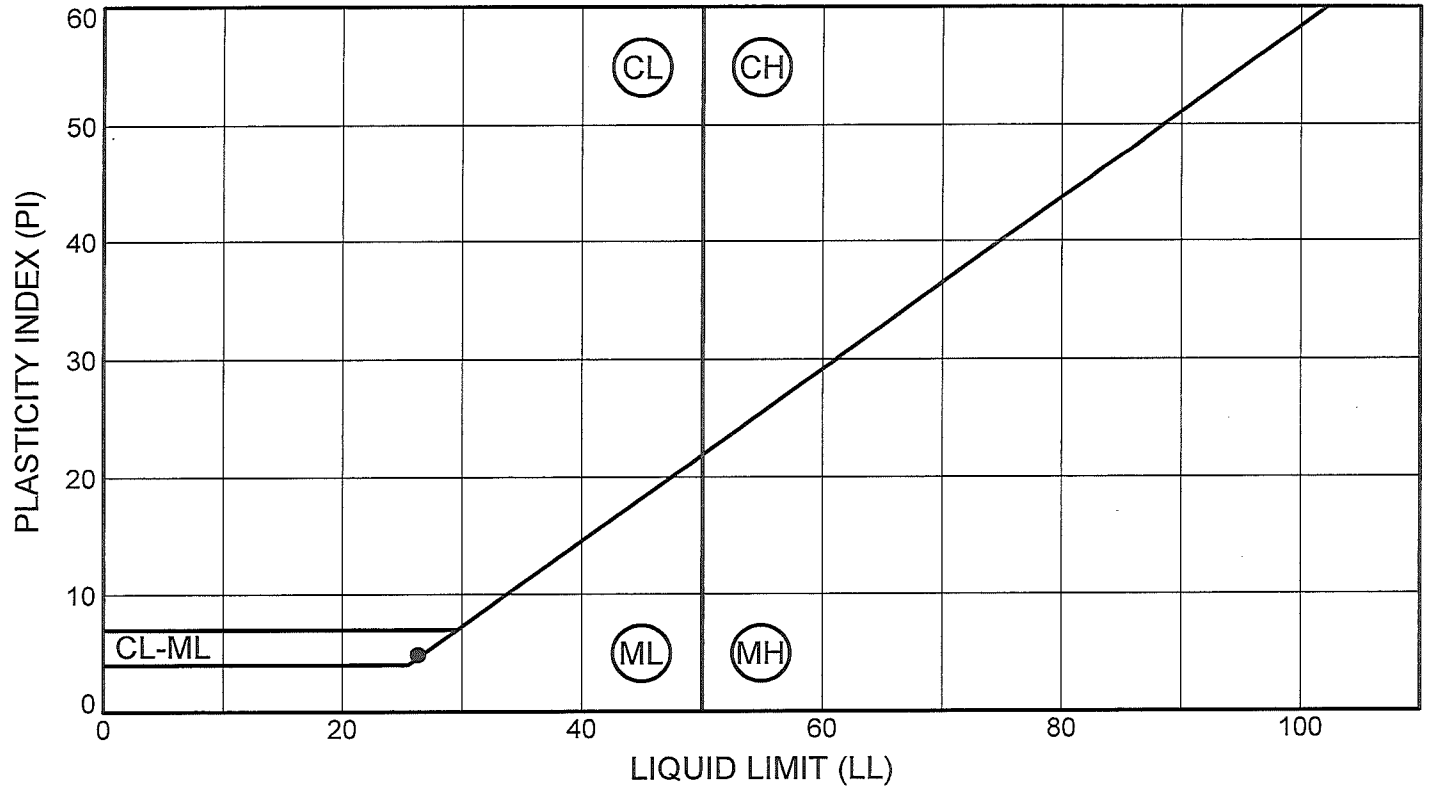
MATERIAL CLASSIFICATION / DESCRIPTION	Moisture %	Sand Equiv't	L.A. Abras'n	Degra-dation	Dust Ratio	MGS04 Sound	Plastic Index	Fracture %
(GP) Poorly graded GRAVEL								

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

SIEVE ANALYSIS
OF AGGREGATE
METHOD ASTM C136

PROJECT NO.: 2011-103 FIGURE: 2



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	Site Soil			(SC-SM) Dark brown, silty, clayey SAND with gravel	15	26	21	5	44.0

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

LIQUID LIMIT, PLASTIC LIMIT AND
PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2011-103 FIGURE: 3

APPENDIX I

DeWind SBCW Construction Quality Control Report

DEWIND ONE-PASS TRENCHING
COMPLETION REPORT
SLURRY WALL CONSTRUCTION
BSB DIVERSIFIED FACILITY
FOR
MID-MOUNTAIN CONSTRUCTION
January 31, 2012

1.0 Introduction

Between September 22 and October 3, 2011, DeWind completed the installation of a slurry wall at the BSB Diversified Facility located in Kent Washington. This Completion Report summarizes the construction activities, provides copies of the completed QC forms and lab results, and includes a cross section of the completed slurry wall.

2.0 Project Summary

The soil-bentonite slurry wall was constructed at the facility from station 0+00 to 15+86 (1586 linear ft). Based on the pre-design mixing tests DeWind mixed 6% dry CETCO Premium Gel Bentonite with the native soils and water, so that the slump was maintained from 4-6 inches, to achieve the design specification permeability (maximum permeability of 1×10^{-7} cm/sec). Four Hundred and thirty five (435) tons of bentonite was mixed with native soils during slurry wall installation.

The dry bentonite was fed through a custom-made delivery system into the cutting chain. Using a dry soil density of 95lbs/cubic foot of soil, 5.7 lbs of bentonite per cubic foot of soil was fed during installation to achieve the 6% bentonite ratio. DeWind constantly monitored the linear footage of slurry wall completed with each supersack of bentonite to ensure the proper amount of bentonite was added to the native soils. Water was fed through a fire hose to the cutting chain such that the slump of the resulting mixture was maintained at 4-6 inches per the specification.

2.1 Installation

The trencher was moved into position at station 14+75 on the slurry wall alignment and the cutting chain rotated. The installed depth of the slurry wall along the alignment is shown on attached project drawings. The rotating cutting chain homogenized the bentonite, native soils, and water as the trencher proceeded along the installation path creating the slurry wall.

3.0 Quality Assurance Sampling

3.1 Laboratory Testing

DeWind collected quality assurance samples of the soil-bentonite slurry wall mixture and sent them to Vector Engineering Laboratory for testing. Samples were collected at the slurry wall surface at a frequency of one per every 150 linear feet of constructed slurry wall for a total of 12 samples. One sample was taken from an approximate depth of 20-ft. The samples were collected by placing slurry wall mixture material in 6 inch long by 3-inch diameter plastic tubes that were capped, labeled, and placed in Ziploc bags. Each of the samples was sent to the laboratory to be tested for Permeability using ASTM test method D-5084.

The basis of acceptance for the Slurry Wall is achieving a maximum permeability of 1 x 10^{-7} cm/sec. Permeability test results provided in Appendix B show that all samples meet this specified permeability with results ranging from 8.1 x 10^{-9}.to 3.5 x 10^{-8} cm/sec.

3.2 Field Testing

During installation of the slurry wall, samples of the soil/bentonite mixture were collected at a frequency of one for every 75 linear feet of constructed slurry wall. The samples were tested for slump (ASTM C-143), and unit weight (mud balance wet density) (ASTM C138). The slump was maintained at the target range of 4 and 6 inches for all of the tests and the unit weight ranged from 110 to 117 pounds per cubic foot. Slump and unit weight test results are provided in Appendix A.

4.0 Documentation

The following records are attached:

Appendix A – Slump and Unit Weight Test Results
Appendix B – Laboratory Results
Appendix C – Slurry Wall Profile

APPENDIX A

FIELD TEST RESULTS

DEWIND ONE-PASS TRENCHING
SLUMP TESTING FORM
BSB DIVERSIFIED FACILITY

DATE	TIME	SLUMP (inches)	LOCATION		DATE	TIME	SLUMP (inches)	LOCATION
9/22	**8:45**	**5**	**14+75**					
9/22	**11:20**	**5.5**	**15+40**					
9/22	**18:00**	**5**	**0+30**					
9/23	**14:15**	**5**	**1+00**					
9/23	**18:20**	**4.25**	**1+ 75**					
9/24	**9:30**	**5.5**	**2+50**					
9/24	**18:00**	**4.75**	**3+25**					
9/24	**18:15**	**5.5**	**4+00**					
9/25	**11:00**	**5.5**	**4+75**					
9/25	**14:15**	**4.75**	**5+50**					
9/26	**10:45**	**5.5**	**6+25**					
9/26	**14:30**	**6**	**7+00**					
9/26	**18:30**	**5.5**	**7+75**					
9/26	**18:35**	**6**	**8+50**					
9/27	**15:45**	**5.25**	**9+25**					
9/27	**16:00**	**6**	**10+00**					
9/28	**11:30**	**5.5**	**10+75**					
9/30	**18:00**	**5.5**	**11+50**					
9/30	**18:15**	**5.75**	**12+25**					
10/3	**13:30**	**6**	**13+00**					
10/3	**13:40**	**4.75**	**13+75**					
10/3	**14:00**	**5**	**15+50**					

DEWIND ONE-PASS TRENCHING
UNIT WEIGHT TESTING FORM
BSB DIVERSIFIED FACILITY

DATE	TIME	UNIT WEIGHT (lbs/cu ft)	LOCATION		DATE	TIME	UNIT WEIGHT (lbs/cu ft)	LOCATION
9/22	9:00	113	14+75		10/3	14:00	115	14+50
9/22	11:20	110	15+40					
9/22	18:00	113	0+30					
9/23	14:15	111	1+00					
9/23	18:20	114	1+75					
9/24	9:30	116	2+50					
9/24	18:00	115	3+25					
9/24	18:15	113	4+00					
9/25	11:00	116	4+75					
9/25	14:15	117	5+50					
9/26	10:45	113	6+25					
9/26	14:30	114	7+00					
9/26	18:30	114	7+75					
9/26	18:35	116	8+50					
9/27	15:45	114	9+25					
9/27	16:00	115	10+00					
9/28	11:30	115	10+75					
9/30	18:00	114	11+50					
9/30	18:15	113	12+25					
10/3	13:30	114	13+00					
10/3	13:40	116	13+75					

APPENDIX B

LABORATORY RESULTS

Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name: DeWind Environmental / BSB Diversified Property, Kent, WA

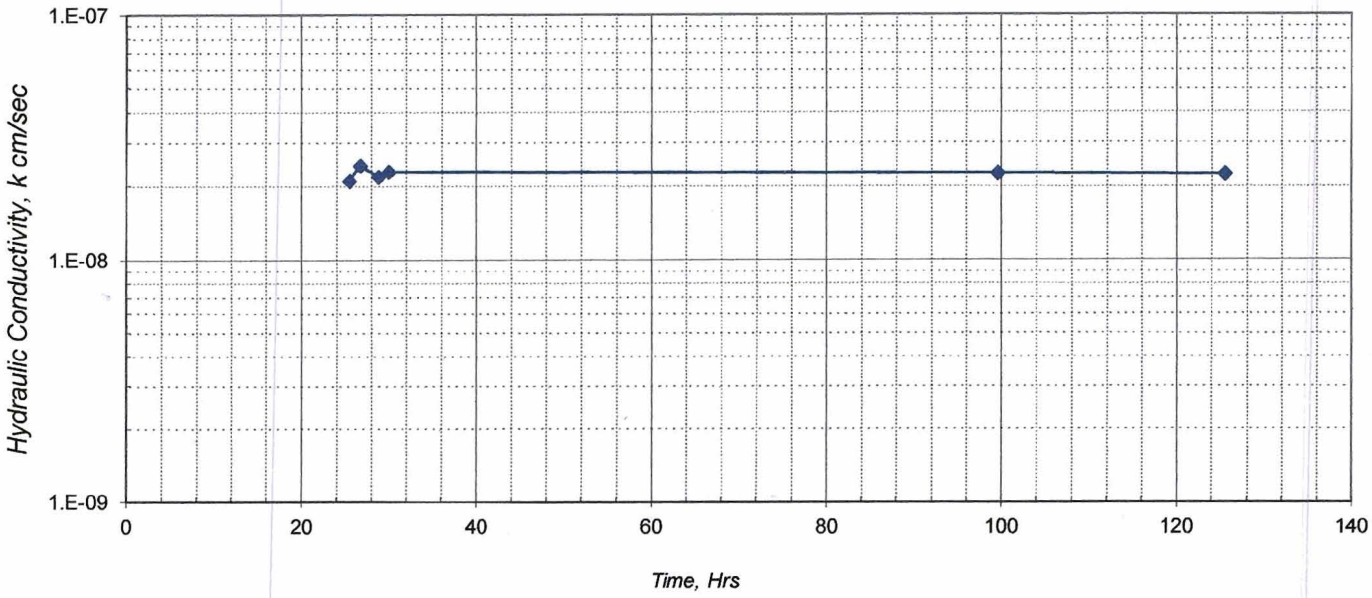
Project No: 2011.A114

Lab Sample Number: 3280A

Sample ID: Sta 0+23

Report Date: October 17, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 0+23	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.1	1.0
DIAMETER, in.	3.0	2.9
WATER CONTENT, %	38.9	26.9
DRY DENSITY, pcf	81	96
SATURATION, %	96	96
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:

Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	16 - 39
IN / OUT RATIO:	1.09
"B" PARAMETER:	0.99

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	25.5	2.1E-08
2	26.8	2.4E-08
3	28.8	2.2E-08
4	30.0	2.3E-08
5	99.6	2.3E-08
6	125.5	2.2E-08

AVERAGE LAST 4 : **2.2E-08**

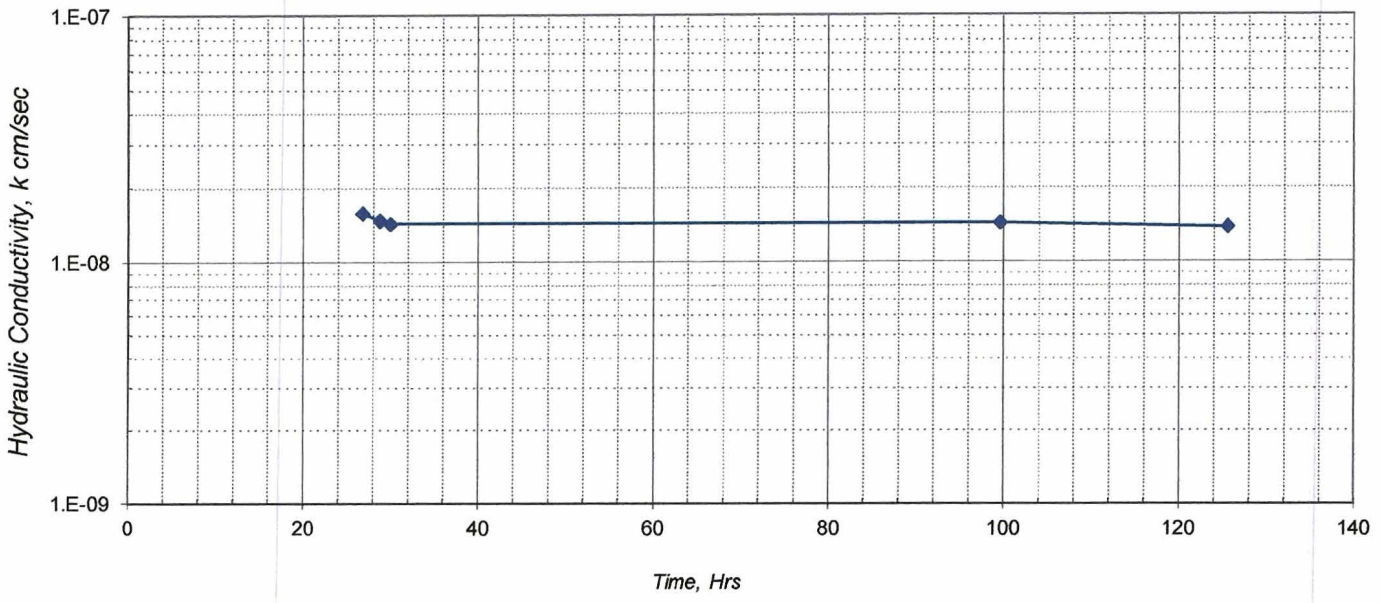
Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name:	Project No:	Lab Sample Number:
DeWind Environmental / BSB Diversified Property, Kent, WA	2011.A114	3280B

Sample ID:	Report Date:
Sta 1+75	October 17, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 1+75	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.3	1.2
DIAMETER, in.	3.0	2.9
WATER CONTENT, %	38.9	26.0
DRY DENSITY, pcf	81	98
SATURATION, %	98	98
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:
Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	21 - 33
IN / OUT RATIO:	1.11
"B" PARAMETER:	0.98

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	26.7	1.6E-08
2	28.8	1.5E-08
3	30.0	1.4E-08
4	99.6	1.4E-08
5	####	1.4E-08

AVERAGE LAST 4 : **1.4E-08**

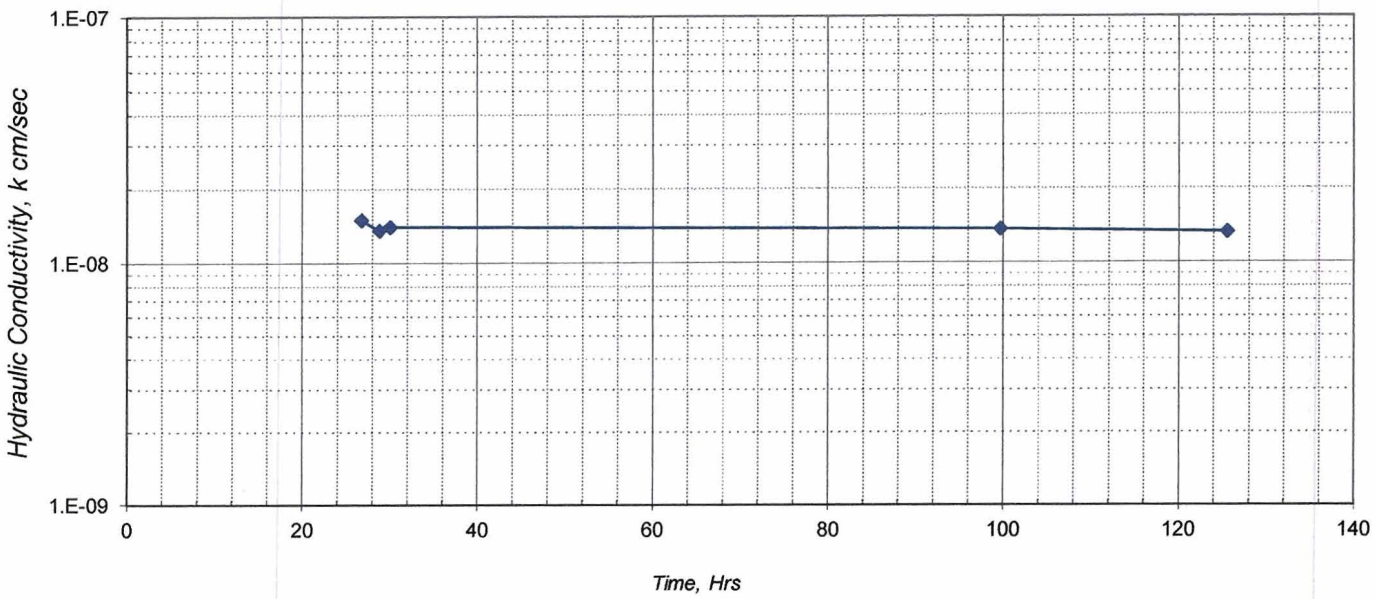
Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name:	Project No:	Lab Sample Number:
DeWind Environmental / BSB Diversified Property, Kent, WA	2011.A114	3280C

Sample ID:	Report Date:
Sta 14+60	October 17, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 14+60	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.2	1.1
DIAMETER, in.	3.1	3.0
WATER CONTENT, %	36.0	23.5
DRY DENSITY, pcf	84	102
SATURATION, %	97	98
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:
Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	21 - 36
IN / OUT RATIO:	0.99
"B" PARAMETER:	0.96

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	26.8	1.5E-08
2	28.8	1.4E-08
3	30.0	1.4E-08
4	99.6	1.4E-08
5	####	1.3E-08

AVERAGE LAST 4 : **1.4E-08**

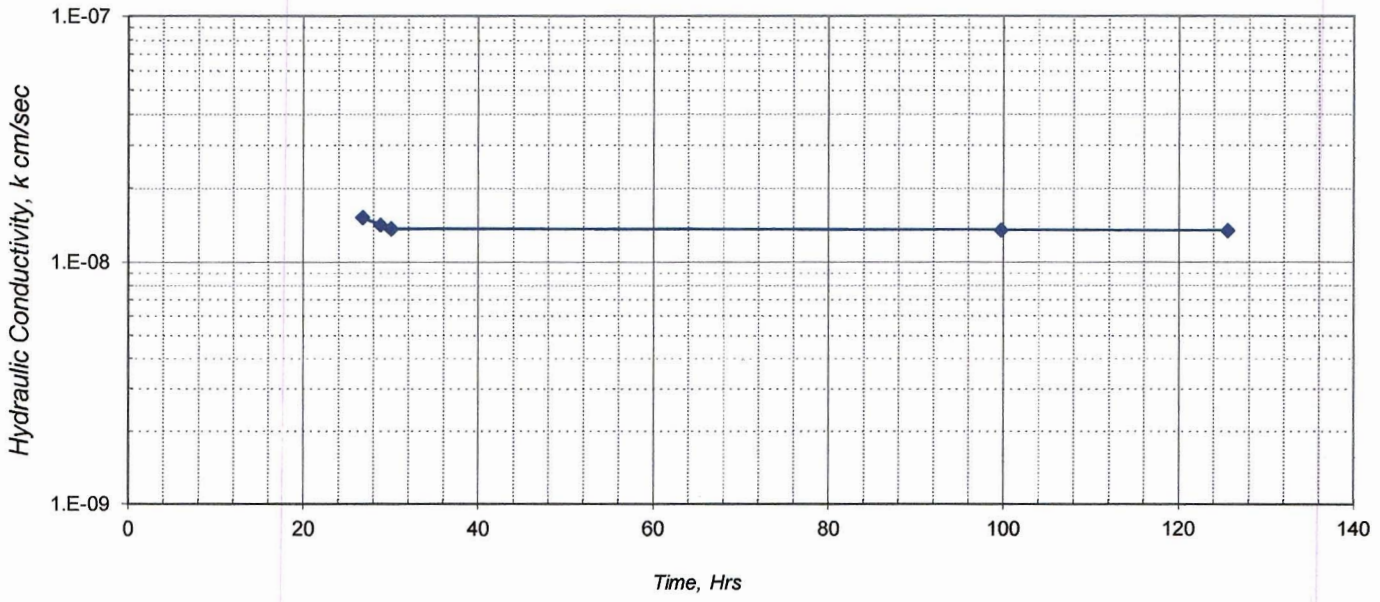
Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name:	Project No:	Lab Sample Number:
DeWind Environmental / BSB Diversified Property, Kent, WA	2011.A114	3280D

Sample ID:	Report Date:
Sta 10+25	October 17, 2011

Hydraulic Conductivity vs Time



9+25 ON SUMMARY TABLE

SPECIMEN DATA

SAMPLE ID:	Sta 10+25
DESCRIPTION:	Soil Bentonite Mix

	INITIAL	FINAL
HEIGHT, in.	1.3	1.2
DIAMETER, in.	3.0	2.9
WATER CONTENT, %	41.3	28.2
DRY DENSITY, pcf	78	94
SATURATION, %	97	97
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:
Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	23 - 35
IN / OUT RATIO:	1.03
"B" PARAMETER:	0.99

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	26.8	1.5E-08
2	28.8	1.4E-08
3	30.0	1.4E-08
4	99.7	1.4E-08
5	####	1.3E-08

AVERAGE LAST 4 : **1.4E-08**

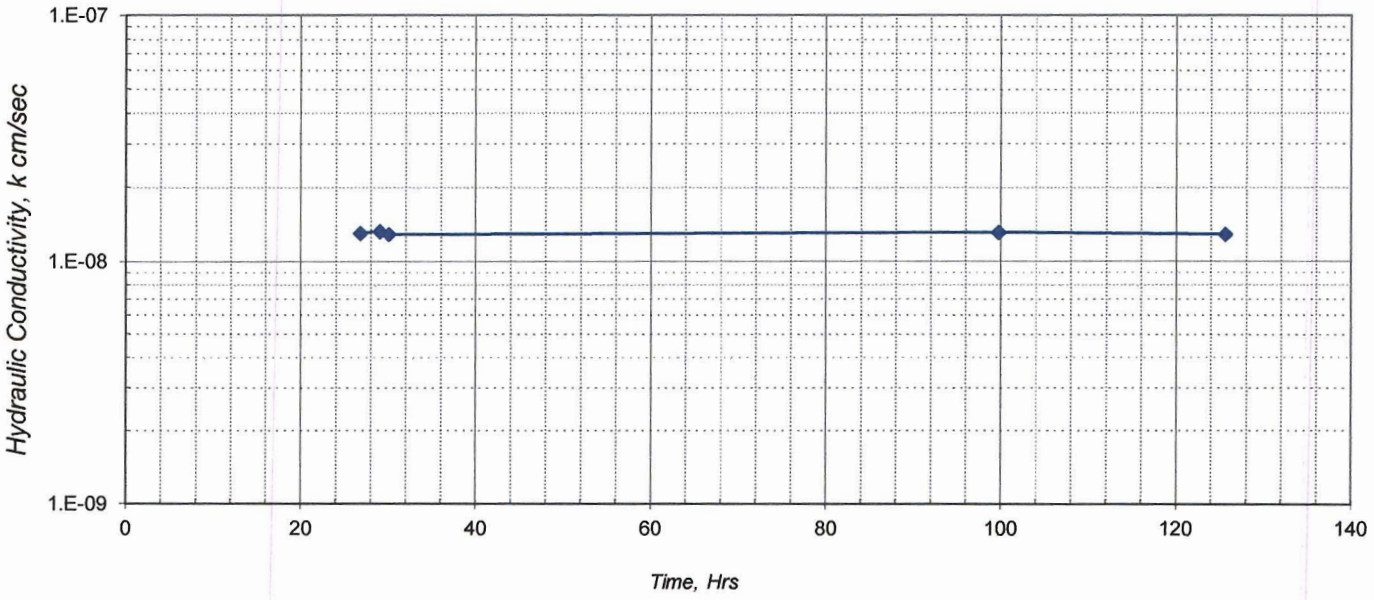
Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name:	Project No:	Lab Sample Number:
DeWind Environmental / BSB Diversified Property, Kent, WA	2011.A114	3280E

Sample ID:	Report Date:
Sta 12+25	October 17, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 12+25	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.4	1.2
DIAMETER, in.	3.1	3.0
WATER CONTENT, %	36.5	24.8
DRY DENSITY, pcf	83	101
SATURATION, %	97	99
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:
Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	22 - 32
IN / OUT RATIO:	0.90
"B" PARAMETER:	0.97

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	26.8	1.3E-08
2	29.0	1.3E-08
3	30.1	1.3E-08
4	99.7	1.3E-08
5	####	1.3E-08

AVERAGE LAST 4 : **1.3E-08**

Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name: DeWind Environmental / BSB Diversified Property, Kent, WA

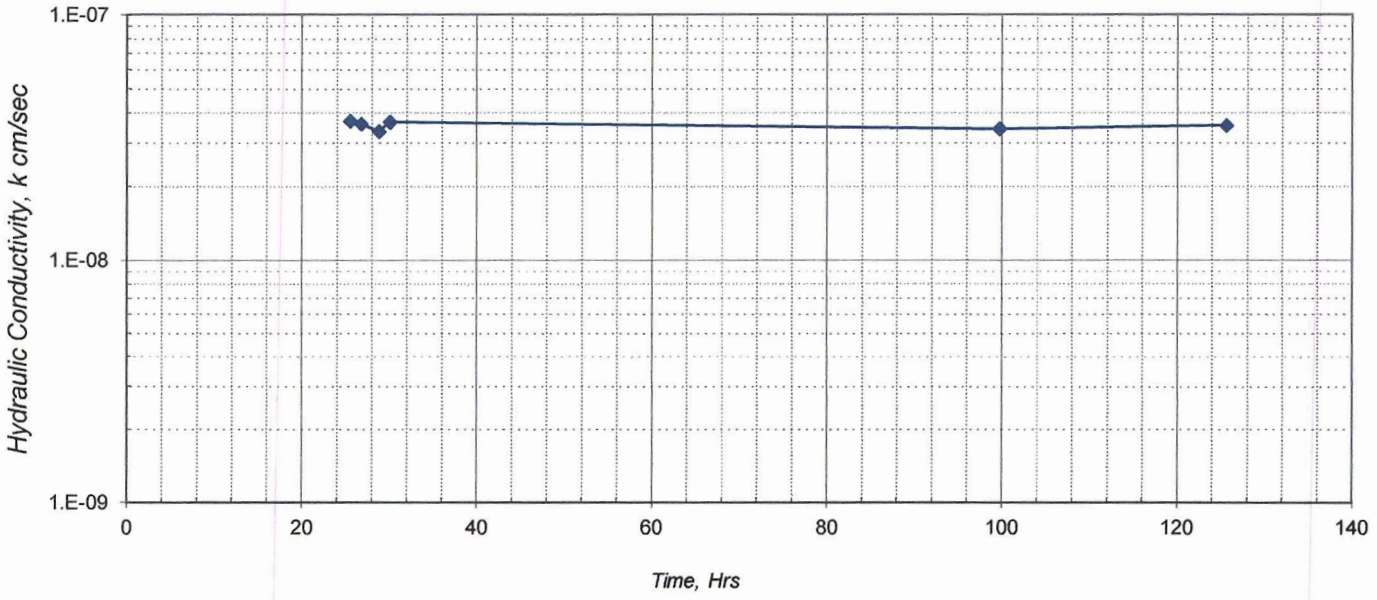
Project No: 2011.A114

Lab Sample Number: 3280F

Sample ID: Sta 7+75

Report Date: October 17, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 7+75	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.3	1.2
DIAMETER, in.	3.0	2.9
WATER CONTENT, %	33.6	23.1
DRY DENSITY, pcf	88	104
SATURATION, %	98	99
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:

Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	11 - 30
IN / OUT RATIO:	1.04
"B" PARAMETER:	0.99

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	25.5	3.7E-08
2	26.8	3.6E-08
3	28.8	3.3E-08
4	30.1	3.7E-08
5	99.7	3.4E-08
6	####	3.6E-08

AVERAGE LAST 4 : **3.5E-08**

Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name: DeWind Environmental / BSB Diversified Property, Kent, WA

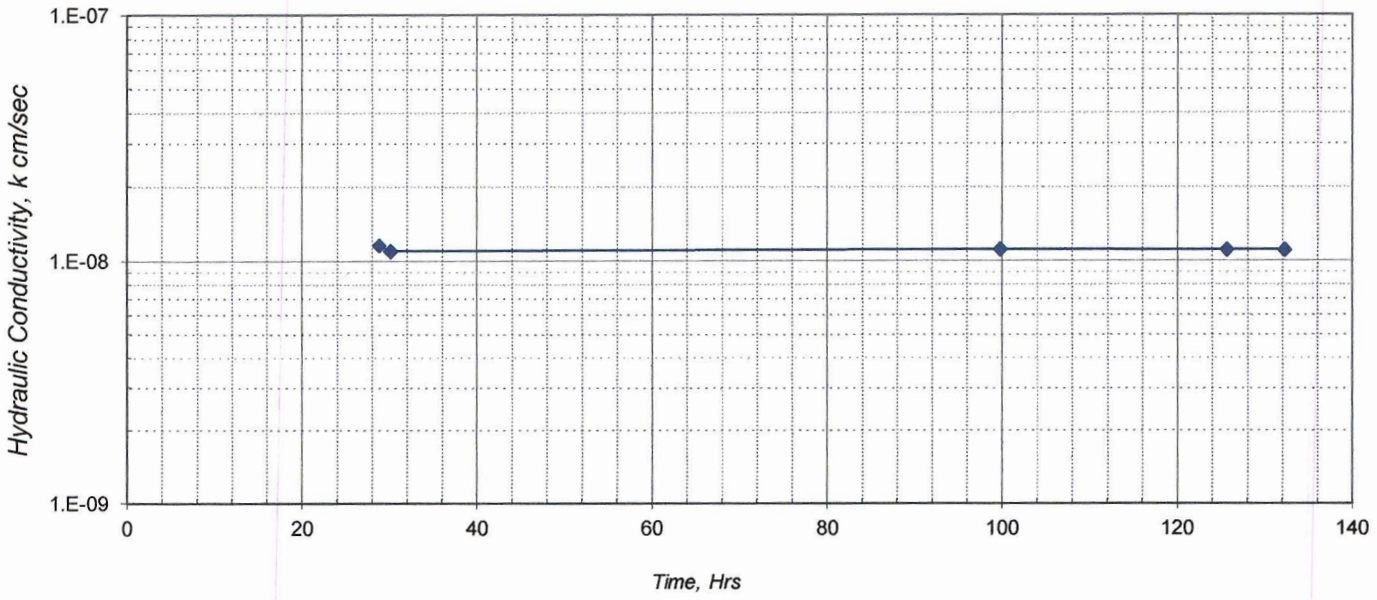
Project No: 2011.A114

Lab Sample Number: 3280G

Sample ID: Sta 10+75

Report Date: October 17, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 10+75	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.4	1.3
DIAMETER, in.	3.0	2.9
WATER CONTENT, %	38.3	26.1
DRY DENSITY, pcf	82	99
SATURATION, %	98	100
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	22 - 31
IN / OUT RATIO:	0.81
"B" PARAMETER:	0.97

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	28.8	1.2E-08
2	30.1	1.1E-08
3	99.7	1.1E-08
4	125.6	1.1E-08
5	132.2	1.1E-08

AVERAGE LAST 4 : **1.1E-08**

COMMENTS:

Tap water used as permeant.

Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name: DeWind Environmental / BSB Diversified Property, Kent, WA

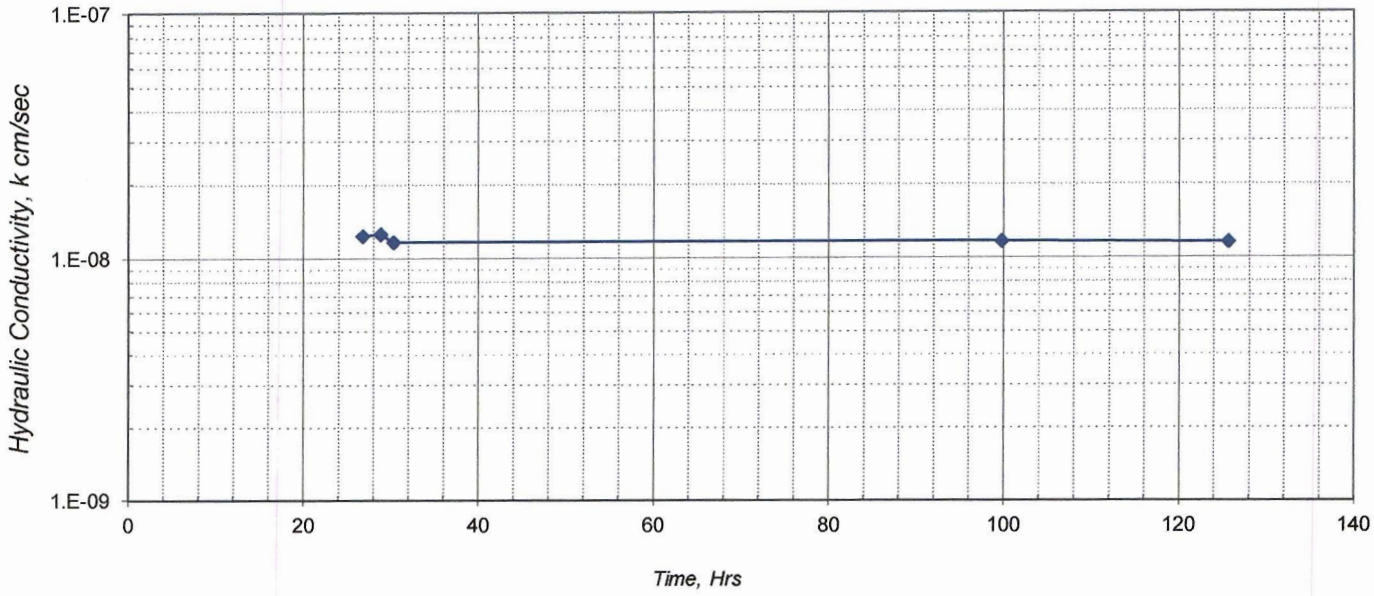
Project No: 2011.A114

Lab Sample Number: 3280H

Sample ID: Sta 14+50

Report Date: October 17, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 14+50	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.2	1.1
DIAMETER, in.	3.1	3.0
WATER CONTENT, %	35.1	23.2
DRY DENSITY, pcf	86	103
SATURATION, %	98	98
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:

Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	26 - 38
IN / OUT RATIO:	1.07
"B" PARAMETER:	0.96

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	26.8	1.2E-08
2	28.8	1.3E-08
3	30.3	1.2E-08
4	99.7	1.2E-08
5	125.6	1.2E-08

AVERAGE LAST 4 : **1.2E-08**

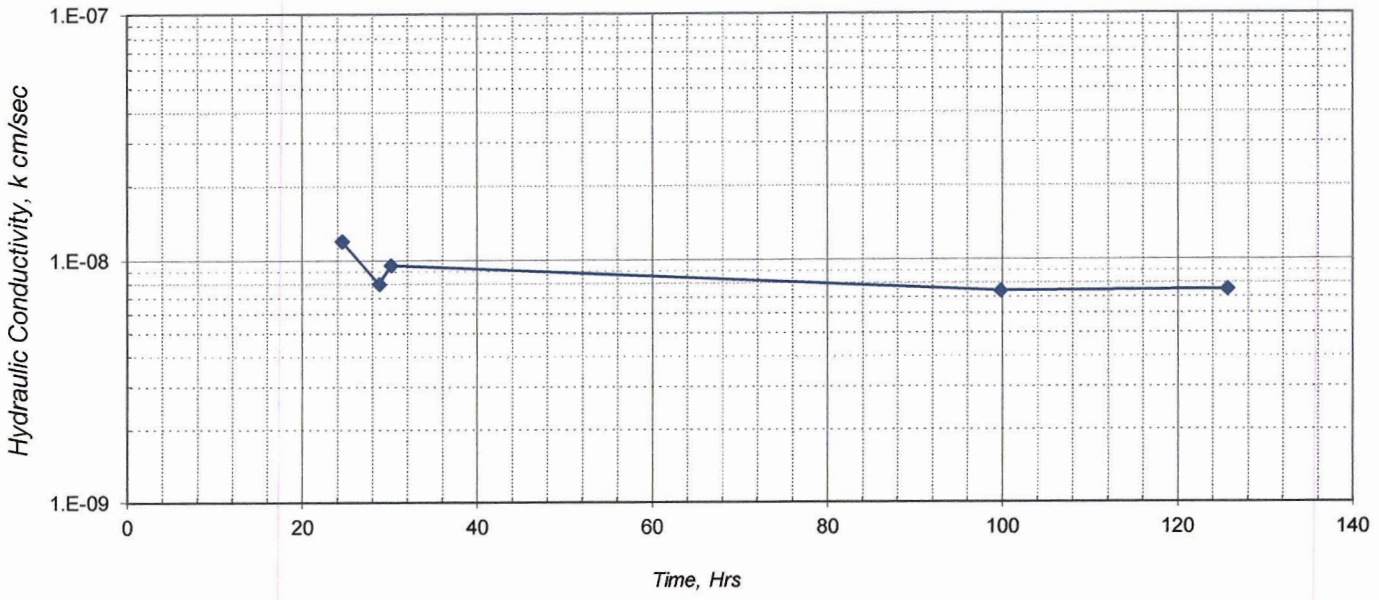
Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name:	Project No:	Lab Sample Number:
DeWind Environmental / BSB Diversified Property, Kent, WA	2011.A114	3280I

Sample ID:	Report Date:
Sta 13+75	October 17, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 13+75	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.4	1.2
DIAMETER, in.	3.0	2.9
WATER CONTENT, %	37.8	26.1
DRY DENSITY, pcf	82	98
SATURATION, %	97	97
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:
Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	27 - 34
IN / OUT RATIO:	0.97
"B" PARAMETER:	1

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	24.5	1.2E-08
2	28.8	8.0E-09
3	30.1	9.6E-09
4	99.8	7.4E-09
5	125.7	7.5E-09

AVERAGE LAST 4 : **8.1E-09**

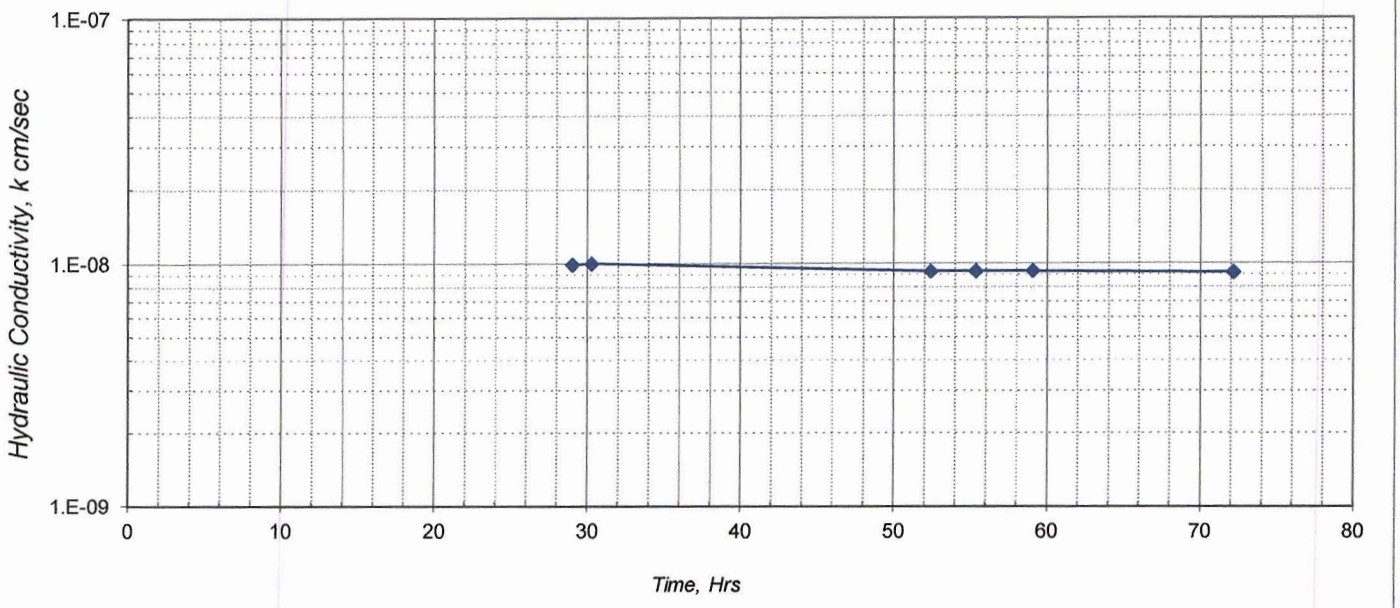
Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name:	Project No:	Lab Sample Number:
DeWind Environmental / BSB Diversified Property, Kent, WA	2011.A114	3280J

Sample ID:	Report Date:
Sta 3+25	November 9, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 3+25	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.3	1.2
DIAMETER, in.	3.0	3.0
WATER CONTENT, %	35.2	26.0
DRY DENSITY, pcf	85	98
SATURATION, %	98	98
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:
Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	30 - 35
IN / OUT RATIO:	0.84
"B" PARAMETER:	0.98

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	29.0	9.9E-09
2	30.3	1.0E-08
3	52.4	9.3E-09
4	55.3	9.3E-09
5	59.1	9.3E-09
6	72.2	9.2E-09

AVERAGE LAST 4 : **9.2E-09**

Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name: DeWind Environmental / BSB Diversified Property, Kent, WA

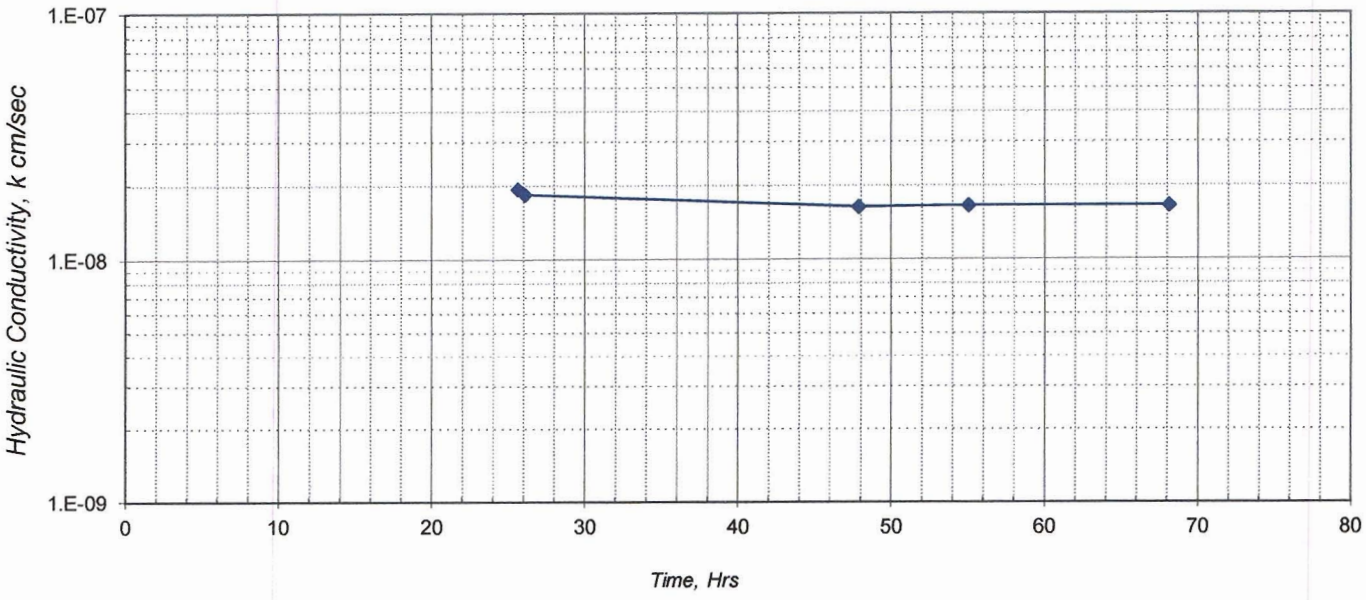
Project No: 2011.A114

Lab Sample Number: 3280K

Sample ID: Sta 6+25

Report Date: November 9, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 6+25	
DESCRIPTION:	Soil Bentonite Mix	
	INITIAL	FINAL
HEIGHT, in.	1.2	1.1
DIAMETER, in.	3.0	2.9
WATER CONTENT, %	33.1	25.5
DRY DENSITY, pcf	88	100
SATURATION, %	99	100
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:

Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	29 - 37
IN / OUT RATIO:	0.87
"B" PARAMETER:	0.97

TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	25.6	1.9E-08
2	26.1	1.8E-08
3	47.9	1.6E-08
4	55.0	1.7E-08
5	68.1	1.7E-08

AVERAGE LAST 4 : **1.7E-08**

Geo-Logic ASSOCIATES

HYDRAULIC CONDUCTIVITY REPORT

Client / Project Name: DeWind Environmental / BSB Diversified Property, Kent, WA

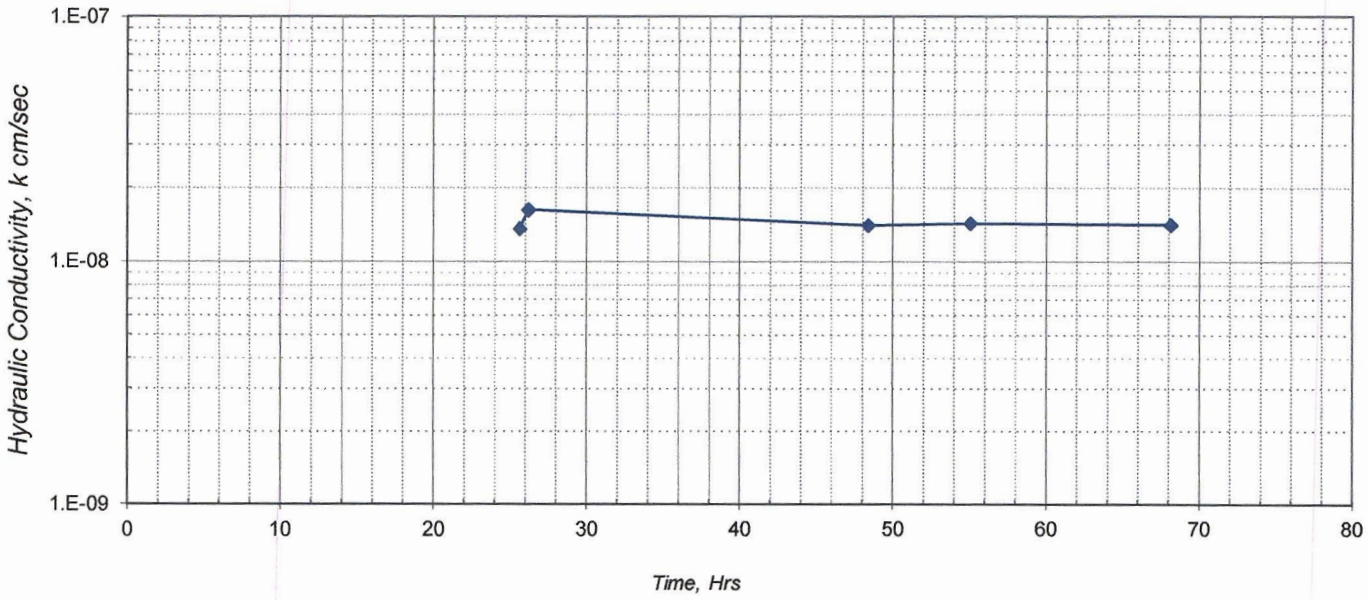
Project No: 2011.A114

Lab Sample Number: 3280L

Sample ID: Sta 4+75

Report Date: November 9, 2011

Hydraulic Conductivity vs Time



SPECIMEN DATA

SAMPLE ID:	Sta 4+75
DESCRIPTION:	Soil Bentonite Mix

	INITIAL	FINAL
HEIGHT, in.	1.3	1.2
DIAMETER, in.	3.1	3.0
WATER CONTENT, %	34.4	23.7
DRY DENSITY, pcf	86	102
SATURATION, %	98	98
(Specific Gravity assumed as 2.7)		
MAXIMUM DRY DENSITY, pcf		
OPTIMUM WATER CONTENT, %		
SPECIFIED COMPACTION, %		
ACHIEVED COMPACTION, %		

COMMENTS:

Tap water used as permeant.

TEST DATA

ASTM D-5084, Method C

EFFECTIVE STRESS:	10 psi
GRADIENT RANGE:	28 - 34
IN / OUT RATIO:	0.86
"B" PARAMETER:	0.99

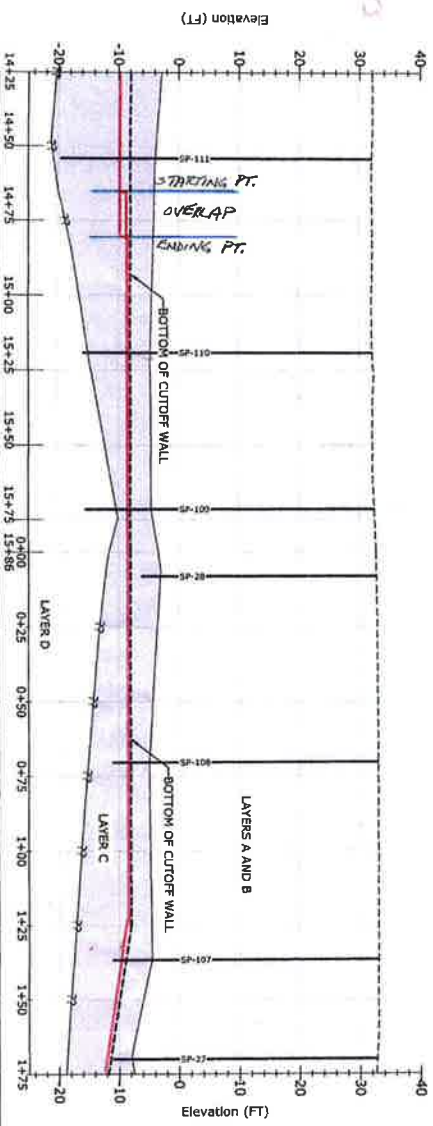
TRIAL nos.	TIME hrs.	HYDRAULIC CONDUCTIVITY cm / sec
1	25.6	1.4E-08
2	26.2	1.6E-08
3	48.4	1.4E-08
4	55.0	1.4E-08
5	68.1	1.4E-08

AVERAGE LAST 4 : **1.5E-08**

APPENDIX C

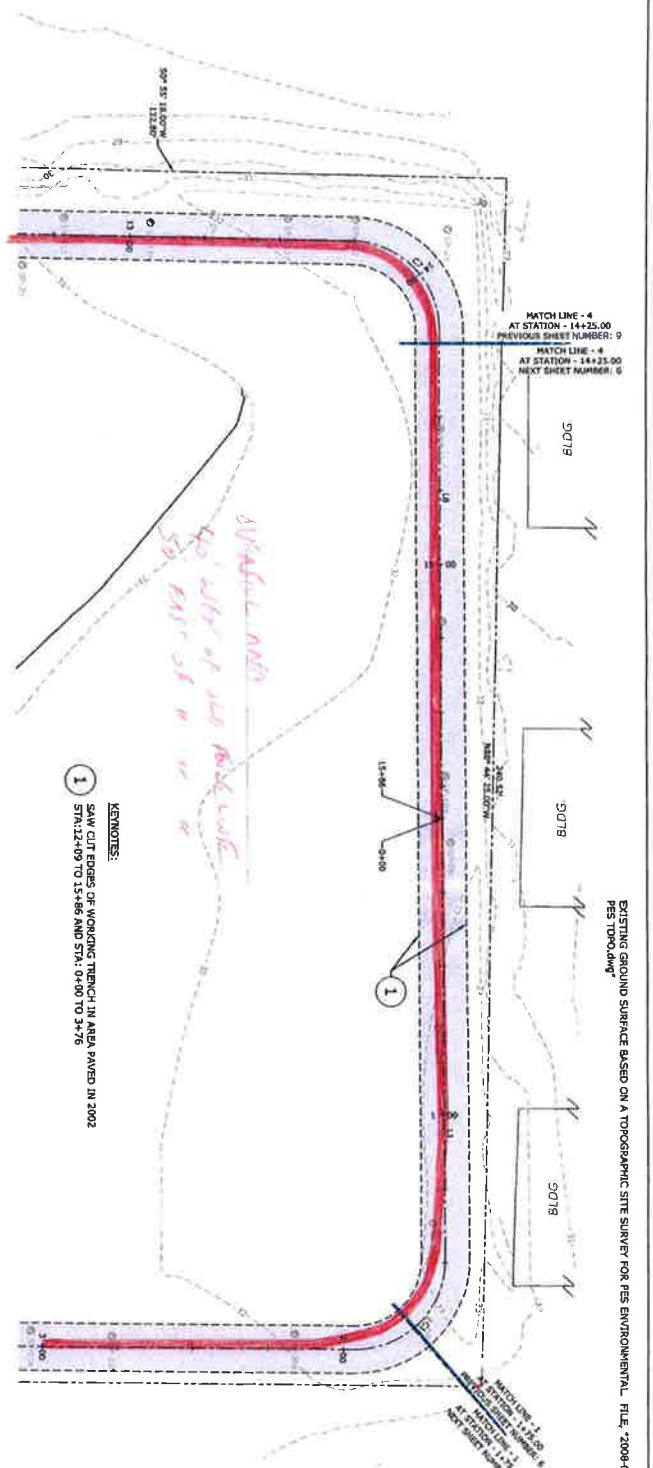
SLURRY WALL PROFILE

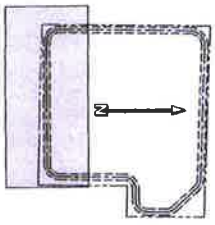
CUTOFF WALL PROFILE



	14+25	14+50	14+75	15+00	15+25	15+50	15+75	0+00	0+25	0+50	0+75	1+00	1+25	1+50	1+75
EXISTING GROUND ELEVATION (FT)	32.1'	32.1'	32.0'	32.3'	32.1'	32.5'	15+86	32.9'	33.0'	33.0'	33.1'	33.0'	33.0'	32.7'	
TOP OF LAYER C ELEVATION (FT)	-3.7'	-4.1'	-4.4'	-4.7'	-4.6'	-4.2'		-3.5'	-4.3'	-4.9'	-4.7'	-4.6'	-5.9'	-7.5'	
BOTTOM OF CUTOFF WALL ELEVATION (FT)	-8.0'	-8.0'	-8.0'	-8.0'	-8.0'	-8.0'		-8.0'	-8.0'	-8.0'	-8.0'	-8.0'	-9.9'	-11.8'	
DEPTH OF CUTOFF WALL (FT)	40.1'	40.1'	40.0'	40.3'	40.1'	40.5'		40.9'	41.0'	41.0'	41.1'	41.0'	42.9'	44.5'	

CUTOFF WALL PLAN





REDUCTION SCALE CHECK
1" = 1"
GRAPHICAL SCALE
0 20' 40'

N

REV.	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 20'
DATE: 8/26/2011

VISTA CONSULTANTS, LLC
4132 SW BARBUR BLVD.
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(503) 922-2522
PROJECT NO. 11-12

DRAWING NO. 6 OF 13

FINAL CLEANUP ACTION PHASE II
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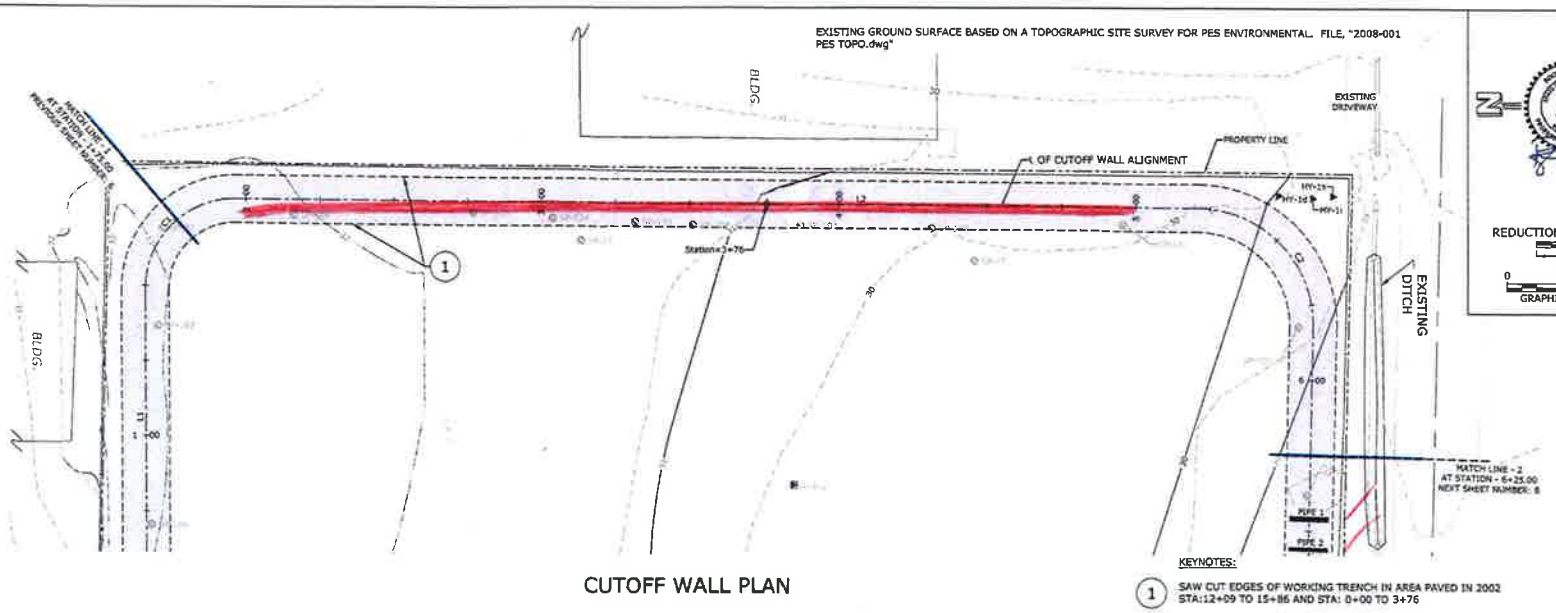
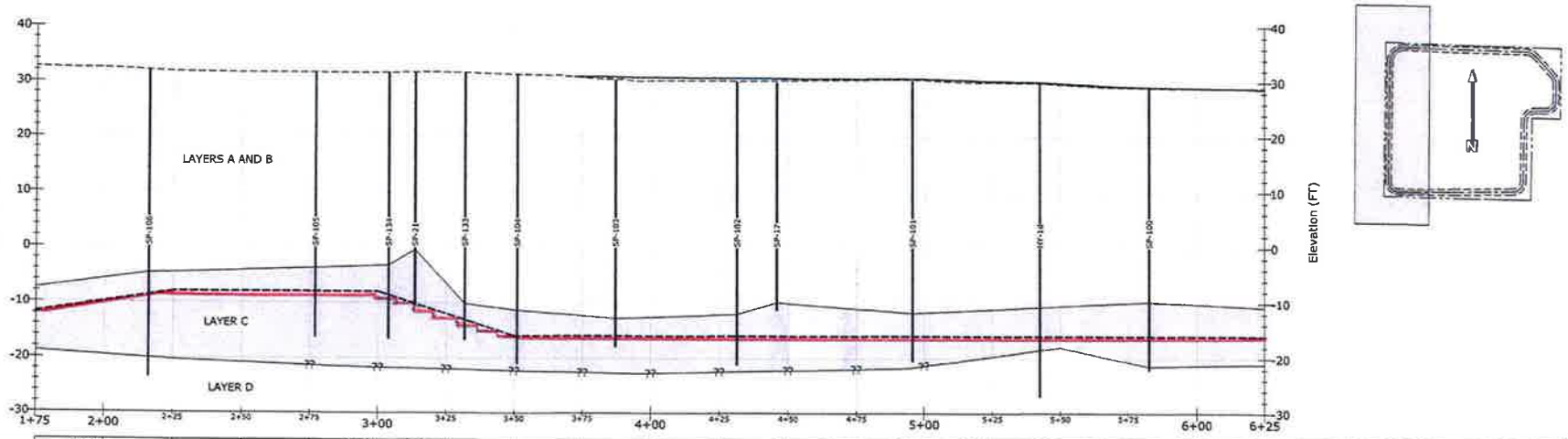
KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 1



CUTOFF WALL PLAN



32.4'	31.9'	31.7'	31.7'	31.7'	31.8'	31.4'	30.9'	30.3'	30.3'	30.3'	30.4'	30.4'	30.0'	29.6'	29.1'	28.9'	28.9'	EXISTING GROUND ELEVATION (FT)
-5.8'	-4.6'	-4.1'	-3.7'	-3.3'	-6.5'	-11.2'	-12.3'	-12.6'	-12.1'	-10.0'	-11.0'	-11.7'	-11.1'	-10.5'	-9.9'	-10.1'	-10.8'	TOP OF LAYER C ELEVATION (FT)
-9.9'	-8.0'	-8.0'	-8.0'	-8.0'	-12.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
42.3'	39.9'	39.7'	39.7'	39.7'	43.8'	47.4'	46.9'	46.3'	46.3'	46.3'	46.4'	46.4'	46.0'	45.6'	45.1'	44.9'	44.9'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE

REDUCTION SCALE CHECK
1"
0 20' 40'
GRAPHICAL SCALE

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SCALE: 1" = 20'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II
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CUTOFF WALL PLAN AND PROFILE 2

DRAWING NO. 7 OF 13

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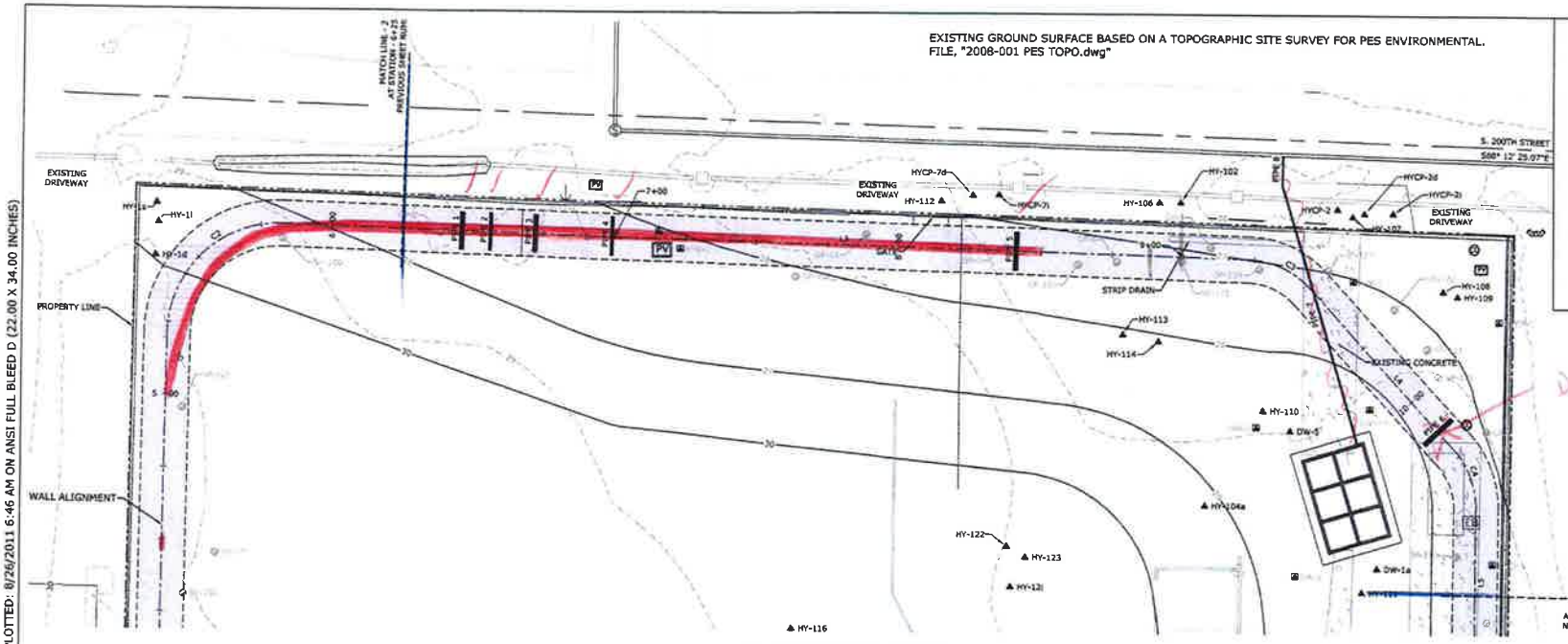
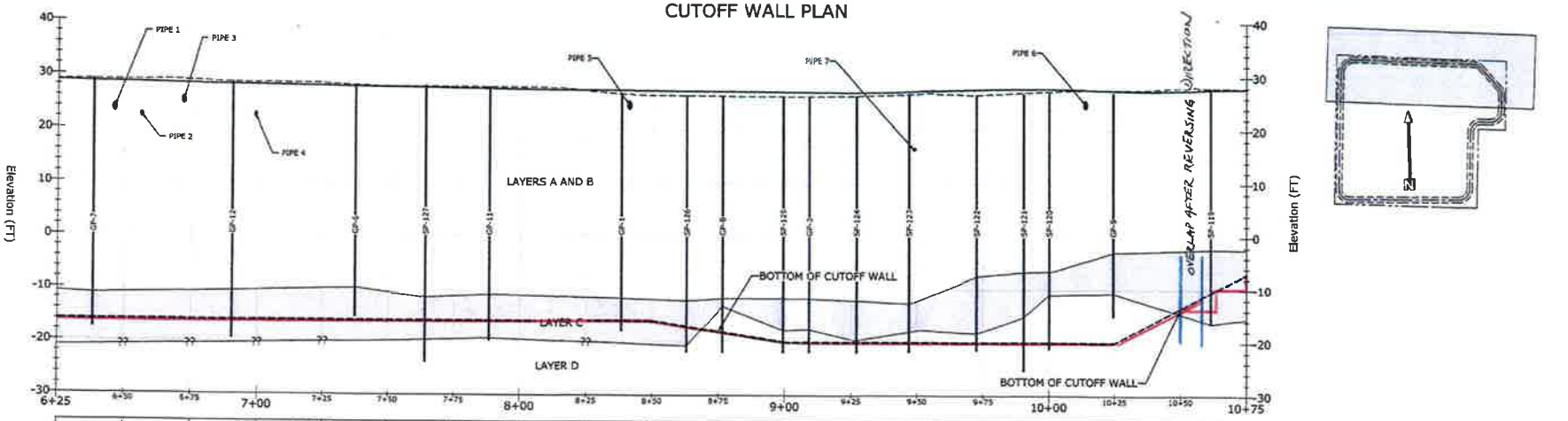


CUTOFF WALL PLAN



29.0'	29.0'	28.6'	28.5'	28.0'	27.9'	27.9'	27.3'	26.5'	26.3'	26.2'	26.3'	26.8'	26.7'	27.3'	27.6'	27.9'	27.9'	EXISTING GROUND ELEVATION (FT)
-11.0'	-10.7'	-10.4'	-10.1'	-10.7'	-11.4'	-11.2'	-11.6'	-12.0'	-11.9'	-11.8'	-12.1'	-12.1'	-7.3'	-6.5'	-2.9'	-2.5'	-2.3'	TOP OF LAYER C ELEVATION (FT)
-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-16.0'	-18.0'	-20.0'	-20.0'	-20.0'	-20.0'	-20.0'	-20.0'	-13.5'	-7.0'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
45.0'	45.0'	44.6'	44.5'	44.0'	43.9'	43.9'	43.3'	42.5'	44.3'	46.2'	46.3'	46.8'	46.7'	47.3'	47.6'	41.4'	34.9'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE

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PORTLAND, OREGON 97239
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PROJECT NO. 11-12

REV	DATE	REVISION DESCRIPTION	DES	DRN	APP
-	08/25/11	CONTRACTOR ISSUE	RN	STM	RN

SCALE: 1" = 20'

DATE: 8/26/2011

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CUTOFF WALL PLAN AND PROFILE 3

DRAWING NO. 8 OF 13

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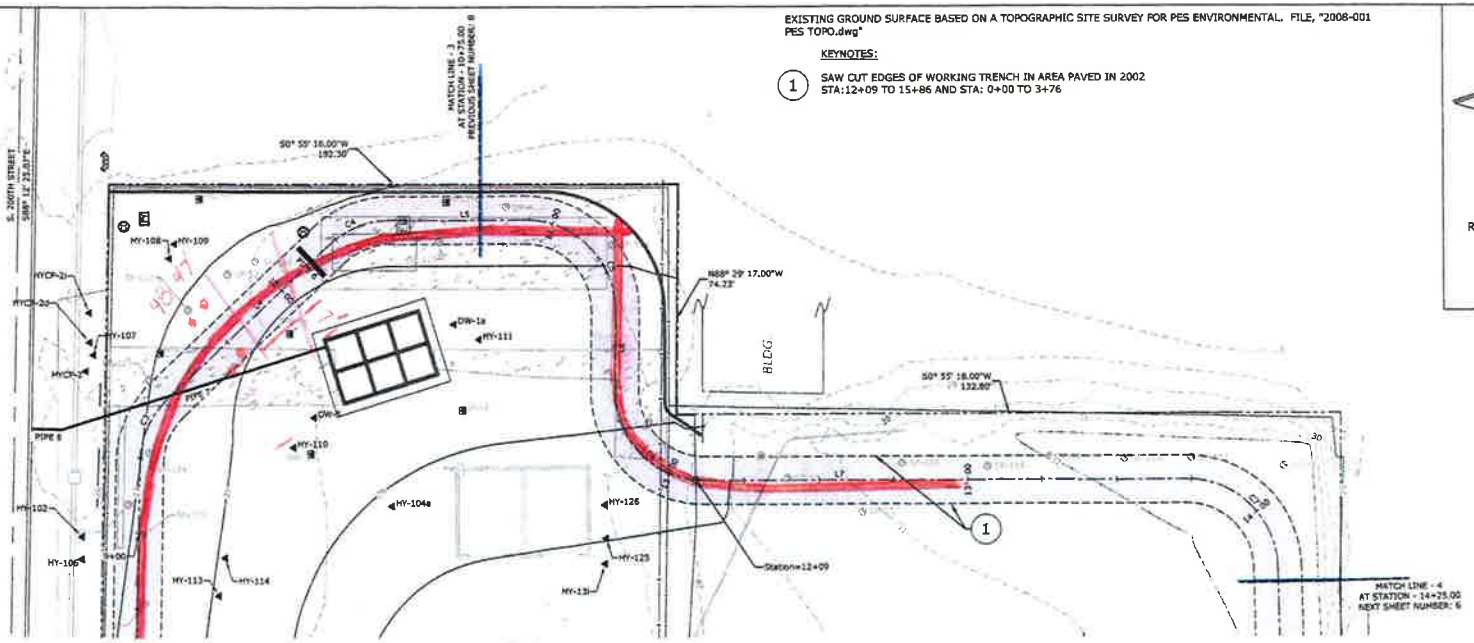
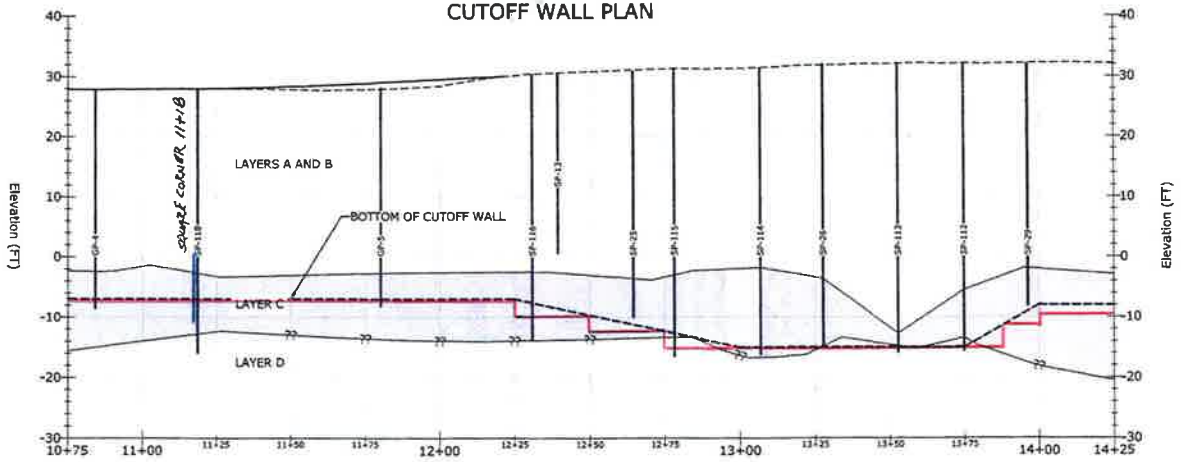
EXISTING GROUND SURFACE BASED ON A TOPOGRAPHIC SITE SURVEY FOR PES ENVIRONMENTAL. FILE, "2008-001 PES TOPO.dwg"

KEYNOTES:

1. SAW CUT EDGES OF WORKING TRENCH IN AREA PAVED IN 2002 STA:12+09 TO 15+86 AND STA: 0+00 TO 3+76

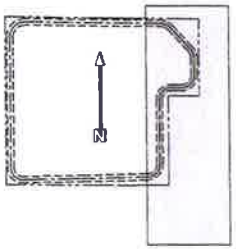


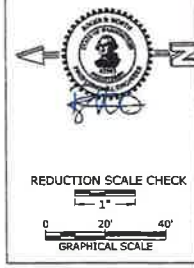
CUTOFF WALL PLAN



27.9'	28.0'	27.9'	27.9'	28.4'	30.2'	30.8'	31.2'	31.3'	31.8'	32.0'	32.1'	32.2'	EXISTING GROUND ELEVATION (FT)
-1.6'	-3.2'	-3.0'	-2.7'	-2.6'	-2.5'	-3.0'	-3.3'	-1.9'	-3.3'	-11.7'	-5.5'	-2.0'	TOP OF LAYER C ELEVATION (FT)
-7.0'	-7.0'	-7.0'	-7.0'	-7.0'	-7.0'	-9.7'	-12.3'	-15.0'	-15.0'	-15.0'	-15.0'	-8.0'	BOTTOM OF CUTOFF WALL ELEVATION (FT)
34.9'	35.0'	34.9'	34.9'	35.4'	37.2'	40.5'	43.6'	46.3'	46.8'	47.0'	47.1'	40.2'	DEPTH OF CUTOFF WALL (FT)

CUTOFF WALL PROFILE





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PORTLAND, OREGON 97239
(503) 922-2822

PROJECT NO. 11-12

REM	DATE	REVISION DESCRIPTION	DES	DRW	APP
-	08/29/11	CONTRACTOR ISSUE	RM	SYH	RM

SCALE: 1" = 20'

DATE: 8/26/2011

FINAL CLEANUP ACTION PHASE II

BSB DIVERSIFED, INC. PROPERTY

KENT, WASHINGTON

CUTOFF WALL PLAN AND PROFILE 4

DRAWING NO. 9 OF 13

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APPENDIX J

HWA GeoSciences Reports for Reactor Vault Gravel Backfill

HWA GEOSCIENCES INC.
Geotechnical & Pavement Engineering · Hydrogeology · Geoenvironmental · Planning & Permitting · Inspection & Testing

October 31, 2011
HWA Project No. 2011-103

PES Environmental, Inc.
1215 Fourth Avenue, Suite 1350
Seattle, WA 98161

Attention: Mr. Brian O'Neal, PE

Subject: **MATERIALS LABORATORY REPORT NO. 5**
SOIL-BENTONITE SLURRY EVALUATION
BSB Diversified Property
Kent, Washington

Dear Mr. O'Neal:

As requested, HWA GeoSciences Inc. (HWA) performed laboratory testing for the subject project. Herein we present the results of our laboratory analyses, which are summarized on the attached Tables and Figures. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE INFORMATION: Samples were picked up at the site and delivered to our laboratory on September 21, 2011, by HWA Personnel. These samples were delivered in 5-gallon buckets and large plastic bags. Based on manual-visual methods, the soil descriptions for the samples are as follows:

Site Soil	Dark brown silty clayey SAND with gravel (SC-SM)
Drain Rock	Poorly graded Gravel (GP)
Bentonite	Finely graded commercial Bentonite

BENTONITE SLURRY TESTING PROGRAM: We prepared soil-Bentonite-cement slurries, using the proportions provided by the client. The site soils were screened over a ¾ inch sieve to remove large gravel particles and to blend the soils from each bucket together. After determining the soil moisture content, about 20 lbs of moist site soil was weighed out into a 5-gallon bucket. Six percent Bentonite, based on the dry soil weight, was added to the bucket, along with water. The materials were mixed using a paddle mixer attached to an electric drill. Water was added until the resulting slurry had a slump that was visually estimated at about 5-6 inches. LaFarge Portland type I/II cement was then added at 5% of the dry soil weight. The slurry was mixed until a uniform mixture was obtained. The material was then scooped into four by eight inch concrete cylinder molds. The slurry was consolidated to remove air bubbles. Three additional batches were then prepared in a similar manner using 8%, 11%, and 14% cement by dry weight of soil.

21312 30th Drive SE
Suite 110
Bothell, WA 98021.7010
Tel: 425.774.0106
Fax: 425.774.2714
www.hwageo.com

MOISTURE CONTENT OF SOIL: The "as-received" moisture content of the site soil (percent by dry mass) was determined in general accordance with ASTM D 2216. The moisture content sample was taken from the bucket after the contents were re-mixed thoroughly. The results are shown on Figure 1.

PARTICLE SIZE ANALYSIS OF SOILS: The site soil sample was tested to determine the particle size distribution in general accordance with ASTM D422. The results are shown on the attached Particle Size Analysis report shown on Figure 1, which also provide information regarding the classification of the sample, and the moisture content at the time of testing.

SIEVE ANALYSIS OF AGGREGATE: The particle size distribution of the drain rock sample was determined by sieving, in general accordance with ASTM C136. The results are reported on the attached Figure 2.

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): The site soil sample was tested using method ASTM D4318, multi-point method. Testing was conducted on the fine-grained portion of the sample that passed the U.S. No. 40 sieve after being air-dried. The results are summarized on the attached Liquid Limit, Plastic Limit, and Plasticity Index report on Figure 3.

PERMEABILITY OF GRANULAR SOILS (WSDOT FALLING HEAD METHOD): The coefficient of permeability (also commonly referred to as hydraulic conductivity) of the drain rock was measured in general accordance with WSDOT method 605. The sample was placed in the test apparatus and compacted by tamping. The material was so permeable that accurate readings were not possible. The permeability was estimated to be greater than or equal to 12,000 inches per hour.

UNCONFINED COMPRESSION TEST: The specimens were cured in a water bath at 70° F until tested. At specified ages, the compressive strength specimens were removed from the bath, stripped from their molds and tested for unconfined compressive strength in general accordance with ASTM C39. The samples were loaded until failure. The compressive strength is reported as calculated, without rounding to the nearest 10 pounds. The results are summarized in Table 1, below:

Table 1. Compressive Strength of Cement-Bentonite-Soil Slurry

Age	Strength at 3 days, psf	Strength at 7 days, psf	Strength at 14 days, psf
5% Cement	4.1	6.9	6.6
8% Cement	21.4	20.9	20.1
11% Cement	35.9	40.2	40.6
14% Cement	51.3	58.4	60.0

CLOSURE: Experience has shown that laboratory test values for soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested sample may represent. HWA also makes no warranty as to how representative either the sample tested or the test results obtained are to actual field conditions. It is a well established fact that sampling methods present varying degrees of disturbance or variance that affect sample representativeness.

No copy should be made of this report except in its entirety.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

Sincerely,

HWA GEOSCIENCES INC.

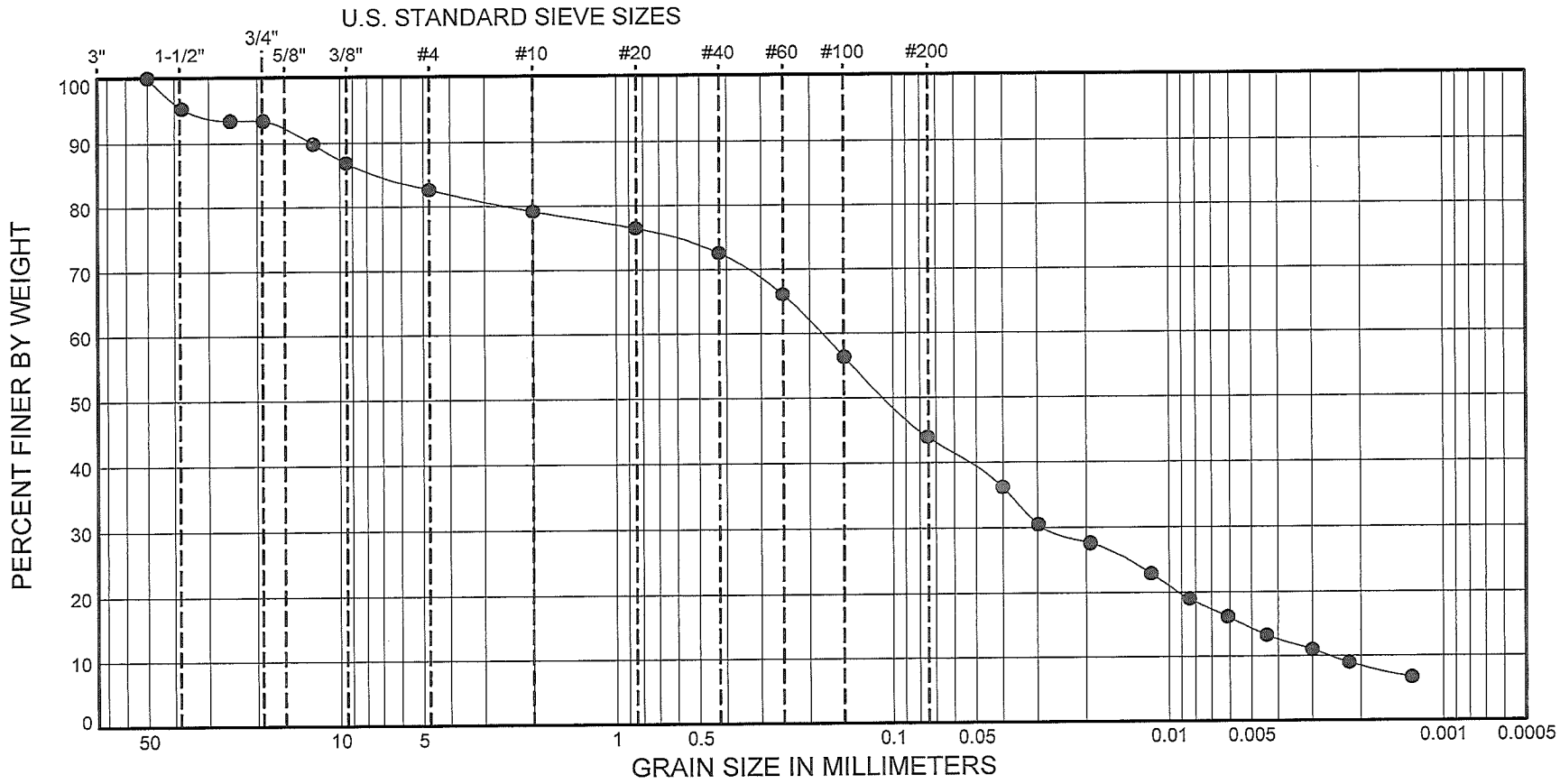
Harold Benny
Laboratory Manager

Steven E. Greene, L.G., L.E.G.
Vice President

Attachments:

Figure 1 Particle-Size Analysis of Soils
Figure 2 Sieve Analysis of Aggregate
Figure 3 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

GRAVEL		SAND			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	Site Soil			(SC-SM) Dark brown, silty, clayey SAND with gravel	15	26	21	5	17.3	38.7	44.0

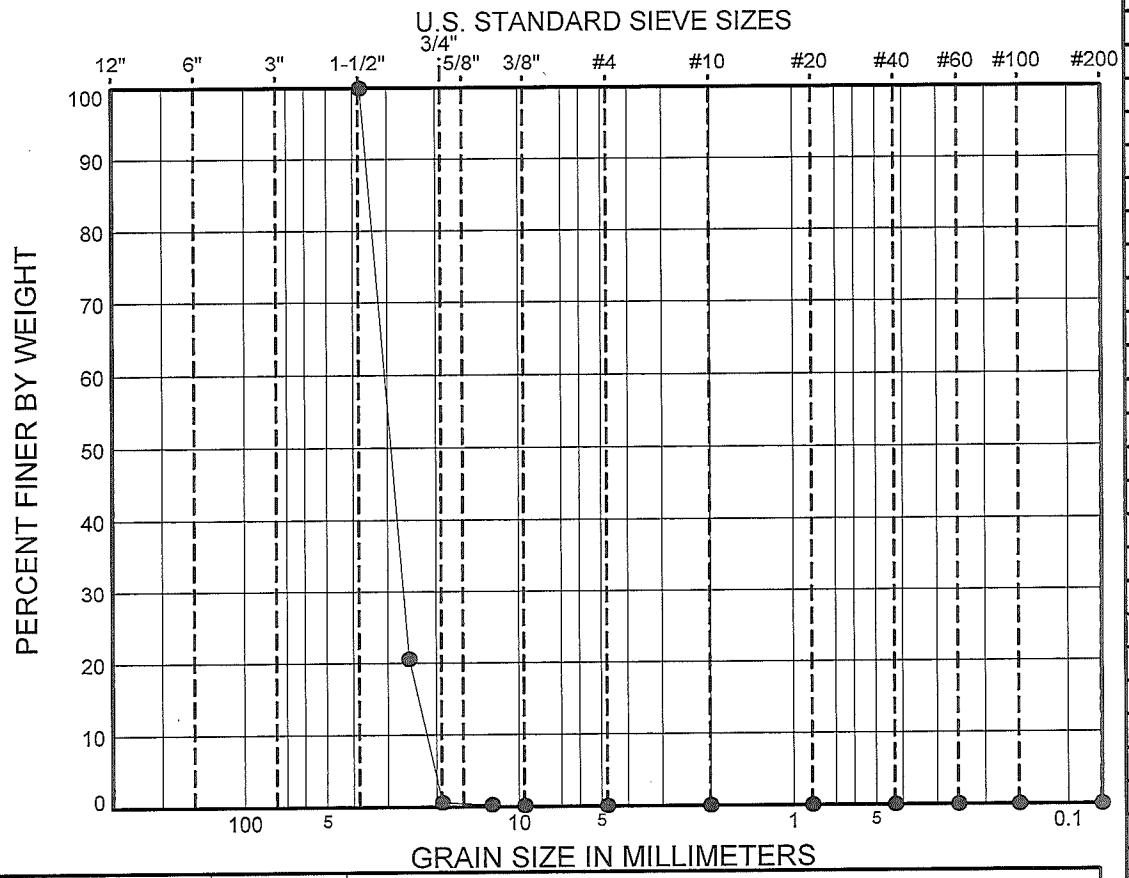
HWA GeoSciences Inc.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

PARTICLE-SIZE ANALYSIS
OF SOILS
METHOD ASTM D422

PROJECT NO.: 2011-103 FIGURE: 1

COBBLES	GRAVEL		SAND		
	Coarse	Fine	Coarse	Medium	Fine



SAMPLE ID	DATE SAMPLED	SAMPLED FROM
DRAIN ROCK		

Sieve Size	Percent Passing	Specification Limits
8 Inch		
7 Inch		
6 Inch		
5 Inch		
4 Inch		
3 Inch		
2 1/2 Inch		
2 Inch		
1 1/2 Inch	100%	
1 1/4 Inch		
1 Inch	21%	
3/4 Inch	1%	
5/8 Inch		
1/2 Inch	0%	
3/8 Inch	0%	
1/4 Inch		
No. 4	0%	
No. 8		
No. 10	0%	
No. 16		
No. 20	0%	
No. 30		
No. 40	0%	
No. 50		
No. 60	0%	
No. 80		
No. 100	0%	
No. 200	0.0%	

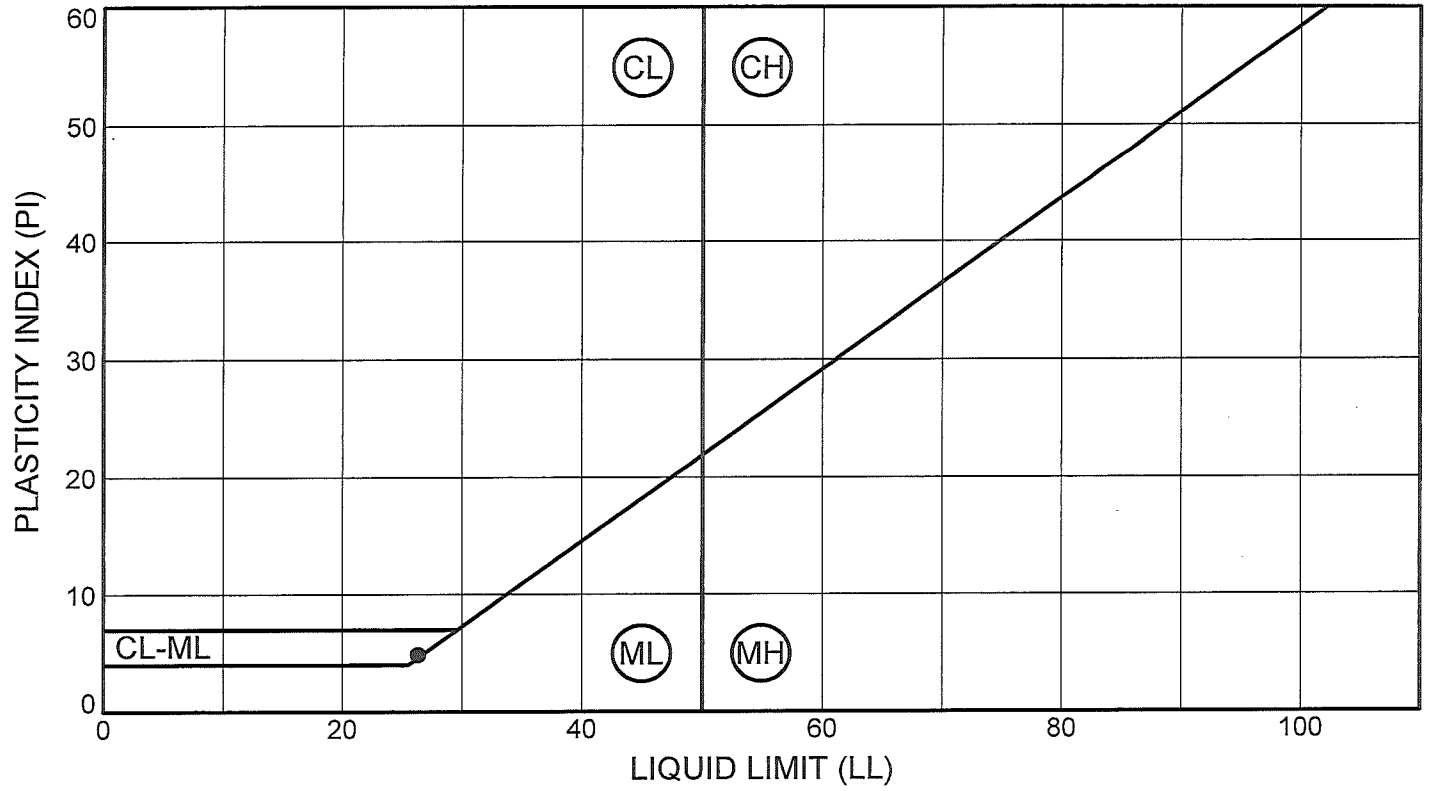
MATERIAL CLASSIFICATION / DESCRIPTION	Moisture %	Sand Equiv't	L.A. Abras'n	Degra-dation	Dust Ratio	MGS04 Sound	Plastic Index	Fracture %
(GP) Poorly graded GRAVEL								

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

SIEVE ANALYSIS
OF AGGREGATE
METHOD ASTM C136

PROJECT NO.: 2011-103 FIGURE: 2



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	Site Soil			(SC-SM) Dark brown, silty, clayey SAND with gravel	15	26	21	5	44.0

HWA GEOSCIENCES INC.

Laboratory Testing For PES
BSB Diversified Property
Kent, Washington

LIQUID LIMIT, PLASTIC LIMIT AND
PLASTICITY INDEX OF SOILS
METHOD ASTM D4318

PROJECT NO.: 2011-103 FIGURE: 3

APPENDIX K

Mayes Testing Crushed Concrete Aggregate Compaction Test Results

LABORATORY COMPACTION CHARACTERISTICS OF SOIL

HWA GEOSCIENCES INC.

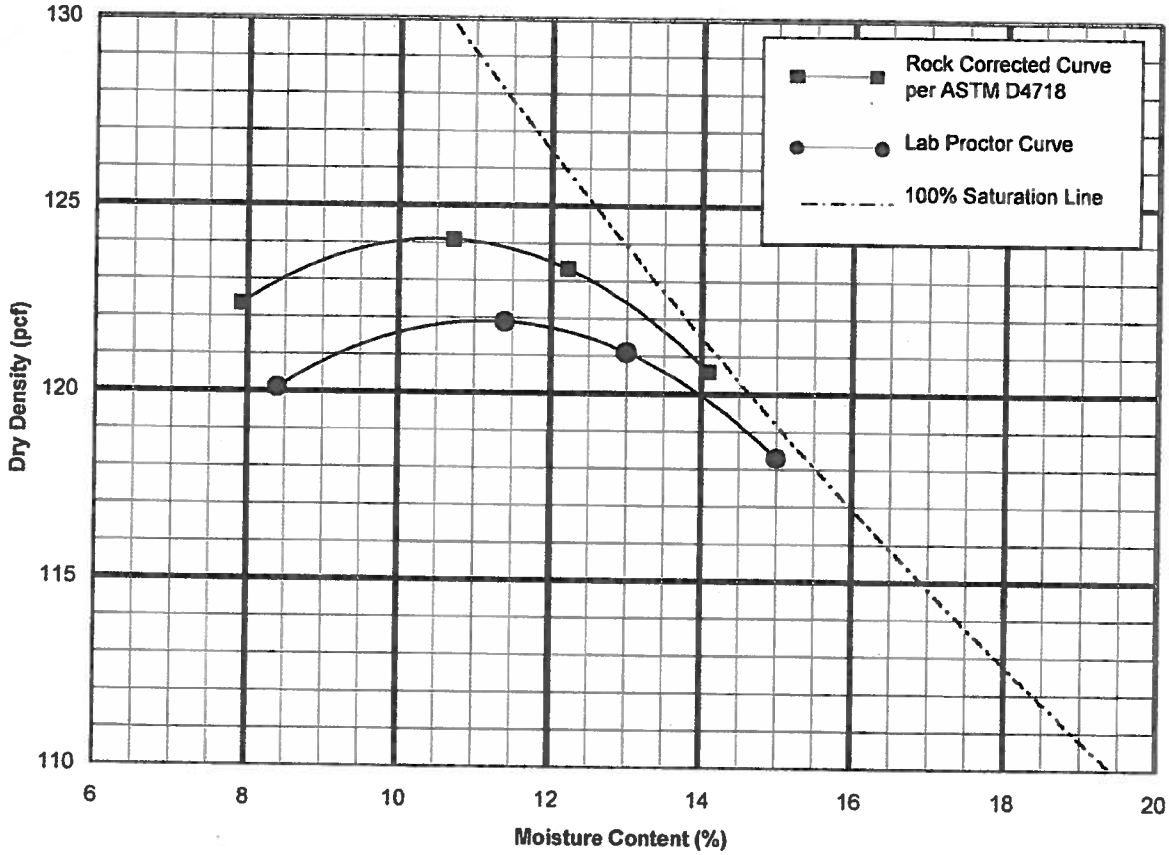
CLIENT: *Renton Concrete Recyclers*
PROJECT: *MLT for Renton Recyclers* SAMPLE ID: *QA-1*
PROJECT NO: *2010-065* Sampled By: *Client* Tested By: *JH*
Date Sampled: Date Received: *7/7/2010* Date Tested: *7/9/2010*

MATERIAL TYPE OR DESCRIPTION:
Recycled Aggregate

MATERIAL SOURCE, SAMPLE LOCATION AND DEPTH:
Renton Concrete Recyclers Plant, Renton, Washington

Designation: [ ] ASTM D 698 [X] ASTM D 1557 Natural Moisture Content: *5.5* %
Method: [ ] A [ ] B [X] C Oversize: *6.5* % retained on: *3/4* in.
Preparation: [ ] Dry [X] Moist Rammer: [X] Auto [ ] Manual Assumed S.G.: *2.68*

Test Data					
Dry Density (pcf)	*120.1*	*121.9*	*121.1*	*118.3*	
Moisture Content (%)	*8.4*	*11.4*	*13.0*	*15.0*	



Data Summary*	
Percent Oversize	*6.5%*
Max. Dry Density (pcf)*	*124.1*
Optimum Moisture (%)*	*10.5*

Test Values At Other Oversize Percentages						
0.0%	5.0%	10.0%	15.0%	20.0%	25.0%	30.0%
121.9	*123.6*	*125.3*	*127.1*	*128.9*	*130.8*	*132.7*
11.2	*10.7*	*10.2*	*9.7*	*9.2*	*8.7*	*8.1*

* values corrected for oversize material per ASTM D4718, using assumed Specific Gravity shown and oversize moisture content of 1%

Reviewed By: *George Minassian* **FIGURE** *1*

LAKESIDE INDUSTRIES

ASPHALT COMPACTION REPORT

PROJECT LOCATION:	BSB Diversified (S 200th St.)	TEST METHOD:	NUCLEAR DENSITY GAUGE
DATE:	Tested 11/7/201	GAUGE SERIAL#:	17419
PLANT:		STANDARDS:	MS: 532 DS: 1947
TYPE OF MIX:	Crushed agg.	Proctor (approx.):	125.0 LBS/FT^3
DEPTH OF MATERIAL:	4" LIFT (t)	TESTED BY:	*Jeff Crouse*

TEST NUMBER	TEST LOCATION / DESCRIPTION	Dry DENSITY (LBS./FT.3)	PERCENT OF MAXIMUM
1	(Various locations)	115.9	92.7%
	"	%M	12.1%
2	"	116.2	93.0%
	"	%M	11.4%
3	"	113.5	90.8%
	"	%M	10.6%
4	"	114.9	91.9%
	"	%M	11.2%
5	"	115.4	92.3%
		%M	10.2%

*Tests taken per digout/grindout near numbered markings on existing asphalt,
Or near location as noted.

SIGNED BY: Jeff Crouse

P.O. Box 7016, Issaquah, WA 98027 • (425) 313-2600 • (425) 313-2620/FAX

MAYES TESTING ENGINEERS, INC

20225 Cedar Valley Road, Suite 110 Ph 425.742.9360
Lynnwood, WA 98036 Fax 425.745.1737

10029 S. Tacoma Way, Suite E-2 Ph 253.584.3720
Tacoma, WA 98499 Fax 253.584.3707

7911 NE 33rd Drive, Suite 190 Ph 503.281.7515
Portland, OR 97211 Fax 503.281.7579

Soil
FIELD DENSITY TEST REPORT
ASTM D 6938

Project No.: T11132 Date: 11/11/2011
Project: BSB Diversified Final Cleanup Action
Inspector: John Opgenorth
MTE Nuclear Gauge No.: T21

Test #	Location	Depth or Elevation (feet)	Backscatter / Direct Transmission	Laboratory		Field				Soil Type Description
				Max Dry Density (PCF)	OMC %	Wet Density (PCF)	Dry Density (PCF)	Moisture Content %	Compaction %	
1	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			132.4	121.5	9.0		Subgrade consisting of recycled concrete
2	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			133.5	122.4	9.1		Subgrade consisting of recycled concrete
3	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			133.6	121,9	9.6		Subgrade consisting of recycled concrete
4	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			135.6	124.6	8.9		Subgrade consisting of recycled concrete
5	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			130.0	119.3	9.0		Subgrade consisting of recycled concrete

Specification Compaction and Material :
☐ ASTM D 1557 (Modified Proctor)
☐ ASTM D 698 (Standard Proctor)

Type and Number of earth moving units:

Type and Number of Compaction units:

Number of Passes: Thickness of lift:

Method of Adding Moisture:

☐ In our opinion, fill generally meets specifications as indicated by test numbers:

☐ In our opinion, fill does not meet specifications as indicated by test numbers:

☐ Fill test meets compaction specifications

☑ Contractor Advised

☐ Full-time observation ☑ Part-time observation

QC Sample: Test No.: 4 Dry Density: 135.1 Moisture %: 8.7

Comments: Fill was firm, stable and unyielding. Subgrade was in place and asphalt placement was in progress upon arrival. Michael Stewart with PES Environmental, Inc. requested density tests be performed on subgrade but was unable to provide a proctor. Testing was performed on areas that were still accessable.

APPENDIX L

Mayes Testing and Lakeside Industries Hot Mix Asphalt Compaction Test Results

LAKESIDE INDUSTRIES

ASPHALT COMPACTION REPORT

PROJECT LOCATION:	BSB Diversified (S 200th St.)	TEST METHOD:	NUCLEAR DENSITY GAUGE
DATE:	Paved 11/7/201	GAUGE SERIAL#:	17419
PLANT:	Covington	STANDARDS:	MS: 532 DS: 1947
TYPE OF MIX:	1/2" HMA A/B	RICE:	157.9 LBS/FT^3
DEPTH OF MATERIAL:	2" TOP LIFT (t)	TESTED BY:	*Jeff Crouse*

TEST NUMBER	TEST LOCATION / DESCRIPTION	DENSITY (LBS./FT.3)	PERCENT OF MAXIMUM
1	(Various locations	146.2	92.6%
2	on top lift)	147.4	93.4%
3	"	146.6	92.8%
4	"	145.8	92.3%
5	"	146.6	92.8%
6	"	150.2	95.1%
7	"	144.0	91.2%
8	"	149.8	94.9%
9	"	145.0	91.8%
10	"	145.3	92.0%
11	"	144.4	91.5%
12	"	148.8	94.2%
13	"	144.3	91.4%
14	"	143.9	91.1%
15	"	144.8	91.7%

*Tests taken per digout/grindout near numbered markings on existing asphalt,
Or near location as noted.

SIGNED BY: JC Crouse

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MAYES TESTING ENGINEERS, INC.

Seattle Office
20225 Cedar Valley Road
Suite 110
Lynnwood, WA 98036
ph 425.742.9360
fax 425.745.1737

Tacoma Office
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Tacoma, WA 98499
ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

Project No.	T11132
Project	BSB Diversified Final Clean Up
Address	8202 South 200th Street, Kent, WA
Engineer	Livermore Architecture and Engineering
Architect	Livermore Architecture and Engineering
Contractor	PES Environmental, Inc.
Record No.	009
Date	11-11-11
Weather	Overcast/Rain
Inspection	Asphalt

Performed asphalt compaction testing on 1,013 tons of modified ½" HMA supplied by Lakeside's Covington plant, placed by Lakeside using a Carlson paving machine in 2" lift along the east side and entire length of site on the north end. A 3" lift was placed around the vault located in the northeast corner of the site. Asphalt had previously been placed along the west side of the site on 11-7-11. Asphalt was compacted using a CAT CB224E and 5 ton BOMAG smooth double drum vibrating rollers.

Shortly after arriving on site, MTE representative met with Michael Stewart, with PES Environmental, Inc. who had requested compaction tests also be done on asphalt placed on 11-7-11, approximately 750 tons, located on the northwest end of the site and compaction tests be done on in place sub-grade consisting of crushed recycled concrete which was in the process of being paved. As requested, density tests were performed using a Troxler 3430 nuclear density gauge on accessible sub-grade located within central portion of the site, however, a proctor was not available on site so relative densities could not be calculated. Density results were recorded for informational purposes and can be found on the attached soil density report. The majority of the sub-grade was found to be firm, stable and unyielding under the weight of fully loaded asphalt trucks with the exception of three locations which were marked on the attached field map in red squares. These areas were found to be soft and some pumping was observed.

The majority of asphalt compaction tests on both the previous 750 tons placed on 11-7-11 and the 1,013 tons placed this day met the WSDOT specification of 91% with the exception of the final 15' wide section along the north end of the site. A delay in trucks occurred around 1:00pm which coincided with the start of heavy rainfall. The entire site drained to the final section of paving which caused the asphalt being placed to cool rapidly and was actually placed in standing water causing steam to burst thru newly placed asphalt once the roller passed over top. Compaction tests reflect the problems which occurred during final asphalt placement along the north end of site. Results of compaction tests for the day can be seen on attached asphalt test reports and site map can be used for reference of test locations.

To the best of our knowledge, all items inspected today are in conformance with approved plans and specifications.

Inspector: John Opgenorth

Reviewed By:

Michael S. Dolder, P.E.
Vice President

MAYES TESTING ENGINEERS, INC

20225 Cedar Valley Road, Suite 110 Ph 425.742.9360
Lynnwood, WA 98036 Fax 425.745.1737

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Portland, OR 97211 Fax 503.281.7579

Soil
FIELD DENSITY TEST REPORT
ASTM D 6938

Project No.: T11132 Date: 11/11/2011
Project: BSB Diversified Final Cleanup Action
Inspector: John Opgenorth
MTE Nuclear Gauge No.: T21

Test #	Location	Depth or Elevation (feet)	Backscatter / Direct Transmission	Laboratory		Field				Soil Type Description
				Max Dry Density (PCF)	OMC %	Wet Density (PCF)	Dry Density (PCF)	Moisture Content %	Compaction %	
1	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			132.4	121.5	9.0		Subgrade consisting of recycled concrete
2	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			133.5	122.4	9.1		Subgrade consisting of recycled concrete
3	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			133.6	121,9	9.6		Subgrade consisting of recycled concrete
4	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			135.6	124.6	8.9		Subgrade consisting of recycled concrete
5	Central area of site between existing paving on 11-7 and 3" section by vault	Final subgrade	Direct Trasmission			130.0	119.3	9.0		Subgrade consisting of recycled concrete

Specification Compaction and Material :
☐ ASTM D 1557 (Modified Proctor)
☐ ASTM D 698 (Standard Proctor)

Type and Number of earth moving units:

Type and Number of Compaction units:

Number of Passes: Thickness of lift:

Method of Adding Moisture:

☐ In our opinion, fill generally meets specifications as indicated by test numbers:

☐ In our opinion, fill does not meet specifications as indicated by test numbers:

☐ Fill test meets compaction specifications

☑ Contractor Advised

☐ Full-time observation ☑ Part-time observation

QC Sample: Test No.: 4 Dry Density: 135.1 Moisture %: 8.7

Comments: Fill was firm, stable and unyielding. Subgrade was in place and asphalt placement was in progress upon arrival. Michael Stewart with PES Environmental, Inc. requested density tests be performed on subgrade but was unable to provide a proctor. Testing was performed on areas that were still accessable.

MAYES TESTING ENGINEERS, INC.

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7911 NE 33rd Drive, Suite 190 Ph 503.281.7515
Portland, OR 97211 Fax 503.281.7579

Asphalt
FIELD DENSITY TEST REPORT

ASTM D 2950

Project No.: T11132 Date: 11/11/2011

Project: BSB Diversified Final Cleanup Action

Inspector: John Opgenorth

MTE Nuclear Gauge No.: T21

Test #	Location	Elevation (feet)	Backscatter / Direct Transmission	Laboratory Maximum Rice Density	Field Wet Density	Field Compaction %	Asphalt Type Description
1	2" section placed on 11-7-11 NW corner of site (see map).	Final Grade	Backscatter	158.1	147.2	93.1	Modified 1/2" HMA
2	2" section placed on 11-7-11 NW corner of site (see map).	Final Grade	Backscatter	158.1	144.5	91.4	Modified 1/2" HMA
3	2" section placed on 11-7-11 NW corner of site (see map).	Final Grade	Backscatter	158.1	147.2	93.1	Modified 1/2" HMA
4	2" section placed on 11-7-11 NW corner of site (see map).	Final Grade	Backscatter	158.1	146.0	92.3	Modified 1/2" HMA
5	2" section placed on 11-7-11 NW corner of site (see map).	Final Grade	Backscatter	158.1	144.0	91.0	Modified 1/2" HMA
6	2" section placed on 11-7-11 NW corner of site (see map).	Final Grade	Backscatter	158.1	150.1	95.0	Modified 1/2" HMA
7	Perimeter road southest corner of site (see map)	Final Grade	Backscatter	158.1	144.5	91.4	Modified 1/2" HMA
8	Perimeter road southest corner of site (see map)	Final Grade	Backscatter	158.1	146.8	92.9	Modified 1/2" HMA
9	Perimeter road southest corner of site (see map)	Final Grade	Backscatter	158.1	146.2	92.5	Modified 1/2" HMA
10	3" section around vault northeast corner of site (see map)	Final Grade	Backscatter	158.1	146.2	92.5	Modified 1/2" HMA
11	3" section around vault northeast corner of site (see map)	Final Grade	Backscatter	158.1	145.8	92.2	Modified 1/2" HMA

Specification Compaction and Material : 91% WSDOT Spec

☑ AASHTO T-209 / ASTM D2041 Theoretical Max Specific Density

☐ Other

Type and Number of Compaction units: BOMAG & CAT CB224E

Number of Passes: 5+ Thickness of lift: 2"-3"

Lay-Down Temp: 285-300 Supplier: Lakeside

QC Sample:

Test No.: 2 Wet Density: 144.3

☑ In our opinion, asphalt generally meets specifications as indicated by test numbers: 1 thru 11

☐ In our opinion, asphalt does not meet specifications as indicated by test numbers:

☐ Asphalt test meets compaction specifications

☑ Contractor Advised

☑ Full-time observation ☐ Part-time observation

Comments:

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Portland, OR 97211 Fax 503.281.7579

Asphalt
FIELD DENSITY TEST REPORT

ASTM D 2950

Project No.: T11132 Date: 11/11/2011

Project: BSB Diversified Final Cleanup Action

Inspector: John Opgenorth

MTE Nuclear Gauge No.: T21

Test #	Location	Elevation (feet)	Backscatter / Direct Transmission	Laboratory	Field		Asphalt Type Description
				Maximum Rice Density	Wet Density	Compaction %	
12	3" section around vault northeast corner of site (see map)	Final Grade	Backscatter	158.1	149.4	94.5	Modified 1/2" HMA
13	3" section around vault northeast corner of site (see map)	Final Grade	Backscatter	158.1	144.5	91.4	Modified 1/2" HMA
14	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	146.3	92.6	Modified 1/2" HMA
15	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	145.5	92.0	Modified 1/2" HMA
16	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	144.0	91.0	Modified 1/2" HMA
17	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	149.6	94.6	Modified 1/2" HMA
18	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	147.7	93.4	Modified 1/2" HMA
19	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	144.3	91.2	Modified 1/2" HMA
20	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	146.4	92.6	Modified 1/2" HMA
21	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	147.3	93.2	Modified 1/2" HMA
22	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	149.4	94.5	Modified 1/2" HMA

Specification Compaction and Material : 91% WSDOT Spec

☑ AASHTO T-209 / ASTM D2041 Theoretical Max Specific Density

☐ Other

Type and Number of Compaction units: BOMAG &CAT CB224E

Number of Passes: 5+ Thickness of lift: 2"-3"

Lay-Down Temp: 285-300 Supplier: Lakeside

QC Sample:

Test No.: 20 Wet Density: 145.9

☑ In our opinion, asphalt generally meets specifications as indicated by test numbers: 12 thru 22

☐ In our opinion, asphalt does not meet specifications as indicated by test numbers:

☐ Asphalt test meets compaction specifications

☑ Contractor Advised

☑ Full-time observation ☐ Part-time observation

Comments:

MAYES TESTING ENGINEERS, INC.

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Lynnwood, WA 98036 Fax 425.745.1737

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Asphalt
FIELD DENSITY TEST REPORT
ASTM D 2950

Project No.: T11132 Date: 11/11/2011

Project: BSB Diversified Final Cleanup Action

Inspector: John Opgenorth

MTE Nuclear Gauge No.: T21

Test #	Location	Elevation (feet)	Backscatter / Direct Transmission	Laboratory Maximum Rice Density	Field Wet Density	Field Compaction %	Asphalt Type Description
23	remaining 2" section between 3" section and area paved on 11-7-11 (see map)	Final Grade	Backscatter	158.1	145.5	92.0	Modified 1/2" HMA
24	Northwest corner of site (see map)	Final Grade	Backscatter	158.1	146.6	92.8	Modified 1/2" HMA
25	Northwest corner of site (see map)	Final Grade	Backscatter	158.1	146.2	92.5	Modified 1/2" HMA
26	Northwest corner of site (see map)	Final Grade	Backscatter	158.1	144.5	91.4	Modified 1/2" HMA
27	Northwest corner of site (see map)	Final Grade	Backscatter	158.1	146.8	92.9	Modified 1/2" HMA
28	Final 15 foot wide section very north end of site (see map)	Final Grade	Backscatter	158.1	145.4	92	Modified 1/2" HMA
29	Final 15 foot wide section very north end of site (see map)	Final Grade	Backscatter	158.1	142.3	90	Modified 1/2" HMA
30	Final 15 foot wide section very north end of site (see map)	Final Grade	Backscatter	158.1	138.8	87.8	Modified 1/2" HMA
31	Final 15 foot wide section very north end of site (see map)	Final Grade	Backscatter	158.1	141,2	89.3	Modified 1/2" HMA
32	Final 15 foot wide section very north end of site (see map)	Final Grade	Backscatter	158.1	138.1	87.3	Modified 1/2" HMA
33	Final 15 foot wide section very north end of site (see map)	Final Grade	Backscatter	158.1	137.9	87.2	Modified 1/2" HMA

Specification Compaction and Material : 91% WSDOT Spec

☑ AASHTO T-209 / ASTM D2041 Theoretical Max Specific Density

☐ Other

Type and Number of Compaction units: BOMAG &CAT CB224E

Number of Passes: 5+ Thickness of lift: 2"-3"

Lay-Down Temp: 285-300 Supplier: Lakeside

QC Sample:

Test No.: 23 Wet Density: 145.8

☐ In our opinion, asphalt generally meets specifications as indicated by test numbers:

☑ In our opinion, asphalt does not meet specifications as indicated by test numbers: 29-33

☐ Asphalt test meets compaction specifications

☑ Contractor Advised

☑ Full-time observation ☐ Part-time observation

Comments:

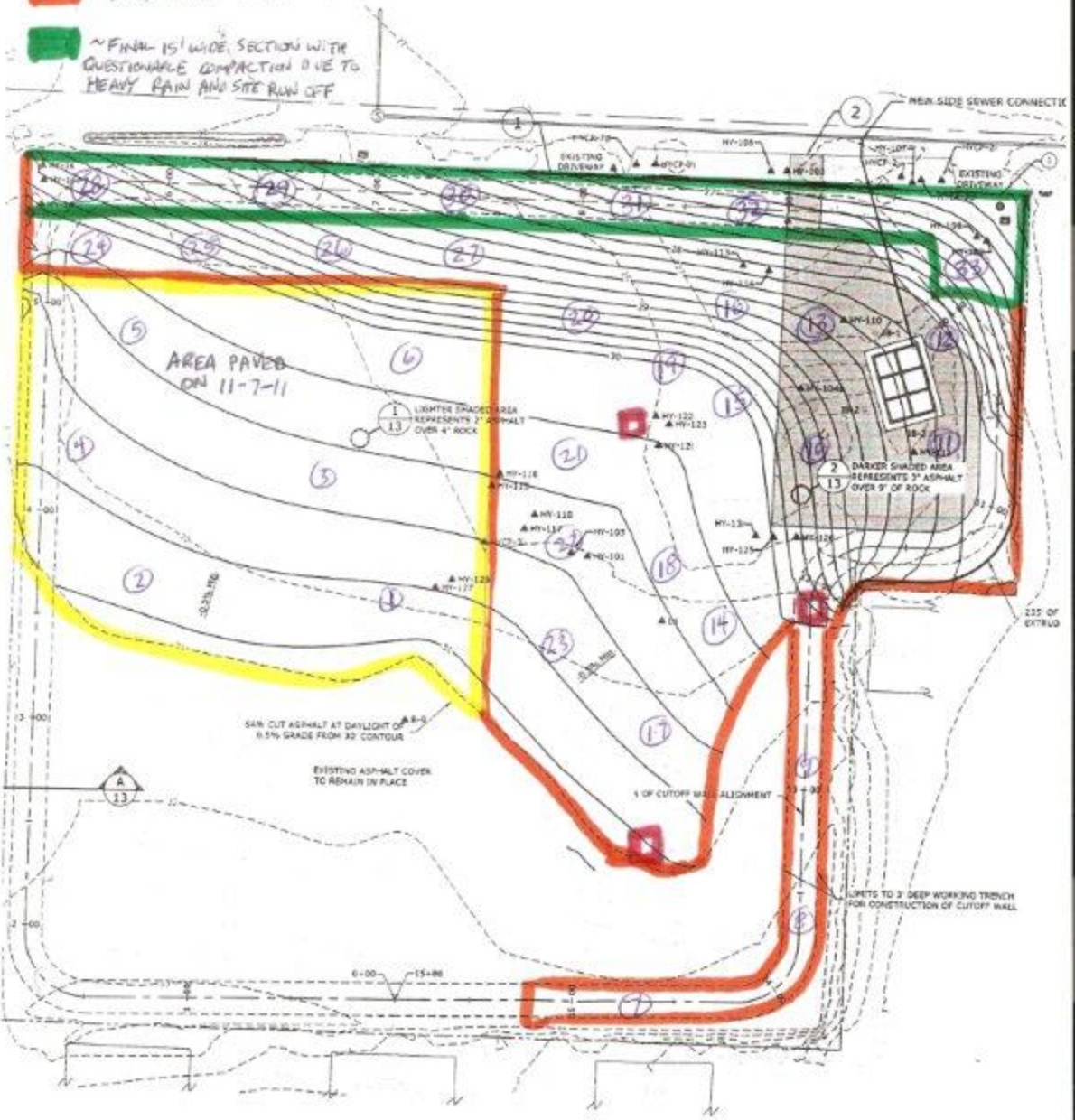
BSB Diversified Final Cleanup Action
T11132 Report from 11-11-11

~ AREA PAVED ON 11-7-11

~ AREA PAVED ON 11-11-11

~ FINAL 15' WIDE SECTION WITH QUESTIONABLE COMPACTION DUE TO HEAVY RAIN AND SITE RUN OFF

SOFT SPOTS IN SUBGRADE



APPENDIX M

Product and Installation Warranties

NORTHWEST LININGS &
GEOTEXTILE PRODUCTS, Inc.
"Helping to Protect the Environment"
21000 77th Avenue South
Kent, WA 98032
(253) 872-0244 • (800) 729-6954
FAX: (253) 872-0245
www.northwestlinings.com

Date: 10-11-11

FACSIMILE COVER SHEET

PLEASE DELIVER TO: Ray Mayhew @ Mid-Mountain rmayhew@midmtn.com

FROM: **NORTHWEST LININGS & GEOTEXTILE PRODUCTS, INC.**

OFFICE NUMBER: **(800) 729-6954, EXT.106** FAX NUMBER: **(253) 872-0245**

TOTAL NUMBER OF PAGES INCLUDING THIS PAGE: 6

PROJECT NAME: **BSB Diversified Site**

REFERENCE: 30-mil PVC, 16 oz. Non-woven Geotextile

MESSAGE: **SEE ATTACHED QUOTATION (6 PAGES) CONCERNING SUBJECT BID**

With this fax cover page, you should have received the following:

Bid Quotation Letter
Project Specific Clarifications and Exceptions
Project Site Support Sheet
Standard Clarifications and Exceptions

If you did not receive all 6 pages or have any questions concerning this quotation, please contact us at (800) 729-6954, ext. 109.

Sincerely,

Kirk Lillehaug

Vice President – Construction Operations
Northwest Linings & Geotextile Products, Inc.

including reasonable attorney fees. The buyer agrees that if credit is granted by Northwest Linings, the Buyer will be responsible for all invoices as presented.

This bid must be accepted in its entirety unless specifically noted. Installation of the listed items has many crossover and related costs and should not be evaluated separately. Northwest Linings reserves the right to revise this proposal in the event of a reduction in scope of work or material quantities of 10% or greater.

Resin Pricing: The prices submitted herein are based on plastic resin prices of today's date. Northwest Linings' prices may be adjusted to reflect an increase in the price of resin, without allowance for overhead and profit.

Warranties: A warranty on Northwest Linings' workmanship will be an industry standard warranty good for 1 year upon completion of the liner installation. A material warranty on the Geomembrane, Geocomposite, GCL, or Geotextile products supplied by Northwest Linings will be industry-standard 1 year supplied by the manufacturer of the applicable Geosynthetic (unless otherwise noted in this bid) on a pro-rata basis only. Owners or Contractors failure to promptly pay in full all invoices, change orders, final payment and retention shall operate as an explicit waiver of all warranties set forth and referenced to above concerning this bid and project unless waived in writing by Northwest Linings & Geotextile Products, Inc. (Sample warranties will be provided upon request).

Weather-Related Issues: This bid is for installation when temperatures above 40°F can reasonably be expected between the hours of 8:00 AM and 5:00 PM. Installations cannot take place in winds over 15-20 MPH, in the presence of moisture of any kind (fog, rain, high humidity, etc.), or in temperatures below freezing without a major impact on seam quality and work productivity. Northwest Linings' decision to mobilize requires that the closest National Weather Service or airport weather station must forecast at least one more day of workable weather than what we estimate we will need to complete the project.

If you desire that we attempt installations under cold weather, high wind, or moist conditions, a change order must be signed before work begins acknowledging that possible standby time and other weather related delays are outside the scope of this bid, and that Northwest Linings will be reimbursed on a pre-construction negotiated basis. Since most liner products are heat-sealed, the presence of moisture within the subgrade or in the air will contribute to failed field seams, patches, etc. at a future date. Northwest Linings will not be responsible for meeting specified standards for seam strength or for providing installation or material warranties if forced to install liner materials under conditions of high wind, temperatures below 40°F, or moisture.

Field Seams: Field seams are very sensitive to a variety of outside weather conditions. Since Northwest Linings is responsible for the quality of the field seams, we reserve the right to stop field seaming operation if we decide conditions are marginal.

Old-to-New Field Seams: The welding of old-to-new materials is difficult due to the aging of the old material by dirt or chemical products. This old-to-new seam often will not have consistent tensile or peel strength and/or will not meet specified values. Northwest Linings will not be responsible for obtaining full tensile or peel specified values on old-to-new seams.

Back charge Notification: Any potential back charges against Northwest Linings by the Owner or General Contractor must be brought to the attention of Northwest Linings in writing within 24 hours of the event giving rise to the back charge. This prompt notification is necessary to give Northwest Linings the opportunity to correct the situation immediately. The notification must include a description of the problem(s) and an itemized breakdown of the associated costs. Northwest Linings will not be responsible for any back charges sought by the Owner or General Contractor where the written notification described above was not provided, unless this notification requirement is specifically waived by Northwest Linings in writing by the Construction Operations Manager or NWL Company Officer.

Project Rescheduling: Northwest Linings will attempt to accommodate any re-scheduling by the Owner or General Contractor. However, there may be occasions where we cannot meet the revised schedule due to other commitments. This is especially possible in the months of June through October when the majority of geosynthetic material installations are scheduled. Under these circumstances, Northwest Linings will mobilize as close as possible to the revised date but will not be responsible for any potential costs associated with the delay.

Water Fill Leak Testing (if required in bid documents):

1. Test must be performed before any backfilling takes place and segregate all other system from the liner including all piping, valves, concrete and structures to be considered a test of the liner, if this is not possible the test is a test of all the systems in contact with the contained liquid, Northwest Linings will not be responsible for these items.

Tremco Incorporated
3735 Green Road Beachwood, Ohio 44122 216-292-5000 FAX: 216-766-5543

Sealant/Weatherproofing Division
Tremco • Mameco/VULKEM® • Paramount™

Warranty No 124266SP
Exp 11/25/2016 -- pge 11/25/2020

PARASEAL WARRANTY

PROJECT NAME	**BSB Diversified Vault 8202 S. 200th Street Kent, WA 98042**	**APPLICATOR**	**Purcell Painting & Coatings 6456 S. 144th Street Tukwila, WA 98168**
ARCHITECT-ENGINEER	**PES Environmental, Inc. 1215 4th Ave. S, Suite 1350 Seattle, WA 98161**	**GENERAL CONTRACTOR**	**Mid Mountain Contractors 825 Fifth Ave., P.O. Box 2909 Kirkland, WA 98083**
OWNER	**BSB Diversified, Inc. 902 Grapevine Lane Nashville, TN 37221**	**COMPLETION DATE**	**11/25/2011**
PRODUCT(S)	**Paraseal, TREMDrain 1000, Paramastic, Paragranular, Seam Tape**	**TYPE OF WORK**	**Underground Concrete Detention Vault - Below Grade 3650 SQ FT New Exterior**

TREMCO Paraseal Products, when applied to various construction projects following the procedures, instructions and conditions of Tremco Incorporated (Tremco) data and information sheets, are covered by the following warranty:

Tremco warrants that for a period of *5 Years* following the date of substantial project completion Tremco Paraseal Products, when applied according to directions will: (1) meet the requirements of the ASTM specification which applies to the product used (2) bridge ruptures caused by cracking of the immediate substrate up to 1/8th inch width and (3) will not leak water directly through any individual Paraseal membrane as a result of deterioration caused by ordinary wear and the effects thereof. Tremco shall, at its option, replace or repair that portion of Tremco Paraseal Products which is proven defective and such refund or replacement shall constitute the limit of the Company's liability and obligation for any such defects. In no event shall Tremco's liability exceed the original membrane purchase value. An acceptable method of repair may include negative side injection. It is the responsibility of the owner to provide access to any areas that require repair.

The Warranty shall not apply if the product is ruptured by any cause other than failure of the Tremco Paraseal Products and/or is subject to misuse or abnormal use or condition. Tremco makes no warranty with respect to expansion joints.

Tremco's obligations under this Warranty are expressly conditioned upon receipt of full payment for the System and the Owner's compliance with each of its responsibilities described in this Warranty Document. Any delay in full payment to Tremco shall not extend the Warranty Period.

The total liability of Tremco over the life of this Warranty shall not in any event exceed the dollar value of the original cost of the System as specified above. No representative of Tremco has the authority to make any representations or provisions except as stated herein.

THE ABOVE WARRANTY IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. EXCEPT AS EXPRESSLY PROVIDED HEREIN, TREMCO SHALL NOT BE LIABLE FOR DAMAGE TO THE PROJECT STRUCTURE OR INTERIOR CONTENTS OR FOR ANY OTHER CONSEQUENTIAL, SPECIAL OR OTHER DAMAGES ARISING FROM OR RELATED TO, DIRECTLY OR INDIRECTLY, THIS WARRANTY OR THE PERFORMANCE OF THE MATERIALS COVERED BY THIS WARRANTY, WHETHER BASED ON BREACH OF WARRANTY, NEGLIGENCE OR OTHER THEORY OF LIABILITY.

TREMCO INCORPORATED

Michael J. Soeder
Vice President, Sales, North America
Commercial Sealants and Waterproofing

Date Issued: 2/21/2012

To expedite processing, this document will be completed and delivered in electronic form only. An electronic signature from a Tremco Representative on a completed warranty document is valid and binding and is enforceable to the same extent as a penned signature.

An RPM Company

APPENDIX N

Compact Disk with Daily Field Reports

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-01
Date: 08-10-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Overcast about 70 F
PM: Overcast about 70 F

CQA Monitor Arrival Time: 10:30 AM **CQA Monitor Departure Time:** 2:40 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- 4-inch diesel powered pump.
- Superintendent.
- Labor assisting with trailer install.

General Contractor Activities for the Day:

- Mobilized office trailer.
- Mobilized 4-inch diameter pump to pump down excavation.
- Pumped excavation from 10:40 AM until 2:28 PM. .

Surveying Activities for the Day:

- None today, but Mid Mountain is scheduling for this week. I suggested they include setting benchmarks for the slurry wall in addition to the vault.
- .

CQA Activities for the Day:

- Observed and documented excavation pumping.
- Prepared change request form 2011-1 related to not needing to replace steel reinforcement for the vault (Item 35 in Change Order 8).
- Prepared Change request summary log.

Material / Product Deliveries and Certification Documentation:

- None.

Problems or Deficiencies Requiring Resolution or Follow Up:

- None.

Follow Up on Previous Days Problems or Deficiencies:

- N/A.

Other Action Items:

- Set up weekly meeting schedule and time.

Attachments:

- Vault water pumping data.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-02
Date: 08-15-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy 64 F
PM: Sunny, warm about 78 F

CQA Monitor Arrival Time: 7:45 AM **CQA Monitor Departure Time:** 3:35PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- 4-inch diesel powered pump.
- 25,000 gallon Baker Tank.
- Ingersol Rand MF 62 forklift with front loader attachment.

General Contractor Activities for the Day:

- Idle.

Surveying Activities for the Day:

- None today, but on Friday 8/12/11 MM's surveyor set several control points near the existing water groundwater treatment plant.

CQA Activities for the Day:

- Observed turbidity of water stored in the Baker Tank by gravity draining it into a 5-gallon bucket. Water was turbid to the point where we could not see the bottom of the bucket.
- Discussed issue with B O'Neal and we decided to bring out an Imhoff meter / guage to measure settleable solids in the stored water to determine if it can be direct discharged to the sanitary sewer from the tank.
- 2:30 PM, performed three Imhoff tests and the results indicated no visible settleable solids over a 45-minute period. Approved discharge of stored water from the Baker Tank to the sanitary sewer through a tank outlet located approximately 24 inches above the tank bottom, after a leak in the discharge piping was repaired Requested MM to continue moinitoring flow rate, total flow and perform additional Imhoff tests during dicharge.

Material / Product Deliveries and Certification Documentation:

- MM brought in several new hand tools such as drills and saws.

Problems or Deficiencies Requiring Resolution or Follow Up:

- Need to determine if stored water can be discharged to sewer.

Follow Up on Previous Days Problems or Deficiencies:

- N/A.

Other Action Items:

- Set up weekly meeting schedule and time.

Attachments:

- Photos.

Imholf test on stormwater stored in Baker Tank.

Close up of Imholf test on stormwater stored in Baker tank.

Excavation after removal of stormwater.

Sink hole at northwest corner of excavation outside of sheet piles.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-03
Date: 08-17-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Sunny 62 F
PM: Sunny, warm.

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 12:00 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- 4-inch diesel powered pump.
- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 450 Excavator.
- Deere 624H Loader

General Contractor Activities for the Day:

- Pumped stormwater from 25,000 gallon tank (green tank) to sewer (Approximately 20,000 gallons total, 3 – 4 feet of water remains in tank).
- Pumped water from excavation into second tank (blue tank).
- Transferred steel and forms from west side of site to location near vault.
- Established elevations on top whaler for excavation elevation control.

Surveying Activities for the Day:

- None

CQA Activities for the Day:

- Observed pumping of water from excavation to tank.
- Re-visited and updated submittal list.
- Contacted Greg Lovinger and requested that they update submittals.
- Emailed Greg an updated submittal register with red-line text in comment column.
- Contacted PES office and requested sampling and testing of water pumped to blue tank.
- Met Greg in his office and picked up red-line drawings from 2009 work.
- Requested redline steel erection submittal from Greg.
- Discussed rat slab with Roger North. He approved concept.

Material / Product Deliveries and Certification Documentation:

- Framing lumber (2 x 6 boards and plywood).

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- Set up sampling of blue baker tank water pumped from excavation on 8/17/11.

Other Action Items:

- .

Attachments:

- Photos.

Condition of steel after two years storage. Steel accepted based on special inspection performed by Mayes Testing.

White paint on top whaler is where elevations were established.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-04
Date: 08-18-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Sunny 62 F
PM: Sunny, warm.

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 12:05 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 450 Excavator.
- Deere 624H Loader.
- Air supply fans for fresh air into excavation.

General Contractor Activities for the Day:

- 7:00 safety meeting, and planning meeting with contractor. Discussed setting up a decontamination area.
- On-site safety rep for MidMountain shut down work in the excavation until proper safety equipment and precautions are in place, specifically those that are spelled out in their own safety plan.
- Spent morning setting up project site.
- Crew demobilized at about 11AM.

Surveying Activities for the Day:

- None

CQA Activities for the Day:

- Showed the MM safety rep the Mid Mountain Safety Plan, which he had signed and asked him if they were in compliance. MM stopped all work in the excavation.

Material / Product Deliveries and Certification Documentation:

- 6-inch and 4-inch diameter perforated HDPE pipe with 3/8-inch perforations, 8 rows, 6 inch spacing. 4-inch complies with drawings and specs, 6-inch not required on this project.

Problems or Deficiencies Requiring Resolution or Follow Up:

- MM compliance with their own Safety Plan.

Follow Up on Previous Days Problems or Deficiencies:

- Set up PES to sample water that was pumped from the lower elevations of the excavation and into the blue baker tank. This water requires sampling prior to discharge into sewer.

Other Action Items:

- .

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-05
Date: 08-19-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Overcast 60 F
PM: Sunny, 70 F at 1:00 PM.

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 4:30 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 450 Excavator.
- Deere 624H Loader.
- Air supply fans for fresh air into excavation.
- Takecuchi TB 153 FR Mini-excavator.

General Contractor Activities for the Day:

- 9:00 AM MM Safety officer entered the excavtion in Level A SCBA to measure for vinyl chloride and trichloroethylene. The results were non-detect for both. The MM safety officer cleared the excavation area for starting work. Only 40-hr trained individuals are allowed in the excavation per MM' safety plan.
- Began excavating at 10:00 AM.
- Re-checked established control elevation on lower waler by backsighting on INCA's TBM. The waler control elevation checked to within 0.05 feet.
- Lifted mini-excavator into hole at 10:50 AM.
- Removed mini excavator from excavation at 12:10 PM.
- Continued dewatering excavation throughtout the day, but volume of water is minimal. Dewatering liquid is being pumped into the same Baker Tank that PES obtained a water sample from on Thursday 081711.
- At 4:00 PM two sand boils developed in the NE corner of the excavation about 5 – 6 feet in from the sheet piles and at an an elevation of about 9.8 feet. Excavation was discontinued and about 10 yards of soil was placed over the boils. A series of short hubs were then driven into the existing excavated soil surface and the top elevation of each hub surveyed to establish its elevation. We will re-survey them on Monday morning to see if any heaving is occuring.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Reviewed MM revised safety plan.
- Finalized mark up on direct subs with Greg Lovinger who agreed to 10%.
- Monitored excavation activities and soil stockpiling activities. No apparent run off is coming off stockpiled soil. Dewatering actvities in excavtion appear to be working.

Material / Product Deliveries and Certification Documentation:

- None.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- MM implemented revised site safety plan.

Other Action Items:

- .

Attachments:

- Photos.

Establishing grade control with laser in excavation.

Beginning excavation to elevation 9.75.

Lowering mini-excavator into excavation to assist with excavation.

Soil conditions in excavation.

Setting sump pump in excavation.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-06
Date: 08-22-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Overcast 60 F
PM: Sunny, 70 F at 1:00 PM.

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 1:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 450 Excavator.
- Deere 624H Loader.
- Air supply fans for fresh air into excavation.
- Takecuchi TB 153 FR Mini-excavator.

General Contractor Activities for the Day:

- 7:00 AM Subcontract safety officer on site going over safety with MM superintendent.
- Contractor idle pending resolution of water in excavation.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Coordinated possible resolutions to water in excavation with design team and contractor.

Material / Product Deliveries and Certification Documentation:

- None.

Problems or Deficiencies Requiring Resolution or Follow Up:

- Groundwater in excavation has risen to elevation 11.4 over week end submerging the hubs set to monitor heaving in the excavation, however no heaving appears to be taking place.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Attachments:

-

- 

  Groundwater in excavation at elevation 11.4 feet.

Groundwater in excavation.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-07
Date: 08-23-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Overcast 60 F Overnight rain
PM: Partly Cloudy.

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 1:30 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 624H Loader.

General Contractor Activities for the Day:

- Idle due to water in excavation.
- Pumped approximately 8,000 gallons of water from green tank into sewer ending at 10:50 AM. Discharge approved by Bill Haldeman.
- 11:00 AM; Began pumping water from excavation back into green tank (approximately 4,000 gallons). Pumping discontinued at 1:25 PM.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Ran Imholf test on water pumped from green tank. Results were zero settleable solids in 1 hour.
- Monitored volume of water being pumped to sewer and into tank.

Material / Product Deliveries and Certification Documentation:

- None.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-08
Date: 08-25-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Clear 62
PM: Warm, clear 80

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:20 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon Baker Tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 624H Loader.
- Mobilized Komatsu 220 Excavator with extended arm.

General Contractor Activities for the Day:

- Idle due to water in excavation.
- Mobilized in a replacement Baker Tank.
- Pumped approximately 5,000 gallons of water from excavation to both Baker Tanks.
- Cut 42-inch diameter steel casing into two 6' 10" long pieces to use as casings to install the proposed dewatering sumps.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Discontinued treatment of groundwater wells and began using on site treatment system to treat water stored in the Baker tanks.
- Installed sump pump and flexible hose discharge that allows us to pump water from the Baker Tanks to an inlet point in the treatment system.
- Began pumping and treating water at about 3:00 PM Treated approximately 12,000 gallons of water from 3:00 PM to 7:00 AM on 8/26.

Material / Product Deliveries and Certification Documentation:

- 2-inch PVC pipe, fittings and valves for hard piping from four sump pumps to the Baker Tanks.
- Two 20-foot long sections of 12-inch diameter slotted PVC casing.
- One 14-foot long section of 42-inch diameter steel casing.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

- .

Other Action Items:

- .

Site Visitors:

- Jerry Porter representing the Department of Ecology. Met with Mike Stewart and Jason to get an update on project status.

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-09
Date: 08-26-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Clear 62
PM: Warm, clear 80

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 624H Loader.
- Komatsu 220 Excavator with extended arm.
- Diesel Powered 70 KVA Generator.

General Contractor Activities for the Day:

- Improved safety restraints around top of excavation.
- Cleaned up site to reduce trip hazards.
- Installed a 4-gas meter in the NE corner of the excavation at elevation 15'.
- Installed three electric fans in the excavation positioned on top of the top whaler.
- Cut 12-inch diameter slotted casings to 10-foot long sections.
- Pushed 42-inch steel casing to elevation 6' in all four corners of the excavation.
- Removed soil inside of steel casing with a vacuum truck to elevation 6.2'.
- Completed installation of slotted PVC pipe, and pea gravel backfill in all four corners.
- Pulled casing in all four corners.
- There was no sand heaving or excessive water in any of the casings after vactoring the soil out to elevation 6.2'.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Installed second sump pump and flexible hose discharge that allows us to pump water from each of two Baker Tanks without moving the pump from tank to tank.
- Continued pumping and treating water until 1:00 PM. Left 40,000 gals of capacity in the tanks at 1:00 PM.
- Observed installation of MM safety devices.
- Observed and documented installation of dewatering sumps to elevation 6 feet plus or minus 0.2 feet.

Material / Product Deliveries and Certification Documentation:

- 10 tons of pea gravel
- 32 tons 1 ½-inch minus gravel.

Problems or Deficiencies Requiring Resolution or Follow Up:

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- Photos.

Slotted 12-inch diameter PVC well casing.

Fans installed to provide fresh air to excavation.

Lowering steel casing into NE corner of excavation.

Vactoring soil from inside casing after it was pushed to a base elevation of 6 feet.

Setting PVC casing in steel casing with bottom of capped PVC casing set at elevation 6.0 feet.

East side wells with pea gravel in place and casing pulled.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-10
Date: 08-27-11 **Day of Week:** Saturday
Prepared by: Mike Stewart

Weather: AM: Clear Warm
PM: Warm, near 80

CQA Monitor Arrival Time: 5:50PM **CQA Monitor Departure Time**: 7:20 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Completed hard piping of 4 sump pumps from excavation to baker tanks 1 and 2.
- Installed valve system that will allow switching of pump flow from one tank to the other or to pump to both tanks simultaneously.
- Began pumping water from excavation to tank # 2 at a rate of 5 – 6 gpm at 1:40PM.

General Contractor Activities for the Day:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 624H Loader.
- Komatsu 220 Excavator with extended arm.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Monitored flow rate from excavation to tank and measured approximate flow of 5 – 6 gpm.
- Determined that based on flow rate and remaining capacity in tank that pumping could continue until Monday morning at that rate.
- Communicated my findings to Brad of MM at 7:30 PM via voice mail.
- Took three Imholf tests samples at 7:00 PM directly from the discharge pipe going into Tank 2. At 20 minutes, recorded approximately 2 - 3ml of settleable solids. On Monday morning after 36 hours measured only a slight increase in settleable solids with the total being approximately 3ml/L average with none more than 3.5.
- Did not start treatment of water in tanks.

Material / Product Deliveries and Certification Documentation:

- None.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- Photos.

Hard pipe discharge from wells to Baker tanks.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-11
Date: 08-29-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Overcast 60
PM: Partly Cloudy 70

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 4:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 624H Loader.
- Komatsu 220 Excavator with extended arm.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks.

General Contractor Activities for the Day:

- MM performed air monitoring in the excavation with the PES PID and with dragger tubes and did not detect any VOC's.
- PID is being used continuously in the excavation.
- Workers in the excavation have decided to increase PPE to level C just as a precaution.
- MM switched pumping from Tank 2 to Tank 1 at 7:00 AM.
- MM resumed excavation of the Vault pit at about 8 AM.
- MM is moving empty 55-gallon drums to a location in the middle of the site where they can be picked up for disposal.
- MM added a sump pump to the excavation to remove free standing water in addition to the pumps in the wells.
- Excavation proceeded until 4:30 and is now about 80 percent complete. Excavation spoils are being stockpiled in the soil stockpile area. There is no free water coming out of the stockpiled soil. Excavation depth is being monitored with a laser level device.
- A 6-inch deep trench is also being excavated at the excavation perimeter in an effort to control seepage from the sheet piles.
- MM is ordering geocomposite to install between the top of excavated soil and the gravel. Geocomposite will be placed at elevation 9.75 and through the perimeter troughs and covered with 6 inches of rounded gravel.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Began treating water in Tank #2 at 7:00 AM. Water level in tank 52.5 inches.
- Water level in Tank #2 at 12:00 was 70 inches. Approximate rate of treatment is 10 – 11 gpm.
- Turned off treatment system at approximately 2:45 PM. Water level in tank was 83.25 inches below the top lid. Treated approximately 6,000 gallons of water from tank #2 today.
- Performed Imholf test in top 18 inches of water in tank #1 at 12:00. Results indicate little or no settleable solids, but water is very turbid with suspended solids.

- Made a hand measurement of the excavation to verify excavation elevation and verified that excavation is being completed at roughly 9.75 feet plus or minus 0.2 feet, with local areas (smaller than 10 square feet) being excavated to help move surface water to the wells.
- Reviewed slurry (single pass) proposal from Dewind, with respect to bonding the project.
- Observed excavation activities looking for evidence of heaving or sand boils but none were detected.
- Continued monitoring treatment system function and volume of water in approximate gallons per minute. System has run continuously and magnehelic gage is steady at 26.5 inches of water.

Material / Product Deliveries and Certification Documentation:

- 3-inch perforated PVC pipe

Problems or Deficiencies Requiring Resolution or Follow Up:

- Soil conditions in the bottom of the excavation continue to be challenging. The soil tends to liquefy and water works its way up to the surface when it is disturbed or shaken in any way.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Hidao and Jeremy Porter representing Ecology (1 PM to 2PM). Mike Stewart reported progress to Ecology.

Attachments:

- Photos.

MM employee in level C PPE.

Continued excavation following dewatering well installation.

Excavation spoils inside soil berm.

Excavation at grade (9.75) in NE corner.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-12
Date: 08-30-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Overcast 60, drizzle
PM: Partly Cloudy 67

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 2:30 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 624H Loader.
- Komatsu 220 Excavator with extended arm.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks.

General Contractor Activities for the Day:

- MM performed air monitoring in the excavation with the PES PID and with dragger tubes and detected .02 ppm of Vinyl Chloride with a dragger tube.
- PID is being used continuously in the excavation.
- Workers in the excavation have decided to increase PPE to level C just as a precaution.
- MM continues to pump to Tank 1, as they did all night.
- MM resumed excavation of the Vault pit at about 7 AM.
- A 6-inch deep trench was excavated at the excavation perimeter and for two cross trenches to provide a location to install perforated pipe to control seepage from the sheet piles.
- MM is ordering geocomposite to install between the top of excavated soil and the gravel. Geocomposite will be placed at elevation 9.75 and through the perimeter troughs.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Treated water in tank 2 from 7:10 AM until 8 AM. Water level dropped from 83.25 to 86.
- Began treating water in Tank #1 at 8:04 AM.
- Water level in tank #1 at 9:18 is 68 inches.
- Water level in tank #1 at 10:20 is 71.5 inches (Treated water faster than pumping rate.
- Performed Imholf test in top 18 inches of water and at direct discharge to tank at 7:15. At 45 minutes there was 1ml solids in the direct discharge water and zero in the top 18 inches in the tank. Pump was set approximately 24 inches below water surface in tank.
- Observed excavation activities looking for evidence of heaving or sand boils but none were detected.
- Continued monitoring treatment system function and volume of water in approximate gallons per minute. System has run continuously and magnehelic gage is steady at 26.5 inches of water.

Material / Product Deliveries and Certification Documentation:

- geocomposite

Problems or Deficiencies Requiring Resolution or Follow Up:

- Soil conditions in the bottom of the excavation continue to be challenging. The soil tends to liquefy and water works its way up to the surface when it is disturbed or shaken in any way.

Follow Up on Previous Days Problems or Deficiencies:

- .
- .

Other Action Items:

- .

Site Visitors:

- Brian O'Neal, Roger North.

Attachments:

- Photos.

Perforated pipe being installed over geocomposite.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-13
Date: 09-01-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Clear
PM: Clear 68

CQA Monitor Arrival Time: 2:00 PM **CQA Monitor Departure Time**: 4:20 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- CAT 315C Excavator with claw bucket. (Mobed) in Tuesday
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks.

General Contractor Activities for the Day:

- Jason on site Wednesday 8/31 and Thursday 9/1.
- When Stewart arrived on afternoon of 9/1, steel erection was just beginning.
- Purcell was nearly complete with water proofing with completion scheduled for Friday. All of the floor and the bottom portions of the 12-inch wells were completed. A patch was planned for Friday at the 2-inch sump pump installed through the north end of the water proofing, which was left in place to continue dewatering a seep in the north sheet piling.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- PES observed water proofing and steel erection work for compliance with drawings and specs. Work is in compliance.

Material / Product Deliveries and Certification Documentation:

- 3-inch perforated PVC pipe

Problems or Deficiencies Requiring Resolution or Follow Up:

- MM requested that they pour the outer 2 feet of the bottom slab (east and west sides) without reinforcement. This request was forwarded to Livermore who responded by saying they would need time to evaluate the request. MM didn't have time to wait for a response so they began installing a form on the east and west sides of the slab that would result in the bottom slab being constructed to the designed dimensions.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- .

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-14
Date: 09-02-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Overcast 60
PM: Clear mid 70's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 2:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- CAT 315C Excavator with claw bucket. (Mobed) in Tuesday
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks.

General Contractor Activities for the Day:

- MM continuing to tie floor slab steel. Worked until 9 PM Thursday and began 5 AM today.
- Purcell completing water proofing installation. PES requested that they water proof all four 12-inch diameter well casings all the way through the slab, and raise the north and south ends to extend above the slab to allow overlap after the floor slab is poured.
- MM completed top and bottom steel installation with vertical bars and water stops for walls remaining.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- PES observed water proofing and steel erection work for compliance with drawings and specs. Work is in compliance.
- Livermore performed a structural steel inspection beginning at 11:30 PM.
- Mayes testing also performed a structural steel inspection after conferring with Livermore.
- Baker tank water levels as of 8:30 AM: West 100 inches, East 93 inches. Treatment system is not running as of 8:30 AM.
- East tank water elevation at 12:10 90.5 inches. Turned on treatment system at 12:10. 93.25 at 1:00.
- Started Imholf at 12:38 on water discharging directly out of treatment system to the sanitary sewer. Water looks nearly clear. Results zero settleable solids in 45 minutes.
- Kevin Hill (Mayes Testing) and Danae Austerfeld (Livermore) both provided preliminary inspection of re-bar at 12:30 PM and both agreed that work at that time was in accordance with the drawings and specs. Mayes and Livermore also went over concrete sampling and testing requirements. Sampling will take place from first truck and 6th truck on Tuesday. Testing will include 2 cylinders for 7 day strength and 3 for 28 day strength. Field testing to include temperature, air content, and slump.
- Mayes was scheduled to return Tuesday at 9AM for final steel inspection and to sample concrete as pour begins at 11 AM.
- Water level in east tank 95.5 at 2:00 PM, 99 in west tank at 2:00 PM. Shut down treatment system at 2:00 PM.

-

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- None.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- Requested progress meeting for Wednesday September 7th at 10 AM.

Site Visitors:

- Mayes testing and Livermore Associates.

Attachments:

- Photos.

Bottom #6 bars ties to #5 hooks along west face of slab.

Water stop wrapped around base of PVC well casing.

Water stop extended up side walls of vertical well casings.

Steel progress as of 1:00 PM Friday.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-15
Date: 09-06-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart
Submitted to: Brian O'Neal
Reviewed by:

Weather: AM: Clear low 60's, 11:50, 71 degrees.
PM: Clear mid 70's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- CAT 315C Excavator with claw bucket.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks.
- Alliance 4-inch concrete pump with boom.

General Contractor Activities for the Day:

- MM completed installation of floor steel and #4 verticals for walls. # 6 verts installed on north middle wall because MM ran out of #4's.
- Purcell completing water proofing installation at sump pump location and repaired pieces that fell away from the north wall.
- Pour began at 11 AM.
- Concrete poured in two 1-foot lifts with continuous vibration applied. Top of second lift finished with bow float and hand float. Curing compound applied to finish.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Visited site on Sunday 9/4/11 to inspect water levels in the tanks and to see if any moisture was present in the vault excavation. Water levels were 66 inches in east tank and 98 inches in west tank. Did not activate treatment system because plenty of storage was available. Water proofing was dry in excavation.
- PID readings in excavation and under bottom whaler at 7AM 0.00 ppm.
- Readings 18 inches below top of each Baker tank at 7:30 AM. East tank 20.0 ppm, west tank 13.3 ppm.
- PES observed water proofing and steel erection work for compliance with drawings and specs. Work is in compliance with drawings and specs.
- Baker tank water levels as of 8:25 AM: West 87 inches, East 43.5 inches. Treatment system turned on at 8:25 to start treating water in the east tank. East tank water level 46.5" at 9:17. 49" at 10:06, 58" at 1:13 PM.
- Mayes testing arrived at 9AM and performed a final steel inspection and approved the steel for pour.
- PES made a check of the structural steel installation relative to the overall vault dimensions and wall dimensions. Measurements verified walls and over all dimensions are in accordance

with the drawings.
- Started Imholf test at 9:20 AM using water at back end of treatment. Zero settleable solids at 45 minutes.
- Mayes testing sampled first and sixth load of concrete and ran temperature and air content tests. Both passed, Mayes approved concrete for pour. Also took samples for 7-day and 28-day compressive strength tests.

Material / Product Deliveries and Certification Documentation:

- Forming lumber**.**
- Forming braces.

Problems or Deficiencies Requiring Resolution or Follow Up:

- None.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- Requested progress meeting for Wednesday September 7th at 10 AM. Meeting switched to 1PM Thursday 9/8, and then weekly after that.

Site Visitors:

- Mayes testing.
- Andy Rottler, Rottler Manufacturing. Came by to get an update on our schedule and to reaffirm the sensitivity of ground vibration. We agreed to start slurry wall construction at a location away from their property line so they can get a feel regarding the ground vibration issues.

Attachments:

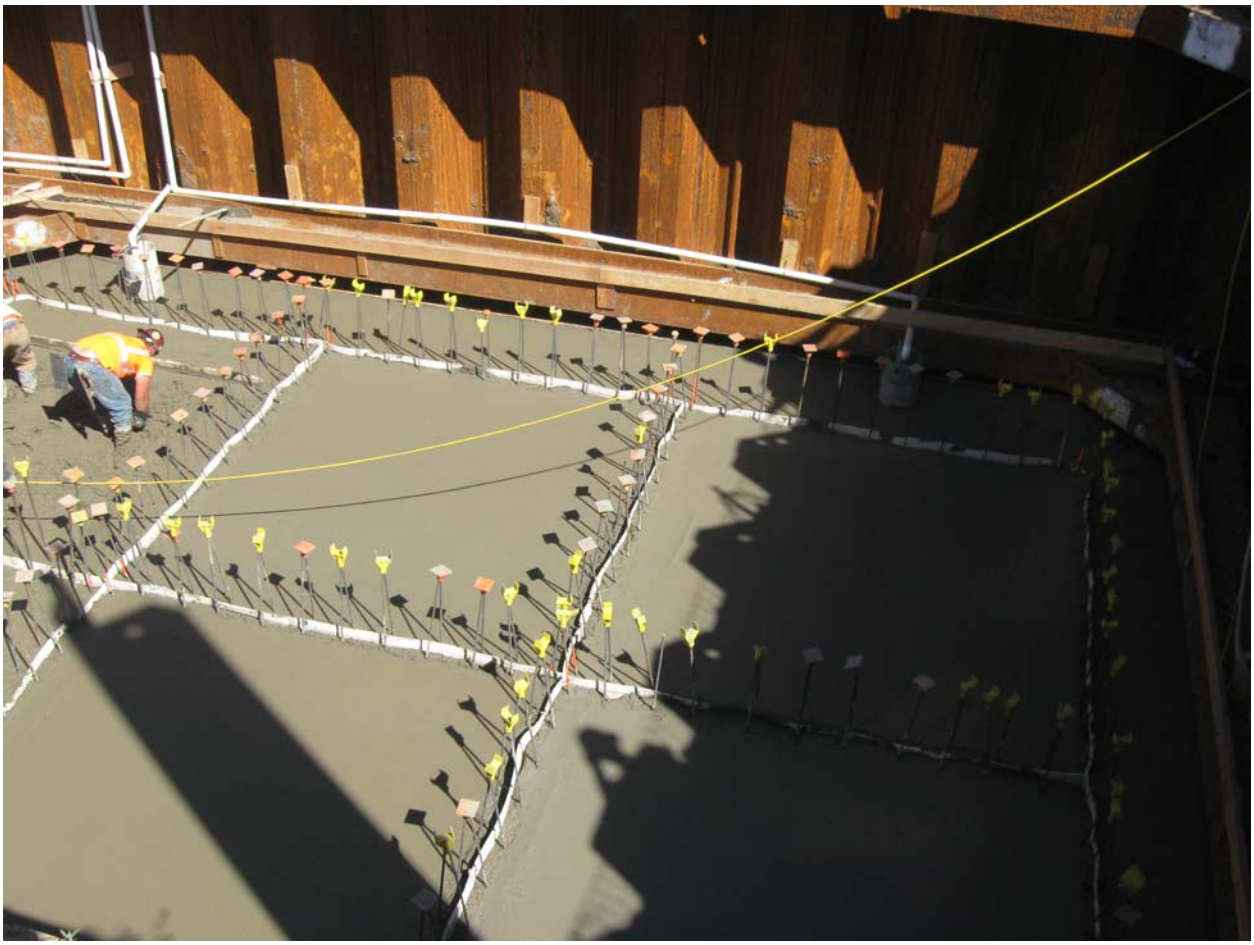
- Photos.

Water stops, and steel reinforcing as concrete pour begins.

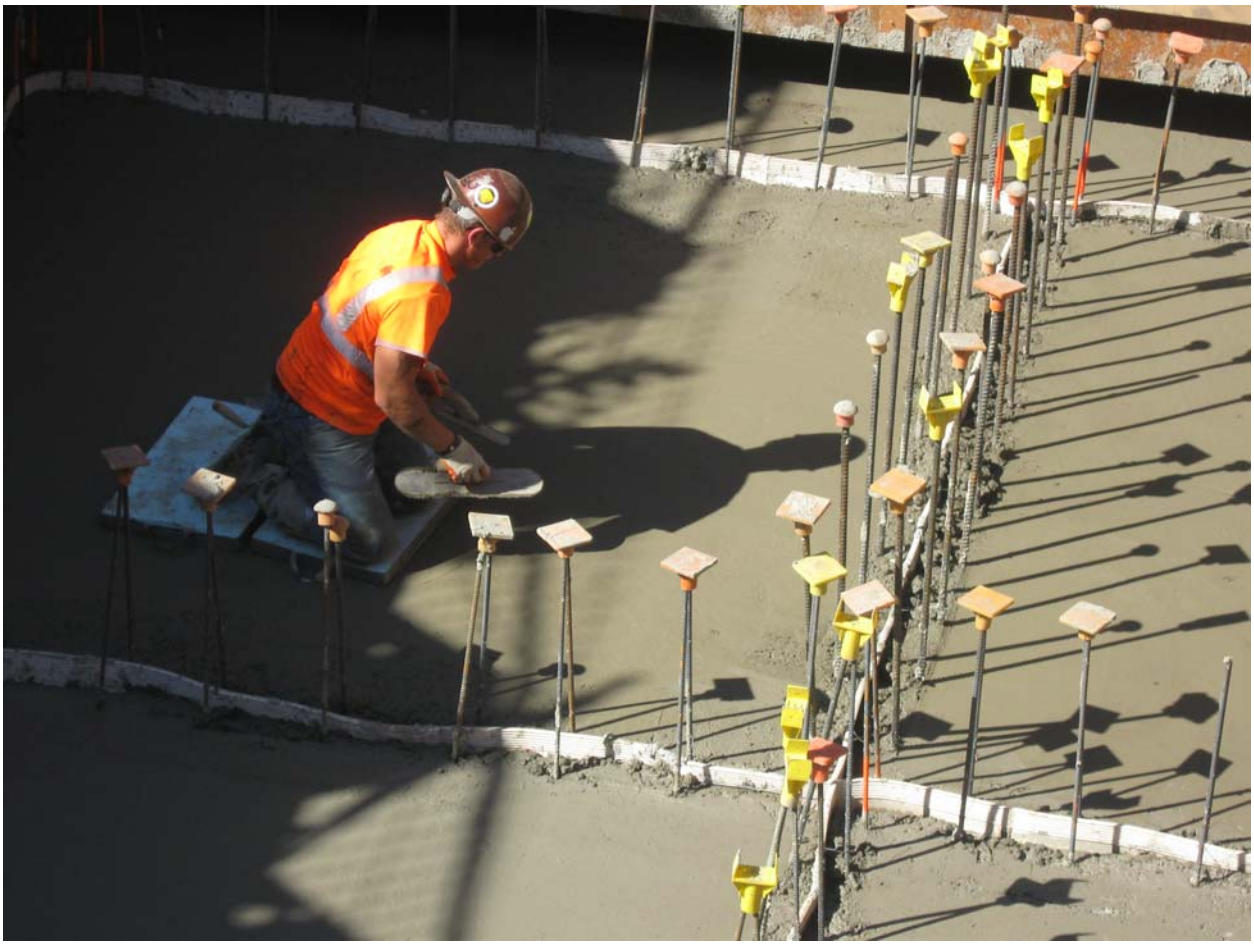
Vibrating first lift of concrete.

Roding final lift of concrete to grade.

Preparing air content test specimen.



Bow float finish in 4 of 6 chambers.



Hand finishing last poured chamber.

Nearly completed base slab pour.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-16
Date: 09-08-11 **Day of Week:** Thursday
Prepared by: Mike Stewart
Submitted to: Brian O'Neal
Reviewed by:

Weather: AM: Clear low 60's
PM: Warm high 70's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- CAT 315C Excavator with claw bucket.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.

General Contractor Activities for the Day:

- MM continued assembling reinforcement steel for the vault walls.
- Lifted east wall steel into place, braced it vertically, and tied it to the vertical steel embedded in the vault floor.

Surveying Activities for the Day:

- INCA arrived at site at 1PM and began setting control stakes for the slurry wall.

CQA / CM Activities for the Day:

- Inspected vertical wall rebar for size and layout. Inspected rebar complied with the drawings.
- Worked with MM to layout the alignment of the potholing trench.
-

Material / Product Deliveries and Certification Documentation:

- 12 bags of bentonite (4,000 lbs each) for 48,000 lbs.
- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- None.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- Progress meeting held from 1 – 2 PM with MM. (Brad Duncan, Ray Mayhew, Mike Stewart and Brian O'Neal in attendance.
- .

Site Visitors:

- Met with Rottler manufacturing personnel to discuss timing of slurry wall trenching activities.

Attachments:

- Photos.
-

70-ton crane used for lifting and setting vertical rebar and forms.

Initial set of east wall rebar.

2 x 6 framing used to position east wall rebar in position relative to outside form.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-16
Date: 09-08-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Clear low 60's
PM: Warm high 70's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- CAT 315C Excavator with claw bucket.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.

General Contractor Activities for the Day:

- MM continued assembling reinforcement steel for the vault walls.
- Lifted east wall steel into place, braced it vertically, and tied it to the vertical steel embedded in the vault floor.

Surveying Activities for the Day:

- INCA arrived at site at 1:00 PM and began setting control stakes for the slurry wall.

CQA / CM Activities for the Day:

- Inspected vertical wall rebar for size and layout. Inspected rebar complied with the drawings.
- Worked with MM to layout the alignment of the potholing trench.

Material / Product Deliveries and Certification Documentation:

- 12 bags of bentonite (4,000 lbs each) for 48,000 lbs.

Problems or Deficiencies Requiring Resolution or Follow Up:

- None.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- Progress meeting held from 1 – 2 PM with MM. (Brad Duncan, Ray Mayhew, Mike Stewart and Brian O'Neal in attendance.

Site Visitors:

- Met with Rottler manufacturing personnel to discuss timing of slurry wall trenching activities.

Attachments:

- Photos.

- 

  70-ton crane used for lifting and setting vertical rebar and forms.

Initial set of east wall rebar.

2 x 6 framing used to position east wall rebar in position relative to outside form.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-18
Date: 09-09-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Clear low high 50's
PM: Warm high 70's to low 80's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- CAT 315C Excavator with claw bucket.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 315C Excavator with thumb.
- 624H Loader

General Contractor Activities for the Day:

- MM continued assembling reinforcement steel for the vault walls.
- Lifted west and south exterior walls into place, braced them vertically, and tied them to the vertical steel embedded in the vault floor and the east wall steel.
- Saw cut asphalt along slurry wall alignment.
- Began exploratory trench at 11 AM. Excavated a 6 to 7-foot deep trench from station 12+25 to 14+00. General soil conditions found in the trench were consistent and are described as follows:
    - 0"- 4": 4 inches of asphalt placed in two lifts with a non-woven geotextile sandwiched between the lifts.
    - From 4" – 12": ¾-inch minus base rock.
    - From 12" – 30": tan silty sand fill.
    - From 30" to between 60" and 72": random fill consisting of silt, sand, gravel, cobbles, boulders, concrete debris, trees roots, and occasional plastic sheeting, and other random debris.
    - From 60" to 72": grey sandy silt to silty sand with small root masses. (appears to be original undisturbed ground surface).

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Inspected vertical wall rebar for size and layout. Inspected rebar complied with the drawings.
- Began assembling hard copy files of field reports and other CM documentation.
- Observed excavation of exploratory trench and logged findings.
- Discussed alternative approach to excavating slurry wall key trench with Brian O'Neal. We agreed to excavate the key trench to a depth of 3-feet for the entire 17-foot width requested by Dewind, and then excavate a 3 to 4-foot wide trench along the proposed wall alignment

through the fill materials until we expose the underlying silty sand (original ground). We anticipate this trench being 0 to 4 feet below the bottom of the 3-foot deep key trench. Spoke to Pat Conner of MM after speaking with Brian and MM agreed with the approach. They will add the estimated additional excavation volume to their Phase II bid price for the key trench excavation. Some consideration for not having to backfill the exploratory trench should be included in the pricing.

- Began review of MM's application for payment for period of August 1 to August 31.
- Continued pumping and treating groundwater stored in the west Baker tank.
- Discontinued pumping groundwater into the east Baker tank and completed treatment of water leaving about 6-inches of water on the bottom of the tank that still needs to be removed and treated. The PES pump cannot lower the water level below six inches in the tank. Working with MM to come up with a method for transferring this water to the west tank.

Material / Product Deliveries and Certification Documentation:

- 12 bags of bentonite (4,000 lbs each) for 48,000 lbs. (second shipment)

Problems or Deficiencies Requiring Resolution or Follow Up:

- Large cobbles, boulders and concrete debris were not anticipated so a method to assure they are not in the way of Dewind's one-pass trencher needs to be accomplished.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- PES will contact PSE to see if they can disconnect and then re-connect the treatment system after it is moved on 9/13.
- MM is looking into using the on-site 70 KVA generator to power the treatment system.
- MM is planning to remove or re-position the east Baker tank on Monday 9/12.
- PES needs to complete review of the August pay application.

Site Visitors:

- Pat Conner, Ray Mayhew.

Attachments:

- Photos.

- 

Continued steel erection for vault exterior walls.

Typical gravel and cobble fill below 30 inches depth in the exploratory trench.

Exploratory trench at station 12+30 with grey sandy silt original ground exposed on trench bottom.

Example concrete debris found at approximately 13+00 in the exploratory trench.

Exploratory trench opened to about 7 feet in depth showing some of the random debris being found in the fill materials.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-19
Date: 09-10-11 **Day of Week:** Saturday
Prepared by: Mike Stewart

Weather: AM: Clear low high 50's
PM: Warm high 70's to low 80's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- CAT 315C Excavator with claw bucket.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 315C Excavator with thumb.
- 624H Loader

General Contractor Activities for the Day:

- MM continued assembling reinforcement steel for the vault walls.
- Lifted inside row of steel for west, south and east wall into place and tied to outer layer of steel.
- Using 300 Excavator, removed asphalt from key trench from station 12+25 to 3+75.
- Using the 300 Excavator, began removing existing base rock from 17-foot wide key trench at Station 3+65 working south and immediately hit PVC liner at a depth of about 2 feet below the asphalt surface (stopped digging).
- Excavated an additional six exploratory trenches along the key trench alignment looking to identify the horizontal position of the PVC liner relative to the key trench, with the following results:
    - Station 3+00: found geotextile covering PVC at 2' below AC.
    - Station 2+25: found PVC at 18" below AC and evidence of slimy tan colored sludge pushing up through the liner.
    - Station 1+75 (SW Corner): found geotextile under PVC and clean sandy soil under the PVC (no sludge).
    - Station 0+75: found PVC 15" below AC (did not go through PVC).
    - Station 0+00: found PVC 2.5' below AC. did not go through PVC)
    - Station 15+10: found no PVC, but hit woven geotextile covering grey sludge at about 5' below AC. Stopped exploratory work until Monday because MM does not have the facilities to stockpile and contain the sludge.
- MM began excavating the 17-foot wide key trench to a depth of 3 feet at Station 12+25 and completed it to Station 14+00. Backfilled exploratory trench in advance of the key trench excavation because it was caving.
- MM transferred remaining water in the east tank to the west tank in preparation for removing the east tank from the site.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Inspected vertical wall rebar for size and layout. Inspected rebar complied with the drawings.
- Observed excavation of exploratory trench and logged findings.
- Reviewed application for payment and input information into the SOV#8 spreadsheet.
- Discussed alternative approach to excavating slurry wall key trench with Brian O'Neal.
- Continued pumping and treating groundwater stored in the west Baker tank from 7 AM until 1:20 PM.

Material / Product Deliveries and Certification Documentation:

- None

Problems or Deficiencies Requiring Resolution or Follow Up:

- We need to develop a plan for stockpiling sludge, and PVC liner that will be removed from the Key trench and exploratory trenches. PES recommended that MM call NW Linings to purchase a PVC or polyethylene liner to place on the existing asphalt as a containment liner.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

- Photos.

Interior and exterior steel on southeast corner of vault.

PVC liner at Station 3+65 + or -.

Slimy tan sludge coming up through liner at station 2+25.

PVC liner over clean sandy soil southeast corner of site.

Grey sludge found 5 feet bgs station 5+10.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-20
Date: 09-12-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Clear low high 50's
PM: Overcast mid 60's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:45 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 315C Excavator with thumb.
- 624H Loader

General Contractor Activities for the Day:

- MM continued assembling reinforcement steel for the vault walls.
- Iron workers did not work today.
- Constructed a 6-mil plastic lined containment area to store sludge that will be excavated from the key trench and the exploratory trench.
- Excavated key trench from station 14+00 through 0+00 to 1+50. Where we found cement stabilized sludge it was placed in the west portion of the containment area.
- Excavated exploratory trench from station 14+00 through 0+00 to 1+50. Found grey to light blue moist and soft sludge from about station 14+25 to station 15+85 at a depth of about 5 feet below top of asphalt. A layer of woven geotextile is covering the sludge. Sludge removed from the exploratory trench was placed in the northeast corner of the containment area. Found cement stabilized sludge from 0+00 to 1+50. This material was placed in the western portion of the containment area.
- Backfilled exploratory trench.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Inspected vertical wall rebar for size and layout. Inspected rebar complied with the drawings.
- Observed excavation of key trench and exploratory trench and logged findings.

Material / Product Deliveries and Certification Documentation:

- None

Problems or Deficiencies Requiring Resolution or Follow Up:

-

Follow Up on Previous Days Problems or Deficiencies:

- A plastic lined containment area was developed for storing sludges.

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

- Photos.

Exploratory trench at approximately 14+50 with sludge under geotextile and original ground exposed on the bottom of the trench.

Continued excavation of exploratory trench through sludge.

Cement stabilized sludge found under PVC cover from station 0+00 TO 1+50.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-22
Date: 09-14-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Clear low high 50's
PM: Overcast mid 60's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 2:00 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 315C Excavator with thumb.
- 624H Loader

General Contractor Activities for the Day:

- MM continued assembling reinforcement steel for the vault walls. Continued making connects from outer walls to inside walls.
- MM continued preparing form work for vault.
- Excavated key trench from 3+70 to 8+00. Placed clean soil and base rock in stockpiles.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Inspected vertical wall rebar for size and layout. Inspected rebar complied with the drawings.
- Observed excavation of key trench.
- Updated change request log.
- Approved August pay request.
- Added Phase II items to pay request spread sheet.
- Contacted Bob at PSE regarding old private high voltage line and he said he would look into whether or not it is live and get back to Mike Stewart.

Material / Product Deliveries and Certification Documentation:

-

Problems or Deficiencies Requiring Resolution or Follow Up:

-

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Jeremy Porter.

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: JL-01
Date: 09-15-11 **Day of Week:** Thursday
Prepared by: Jason Landskron

Weather: AM: Overcast 50's
PM: Overcast 60's

CQA Monitor Arrival Time: 6:30 AM **CQA Monitor Departure Time**: 4:00 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 624H Loader.
- Komatsu 220 Excavator with extended arm.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks. Only 1 continually operating.
- Grove 70-ton crane.
- 300 Excavator
- 315C Excavator w/ thumb

General Contractor Activities for the Day:

- MM continued assembling reinforcement steel for vault walls. Continued making connects from outer walls to inside walls.
- MM continued preparing form work for vault and placing in vault. Inner cell wall forms placed.
- Key trench completed to west gate. Placed clean soil and base rock in stockpiles.
- MM continued grubbing and clearing from west gate to east gate.
- MM began clearing concrete pad under old connex. Concrete stockpiled.
- MM removed old control panel from previous remediation system. Jason removed PLC control boards prior to demolition.

Surveying Activities for the Day:

- None

CQA / CM Activities for the Day:

- Restart treatment system in Baker at 6:45, water level ~8-in.
- Performed site walk to tidy up and ensure stock piles covered appropriately.
- Treatment system off at 15:00 due to low flow (Baker#2 empty).
- Photo-documented work progress for record (my camera and Mike's), email to Brian.
- Observed excavation activities and tree/shrub/debris removal.
- Continued monitoring treatment system function and quantity in approximate gallons per minute.
- Downloaded latest treatment system data set to laptop.
- Re-piped treatment system inlet line overhead between baker and connex to allow MM access without damaging hose.

Material / Product Deliveries and Certification Documentation:

- 7:00, semi load of slurry trench equipment arrived. Semi left onsite and crew left.

Problems or Deficiencies Requiring Resolution or Follow Up:

- Stormwater and sediment control needs addressing.

Follow Up on Previous Days Problems or Deficiencies:

Other Action Items:

Site Visitors:

- Karsten Springstead (PES, VTS and discharge water sampling)
- Hideo (Ecology, onsite: 13:00, offsite: 14:30)
- Brian (PES, onsite: 12:30, offsite: 15:30)

Attachments:

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: JL-02
Date: 09-16-11 **Day of Week:** Friday
Prepared by: Jason Landskron

Weather: AM: Overcast 50's
PM: Overcast 60's

CQA Monitor Arrival Time: 6:30 AM **CQA Monitor Departure Time**: 3:00 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Deere 624H Loader.
- Komatsu 220 Excavator with extended arm.
- Diesel Powered 70 KVA Generator.
- Four 2-inch sump pumps hard piped to the Baker tanks. Only 1 continually operating.
- Grove 70-ton crane.
- 300 Excavator
- 315C Excavator w/ thumb

General Contractor Activities for the Day:

- MM placed additional stormwater/sediment controls along north property boundary (cold patch, hay bales)
- MM reinforced stockpile cover of sludge with 2x4's and additional plastic sheeting.
- MM continued assembling reinforcement steel for vault walls. Continued making connects from outer walls to inside walls.
- MM continued preparing form work for vault and placing in vault. Inner cell wall forms placed.
- MM continued grubbing and clearing from west gate to east gate.
- MM removed trees/shrubs from central portion of property including an old light pole.
- MM continue clearing concrete pad under old connex. Concrete stockpiled.
- MM modified west gate to allow larger semi trailer loads onto property.
- MM moved soil in SW corner and west side key trench to create more berm along west property line and key trench.

Surveying Activities for the Day:

- Inca surveyor onsite 10:00-14:30. Completed key trench perimeter staking at 25-ft intervals.

CQA / CM Activities for the Day:

- Restart treatment system in Baker at 15:00, water level ~20-in. Left running overnight to completely empty Baker prior to weekend storm event.
- Performed site walk to tidy up and ensure stock piles covered appropriately.
- Photo-documented work progress for record (my camera and Mike's), email to Brian.
- Observed excavation activities and tree/shrub/debris removal.
- Downloaded latest treatment system data set to laptop.
- Measured key trench depth at critical locations (per Brian)
- Called for steel inspection (per Brad)
- Verified Inca survey staking.
- Observed and directed stormwater improvements and controls.
- Directed vacuum sweeper truck for site wide dust control and entryway housekeeping.

- Performed volumetric measurements on stockpiles and emailed to Brian.

Material / Product Deliveries and Certification Documentation:

- 7:00, 3 semi loads of bentonite arrived.
- 9:00, 1-2yd^3 of cold patch arrived.
- 9:30, vacuum sweeper onsite, offsite at 11:30.
- 15:00, semi load of slurry trench equipment arrived. Semi left onsite and crew left.

Problems or Deficiencies Requiring Resolution or Follow Up:

Follow Up on Previous Days Problems or Deficiencies:

- MM Installed reinforced covers for sludge stockpiles to minimize sludge contact with moisture.
- MM installed cold patch diversion/retention strip at east gate to prevent sediment laden runoff.
- Vacuum sweeper largely ineffective at sediment removal on asphalt although offsite dust generation was mitigated.

Other Action Items:

Site Visitors:

Attachments:

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-23
Date: 09-19-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Clear high 40's
PM: Clear high 60's low 70's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 4:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 315C Excavator with thumb.
- 624H Loader
- Case 580 backhoe

Dewind
- Track-mounted one-pass trencher with bentonite admix equipment (unassembled)
- Skid Mounted bentonite slurry mixer

General Contractor Activities for the Day:

- MM continued assembling reinforcement steel for the north wall and northern most interior wall. Continued making connects from outer walls to inside walls.
- MM continued preparing and setting form work for vault.
- Removed asphalt and concrete from slurry wall alignment around vault area.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Inspected vertical wall rebar for size and layout. Inspected rebar complied with the drawings.
- Observed removal and stockpiling of concrete and asphalt.
- Walked slurry wall alignment twice to look at construction staking completed by INCA and made notes regarding various stations where the excavation depth to slurry wall bottom appeared to be incorrect. Discussed with Brad Duncan of MM who agreed and he contacted INCA to return to the site Tuesday to make the necessary corrections.
- Attended slurry wall pre-con at 1:00 PM. The main issue that was discussed was Dewind's intent to not use a bentonite slurry admix, but instead to inject dry bentonite at 6% using an auger that places the bentonite 20-feet below ground surface at the trench cutting teeth. PES approved the method pending Dewind re-writing their QC plan for re-submittal to Ecology.
- Mayes testing on site today for re-bar inspection. They signed off on the two northern most interior walls for steel type, size, grade, spacing, lap length and clearance from forms placed at that time.

Material / Product Deliveries and Certification Documentation:

- Dry Bentonite in 3,800 pound bags.

Problems or Deficiencies Requiring Resolution or Follow Up:

- Dewind needs to re-write QC and Work plans
- INCA needs to correct some construction staking for the slurry wall.
- Need to come up with an approach to prevent vegetation from growing through the asphalt cover.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Jeremy Porter, Fujita Hideo, Ray Mayhew, Roger North, Brian O'Neal.

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-24
Date: 09-20-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Clear high 40's
PM: Clear high 60's low 70's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 315C Excavator with thumb.
- 624H Loader
- Case 580 backhoe

Dewind

- Track-mounted one-pass trencher with bentonite admix equipment (being assembled)
- Skid Mounted bentonite slurry mixer

General Contractor Activities for the Day:

- MM completed assembling reinforcement steel for the north wall and northern most interior, but an inspection completed today by Mayes testing revealed some problems with the bar overlap on the inside corner of the northwest corner wall and they also noted that the iron worker used double-laps of number six bars instead of a single lap of number 7 bars on some of the bottom bars that connect the north wall to the north-south running interior wall. I have a call into Livermore to discuss resolution of the issue.
- MM continued excavating the key trench from station 8+30 to the east entrance gate.
- MM continued demolition work around the reactor vault area, and moved 55-gallon drums that contain soil and or water into the soil stockpile containment area.
- MM continued preparing and setting form work for vault.

Surveying Activities for the Day:

- INCA on-site correcting cut information and establishing slurry wall control along the inside of the wall alignment per DeWinds request.

CQA / CM Activities for the Day:

- Followed up on Mayes testing inspection issue.
- Reviewed revised QC and Work Plans provided to MM today by DeWind, and provided MM and PES with my comments.
- Revised the August pay request by deducting silt fence costs.
- Began reviewing Force Account invoice for the installation of dewatering systems, geotextile, geocomposite, and gravel to stabilize the excavation foundation at elevation 9.75.
- Observed removal and stockpiling of concrete, asphalt abd drums.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- See INCA re-staking dicribed above.
- See comments on review of DeWinds revised QC and Work Plan

Other Action Items:

- .

Site Visitors:

-

Attachments:

- Photos .

Horizontal bar cut 4 inches too short resulting in insufficient lap length for interior northwest corner steel.

Progress on re-bar installation and form work at north end of vault.

DeWind Trencher being assembled.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-23
Date: 09-21-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Cloudy high 50's
PM: Cloudy, humid 70's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 7:00 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 315C Excavator with thumb.
- 624H Loader
- Case 580 backhoe

Dewind

- Track-mounted one-pass trencher with bentonite admix equipment (being assembled)
- Skid Mounted bentonite slurry mixer
- Forklift

General Contractor Activities for the Day:

- MM continued excavating the key trench around the reactor fault area and removed asphalt and concrete along the alignment.
- MM continued preparing and setting form work for vault.
- Dewind completed installation of water supply to one-pass machine, and completed assembly of machine.
- Observed trial slurry wall work from station 14+65 to 14+80. Dewind had to reinforce a flexible 12-inch hose that delivers bentonite to front mounted auger.
- Slurry looks well mixed. No QC testing as of this evening.
- PES will consider the starting point station 15+80 going west even though the machine was vertical and bentonite was added starting at station 14+65.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Followed up on Mayes testing inspection issue.
- Revised the August pay request by deducting silt fence costs.
- Observed removal and stockpiling of concrete, asphalt and drums.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

-

Attachments:

- Photos .

Pilot hole at start of slurry wall work.

Crimp in delivery hose.

.
Initial mix in slurry wall trial.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-26
Date: 09-23-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Clear high 50's
PM: Clear, humid 70's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 7:00 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe

Dewind
- Track-mounted one-pass trencher with bentonite admix equipment.
- Skid Mounted bentonite slurry mixer (idle)
- Forklift

General Contractor Activities for the Day:

- MM continued preparing and setting form work for vault including setting spacers between wall forms.
- MM spent time hammering concrete and asphalt to reduce the size of the pieces.
- DeWind completed slurry cutoff wall from station 0+43 to 2+25. Ended excavation at 17:00.
- Slurry looks well mixed. QC field tests meet expected results. (See filed logs for details)

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed slurry wall cutoff trenching for entire day.
- Estimated percent bentonite added for today at about 6.2% for the wall from 0+43 to 1+75.
- Estimated bentonite percentage at 5.8 for 1+25 to 2+25, but actual wall length is less than the stationing along the centerline, because the center of the trench moved inward as the trencher made the southwest corner turn.
- Obtained perm sample SW02-092311 at station 0+40 from elevation plus or minus 5 feet.
- Continued QC slump (4.5 to 5.5") and density (112 to 116 pcf).

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- Livermore approved steel installation despite minor non-conformance to design as indicated in Mayes report.

Follow Up on Previous Days Problems or Deficiencies:

- .
-

Other Action Items:

- .

Site Visitors:

- Many reps invited by Dewind and from Ecology, O'Neal.

Attachments:

- Photos .

Bentonite feeder suspended on forklift to allow trencher to make the southwest corner.

Centerline of trench at mid-point of southwest corner only 4 feet from edge of asphalt cut at station 1+75.

One pass trencher completing southwest corner.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-27
Date: 09-24-11 **Day of Week:** Saturday
Prepared by: Mike Stewart

Weather: AM: Clear high 50's
PM: Cloudy, humid 70's

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 7:00 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe

Dewind
- Track-mounted one-pass trencher with bentonite admix equipment.
- Skid Mounted bentonite slurry mixer (idle)
- Forklift

General Contractor Activities for the Day:

- MM off today.
- DeWind completed slurry cutoff wall from station 2+25 to approx. 4+30. Ended excavation at 19:13.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed slurry wall cutoff trenching for entire day.
- Obtained perm samples SW03-092411 at station 2+00 and SW-04 at station 3+50.
- Continued QC slump (5.0 to 5.5") and density (112 to 116 pcf).

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Ecology (Hideo) briefly on site at about 10:30 AM.

Attachments:

- Photos .

Trench completed to approximately 3+00.

Trencher working at maximum cutting depth.

Slurry spilling from top of rotating chain.

Progress as of 6:00 PM.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: JL-03
Date: 09-25-11 **Day of Week:** Sunday
Prepared by: Jason Landskron

Weather: AM: Light Rain high 50's
PM: Cloudy, periods of light rain, windy, 60's

CQA Monitor Arrival Time: 6:30 AM **CQA Monitor Departure Time**: 4:00 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe

Dewind
- Track-mounted one-pass trencher with bentonite admix equipment
- Skid Mounted bentonite slurry mixer (idle)
- Forklift

General Contractor Activities for the Day:

- MM off today.
- DeWind completed slurry cutoff wall from station 4+30 to approx. 6+10. Ended excavation at 14:00 as they ran out of bentonite.
- Temporarily removed 3 panels and posts from the fence along the northwest property line in order to move slurry machine around corner. Repaired fence afterward.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed slurry wall cutoff trenching for entire day.
- Continued QC slump (4.5 to 5.0") and density (112 to 116 pcf) tests.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Ecology (Hideo) briefly on site about 10:30-11:15 AM.

Attachments: None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-28
Date: 09-26-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Steady rain high 50's
PM: Showers, low 60's

CQA Monitor Arrival Time: 6:45 AM **CQA Monitor Departure Time**: 7:00 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe

Dewind

- Track-mounted one-pass trencher with bentonite admix equipment.
- Skid Mounted bentonite slurry mixer (idle).
- Forklift.

General Contractor Activities for the Day:

- MM continued preparing and setting form work for vault including setting spacers between wall forms and reinforcing wall forms.
- DeWind completed slurry cutoff wall from station 6+10 to 8+80. Ended excavation at 18:16.
- Slurry looks well mixed. QC field tests meet expected results.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed slurry wall cutoff trenching for entire day.
- Estimated percent bentonite added for today at about 6.8% for the wall from 6+10 to 7+10.
- Continued QC slump (5.5 to 6.0") and density (113 to 114 pcf).

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Ecology reps.

Attachments:

- Photos.

Installing slurry wall in rainy conditions.

Progress as of 6PM 9/26.

Slurry wall at northwest corner of site.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-29
Date: 09-27-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy, occasional shower high 50's
PM: Partly cloudy, low 60's

CQA Monitor Arrival Time: 6:45 AM **CQA Monitor Departure Time**: 6:15 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe

Dewind
- Track-mounted one-pass trencher with bentonite admix equipment.
- Skid Mounted bentonite slurry mixer (idle)
- Forklift.

General Contractor Activities for the Day:

- MM continued preparing and setting form work for vault including setting spacers between wall forms and reinforcing walls.
- MM spent time backfilling key trench to DeWinds instructions from about 12+10 to 15+00. This will allow them to turn corners and exit trench at station 15+00.
- MM removed sludge from key trench at southeast corner and placed under cover in a stockpile. (Sludge removed by Dewind to start slurry trench).
- MM constructed a road across the slurry wall at the west entrance gate consisting of the following bottom to top. Geocomposite / asphalt pieces / crushed rock / cold patch asphalt.
- DeWind completed slurry cutoff wall from station 8+80 to 10+50. Ended excavation at 17:50 when machine broke down.
- Slurry looks well mixed. QC field tests meet expected results.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Requested and received approval to move wall in to 14-foot offset from east fence in order to avoid hitting a well that has not been decommissioned yet.
- Observed slurry wall cutoff trenching for entire day until machine breakdown at about 16:10.
- Estimated percent bentonite added for today at about 5.7 to 6.6. Advised DeWind of my estimate.
- Continued QC slump (5.5 to 6.0") and density (114 to 116 pcf).
- Took slurry wall perm samples SW-07 and SW-08 and delivered to HWA.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Ecology reps.

Attachments:

- Photos.

Working northeast corner at about station 9+90.

Very tight working area as machine nears groundwater well HYCP-6.

Mixing chain pulled out after machine breakdown.

Start of road crossing construction at west gate.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-30 Date: 09-28-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy 50's
PM: Mostly clear, north wind, low 60's

CQA Monitor Arrival Time: 6:45 AM **CQA Monitor Departure Time**: 7:00 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe
- One forklift

Dewind

- Track-mounted one-pass trencher with bentonite admix equipment.
- Skid Mounted bentonite slurry mixer (idle).
- One forklift.

General Contractor Activities for the Day:

- MM continued preparing and setting form work for vault including setting spacers between wall forms, and reinforcing walls.
- Some site cleanup.
- DeWind completed machine repairs at 10:50 AM and moved from station 10+50 to 10+57. Stopped at 10+57 and re-positioned machine to work in the opposite direction starting at about station 11+18.
- Slurry wall corner at station 11+18 will be done as a 90 degree angle with the north-south portion from 11+18 working north overlapping the east-west section starting at 11+18 and working west.
- Pilot hole at station 11+18 started at 13:38. Two bags bentonite added to the pilot trench (see photos).
- Down again at 14:35 to re-install the trench box. Re-start at 15:22.
- Down again at 16:58.
- Slurry looks well mixed.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed slurry wall cutoff trenching while it was active.
- Completed review of Force Account for excavation dewatering. I have comments that will be addressed at Friday's meeting.
- Estimated percent bentonite added for today at greater than 6 percent.

- Advised DeWind of my estimate.
- No perm samples today.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- None

Attachments:

- Photos .

Pilot hole at 11+18 with bentonite added to trench.

Pilot hole 11+18 looking north.

Trenching without trench box.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-31 **Date:** 09-29-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Clear cool, high 40's
PM: Clear warm high 70's

CQA Monitor Arrival Time: 6:45 AM **CQA Monitor Departure Time**: 5:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe
- One forklift

Dewind

- Track-mounted one-pass trencher with bentonite admix equipment.
- Skid Mounted bentonite slurry mixer (idle).
- One forklift.

General Contractor Activities for the Day:

- MM continued preparing and setting form work for vault including setting spacers between wall forms, reinforcing walls and providing proper spacing between re-bar and forms.
- Some site cleanup.
- DeWind completed machine repairs and re-started at 9:28 AM and completed an overlap of the wall from station 10+50 to 10+57 working south to north.
- Stopped at 10+50 and turned machine around to start trench at 11+18 working east to west.
- Re-started at 12:13, but progress very slow because of problems with bentonite delivery system.
- Machine down again at 15:59 due to failed screws in bentonite delivery system.
- Installed slurry looks well mixed. QC tests continue to be consistent.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed slurry wall cutoff trenching while it was active.
- Estimated percent bentonite added for today could be as high as 8 percent.
- Obtained perm sample SW-09 at station 10+50.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- None

Attachments:

- Photos .

Completed square corner at station 11+18.

Wall at station 10+75 to 11+18.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-32 Date: 09-30-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Clear cool, 50's
PM: Clear mid 60's

CQA Monitor Arrival Time: 6:45 AM **CQA Monitor Departure Time**: 10:45 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe
- One forklift

Dewind

- Track-mounted one-pass trencher with bentonite admix equipment.
- Skid Mounted bentonite slurry mixer (idle).
- One forklift.

General Contractor Activities for the Day:

- MM continued preparing and setting form work for vault including setting spacers between wall forms, reinforcing walls and providing proper spacing from walls to re-bar.
- Some site cleanup.
- MM used loader to scrap loose soil off pavement on south side of site.
- DeWind completed machine repairs and re-started at 10:48 AM and completed wall from station 11+50 to 12+90. (Jason Landskron on site during wall installation).
- Stopped at 12+90 at 5:40 to work on bentonite delivery system.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Jason observed slurry wall cutoff trenching while it was active.
- Stewart left site at 10:45.
- Progress meeting was held from 8 to 9:30 AM.
- Also met with Rottler regarding cleaning of building. He gave us his painters name to discuss best options for cleaning.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- Looks like DeWind will run out of bentonite on Saturday, and new shipment not expected until Monday.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- None

Attachments:

- Photos.

Slurry mix on painted wall.

Slurry on building wall south of site.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-33 Date: 10-01-11 **Day of Week:** Saturday
Prepared by: Mike Stewart
Submitted to: Brian O'Neal
Reviewed by:

Weather: AM: Overcast, light drizzle
PM:

CQA Monitor Arrival Time: 7:15 AM **CQA Monitor Departure Time**: 12:00 AM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe
- One forklift.

Dewind

- Track-mounted one-pass trencher with bentonite admix equipment.
- Skid Mounted bentonite slurry mixer (idle).
- One forklift.

General Contractor Activities for the Day:

- MM inactive.
- DeWind completed machine repairs last evening, re-started at 8:25 AM and completed wall from station 12+90 to 13+22, then stopped to fix an auger in the bentonite system.
- DeWind received new augers for bentonite delivery system via FedEx at about 9:40 AM.
- Re-started at 11:06 AM and completed trench to about station 13+35, where they ran out of bentonite.
- Stopped at 13+35, and began installing new augers in bentonite delivery system.
- No slurry wall work expected Sunday because of lack of bentonite.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed slurry wall cutoff trenching while it was active.
- Obtained sample SW-10 at station 12+00.

Material / Product Deliveries and Certification Documentation:

- Augers.

Problems or Deficiencies Requiring Resolution or Follow Up:

- DeWind ran out of bentonite on Saturday, and new shipment was expected no earlier than Sunday afternoon (10/2).

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Ecology

Attachments:

- Photos.

New augers.

Wall from about station 12+20 to 13+20.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-34 Date: 10-03-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Overcast, light drizzle
PM: Overcast

CQA Monitor Arrival Time: 7:15 AM **CQA Monitor Departure Time**: 3:15 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe
- One forklift.

Dewind

- Track-mounted one-pass trencher with bentonite admix equipment.
- Skid Mounted bentonite slurry mixer (idle).
- One forklift.

General Contractor Activities for the Day:

- MM continued preparing and setting form work for vault including setting spacers between wall forms, reinforcing walls and providing proper spacing from walls to re-bar.
- Some site cleanup.
- MM used loader to scrap loose soil off pavement on south side of site.
- DeWind completed slurry wall to station 14+80 at 2 PM today.
- DeWind removed machine from key trench and set it up at the northwest corner of the site for cleaning.
- PES requested that they install an asphalt berm around their clean up area to force wash water to enter the key trench, which they did.
- Dan of DeWind told me he was flying out of town at 11:00 PM tonight.
- Requested QC documentation from Doug of DeWind today.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed slurry wall cutoff trenching while it was active.
- Obtained perm sample SW-11 at station 13+52.
- Delivered sample SW-09 through SW-11 to HWA at approximately 4 PM today.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Ecology

Attachments:

- Photos.

Example broken bentonite delivery system auger.

Pulling out of trench after completing wall.

General site conditions as of 10/03/11.

General site conditions 10/03/11.

Vault forms nearing completion.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-35 Date: 10-04-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Overcast, showers
PM: Overcast, showers

CQA Monitor Arrival Time: 7:15 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe
- One forklift.

Dewind
- All equipment parked but still on site.
- One forklift.

General Contractor Activities for the Day:

- MM continued preparing and setting form work for vault including setting spacers between wall forms, reinforcing walls and providing proper spacing from walls to re-bar.
- Some site cleanup.
- Moved yellow 55-gallon drums to west entrance gate for pick up.
- MM used loader to scrap loose soil off pavement on south side of site.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Spent day performing QC of slurry wall bentonite admix records.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

-

Other Action Items:

- .

Site Visitors:

-

Attachments:

- None

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-36 Date: 10-05-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Overcast, showers
PM: Overcast, showers

CQA Monitor Arrival Time: 7:15 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe
- Two forklifts.
- Mobilizing rock crusher

Dewind
- All equipment parked but still on site.

General Contractor Activities for the Day:

- MM continued preparing and setting form work for vault including setting spacers between wall forms, reinforcing walls and providing proper spacing from walls to re-bar.
- Some site cleanup.
- MM began pushing excess bentonite into slurry trench from station 12+20 to about 14+50 and then spreading remaining bentonite slurry over surface of key trench in preparation for cement admix work.
- MM began assembling rock crusher that will be used to crush asphalt and concrete.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Spent day measuring horizontal alignment of slurry wall and preparing as-built drawings of the horizontal and vertical wall location.
- Provided as-builts to Brian and Roger.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Jeremy porter briefly.

Attachments:

- Photos.
-

Slurry spread in key trench at station 12+25.

Slurry spread in key trench at station 13+00.

Slurry spread in key trench at southeast corner.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-37 Date: 10-06-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy
PM: Partly cloudy

CQA Monitor Arrival Time: 7:15 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe
- Two forklifts.
- Mobilizing rock crusher

Dewind
- All equipment parked but still on site.

General Contractor Activities for the Day:
- MM completed setting form work for vault including setting spacers between wall forms, reinforcing walls and providing proper spacing from walls to re-bar.
- Some site cleanup.
- MM continued pushing excess bentonite into slurry trench and then spreading remaining bentonite slurry over surface of key trench in preparation for cement admix work.
- MM crushed concrete and asphalt all day.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Progress meeting held today.
- Spent day updating change request log and change request forms. Also prepared change order #10 for MM signature. Sent copies of CO#10 and change request forms to Ray Mayhew and copied Brian O'Neal.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- Photos.
  none.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-38 Date: 10-10-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Showers
PM: Showers

CQA Monitor Arrival Time: 7:15 AM **CQA Monitor Departure Time**: 4:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One inactive.
- Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Case 580 backhoe
- Rock crusher
- Man Lift

Dewind
- All equipment demobilized over the weekend.

General Contractor Activities for the Day:

- MM poured concrete for the vault walls today. Approximate quantity was 113 CY.
- Set Nelson studs for all walls (wet set) and then attempted to set specialty form work to pour the upper 4 ½-inch wide exterior wall, but the forms fit to tightly to set them correctly, so the pour was terminated at the elevation of the Nelson studs and finished to allow the Nelson Studs in the Lids to fit properly adjacent to the Nelson Studs set in the top of the walls.
- A call was put into Gary Livermore to determine if any special requirements are needed for the cold joint between the exterior 12-inch wall and the exterior 4 ½-inch curb section above it.
- Concrete cured too quickly to allow all Nelson Studs on the interior walls to be installed (5 remain). Emailed Livermore for guidance on installing the Nelson Studs after the concrete reaches at least 7-day strength.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Inspected concrete pour.
- Prepared progress payment for September.
- Mayes testing on-site for entire pour, running slump, temperature and air entrainment tests at a frequency of 1 /50 cubic yards poured, and sampled cylinders for compression testing at the same frequency.

Material / Product Deliveries and Certification Documentation:

- PSC picked up hazardous waste barrels. Paperwork provided to Brian O'Neal.
- N-12 pipes and caps for wall crossings.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- .
-

Other Action Items:

- .

Site Visitors:

- Ecology reps.

Attachments:

- Photos.

Ongoing concrete placement for vault walls.

East wall floated to elevation of Nelson Studs.

Float finish next to an embedded Nelson Stud on the east wall, prior to removing concrete from re-bar that will be cast inside the 4 ½-inch wall.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-39 Date: 10-11-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Overnight Rain, AM Showers
PM: Showers

CQA Monitor Arrival Time: 7:15 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklift with front loader attachment.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher
- Man Lift

General Contractor Activities for the Day:

- MM spent day cleaning up the top of exterior concrete wall poured yesterday in order to allow form work to be installed.
- MM pumped approximately 12,000 gallons of turbid stormwater into the second Baker Tank.
- MM increased the stormwater storage capacity in the northeast corner by excavating additional soil from outside the slurry wall at the northeast corner.

Force Account Work

- MM hired a vacuum truck to remove sediment from City owned culverts running along the south side of South 200th Street. A large blockage was found near the west end (directly adjacent to a large tree) that is suspected to be a root. Removal of the root will probably require replacement of the culvert. Vacuum truck also did a utility locate for us at two locations across marked utilities along the same alignment and we found no utilities within 3 feet of ground surface other than the concrete culvert.
- MM used the crushed asphalt to form a bermed area to store and cover cement in the event it becomes necessary.
- MM spread soil/bentonite in key trench from station 2+00 to 5+00.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Performed a trial area of cement admix to the soil/bentonite at the suggested rate of 7.5 lbs of cement per cubic foot of saturated soil/bentonite. Some strength was observed by the end of the day.
- Began outline of CQA Report.
- Observed work performed by MM and the Vacuum Truck.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- Stormwater management continues to be a challenge. Suggested to MM that they bring on their stormwater treatment and management subcontractor.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Ecology reps.

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-40 Date: 10-12-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy after rain late yesterday
PM: Partly cloudy

CQA Monitor Arrival Time: 7:15 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher
- Man Lift

General Contractor Activities for the Day:

- MM spent day setting the top form for the reactor vault exterior wall.

Force Account

- MM moved wet soil/bentonite from station 1+50 to 3+70 and 7+00 to 8+00 of the key trench to station 12+00 to 14+00 of the key trench. The material from 1+50 to 3+70 was moved to develop additional volume for placement of cement stabilized sludge in the new PVC lined trench. The material from 7+00 to 8+00 was moved to prevent rain water from over topping the trench and to develop additional rain water detention.
- The moved soil/bentonite will be treated and stabilized with cement at its new location in the key trench.
- MM received 24 tons of cement today. Initially we tried to place dry cement in small piles in the key trench, but it created too much dust and the potential for future clean up of cement coated surfaces. Instead, the crushed asphalt stockpile was graded into a small holding area, covered with 6-mil plastic and the cement was then pumped into the lined storage area under a second layer of 6-mil plastic.
- MM began placing and mixing cement into the key trench at about 1 PM beginning at station 1+50 working east.
- After removing the wet soil/bentonite from the key trench (station 1+50 to 3+70), the remaining surface looks like it will need little or no cement treatment. Tomorrow we will attempt to grade and compact this surface in preparation for installing the PVC liner.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.

Material / Product Deliveries and Certification Documentation:

- 24 tons cement. (Force Account)

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

- Livermore A & E approved a cold joint for pouring the top of the Reactor vault exterior wall, however they required that a bonding agent be applied to the cold joint (quikcrete 9902).

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- Photos.

.

Form for stem wall on vault perimeter wall.

Cement stabilization station 0+00 to 1+50.

Preparing for cement stabilization of top of slurry wall station 1+50 to 2+50.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-41 Date: 10-13-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Overcast, cool
PM: Partly cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- Man Lift (idle)
- John Deere 65G Dozer (idle)
- CAT CS 563C Roller

General Contractor Activities for the Day:

- MM completed setting the top form for the reactor vault exterior wall and then poured the wall in the afternoon. Cold joint bonding agent recommended by Livermore was applied to hard concrete surface before pour.
- MM performed a variety of cleanup activities in preparation for site grading.

Force Account

- MM continued cement stabilized sludge completing from station 3+70 to about 7+00. They also spent the morning adding cement to soft areas along the slurry wall alignment where the PVC liner will be installed. The cement stabilization is effective and should allow us to place the final cover and PVC liner system without having a yielding subgrade.
- PES approved purchase of up to 75 tons of cement for admixing purposes, which is about 50 percent more than originally planned. The additional cement seems to be needed to treat not only wet soil/bentonite, but also just wet and unstable soil in the key trench, plus additional cement is needed to stabilize a deeper section along the slurry wall.
- PES approved purchase of 1500 LF of woven geotextile and a cost of about $1,500 to install over the treated key trench surface to provide additional subgrade strength for supporting fill placed over the slurry trench.
- MM received 48 tons of cement today and placed it in the small holding area, and covered it with 6-mil plastic.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Continued summarizing change order items.
- Reviewed and approved MM September application for payment.
- Prepared agenda for Friday's progress meeting.

Material / Product Deliveries and Certification Documentation:

- 48 tons cement (Force Account).

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-42 Date: 10-14-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Overcast, sprinkles
PM: Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor / Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- Man Lift (idle)
- John Deere 65G Dozer (idle)
- CAT CS 563C Roller (idle)

General Contractor Activities for the Day:

- MM began removing forms from exterior of vault.
- MM mobilized their stormwater treatment subcontractor to set up and start treating stored stormwater.

Force Account

- MM continued cement treatment of key trench completing from station 7+00 8+00 and from station 12+00 to 14+50.
- MM finish graded the key trench from station 15+50 through 0+00, and down to station 3+70 in preparation for PVC liner installation.
- MM installed woven geotextile in key trench where PVC liner will be installed.
- MM continued various site cleanup activities.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Participated in a progress meeting with Brad Duncan, Brian O'Neal and Ray Mayhew.
- Forwarded summary of change orders to Brian O'Neal.
- Signed September Application for Payment and passed it on to Brian O'Neal.

Material / Product Deliveries and Certification Documentation:

- Woven geotextile.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- Photos.

Key trench 0+00 to 1+50 prepared and ready for PVC liner installation.

Key trench 1+50 to 3+70 prepared and ready for PVC liner installation.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-43 Date: 10-16-11 **Day of Week:** Sunday
Prepared by: Mike Stewart

Weather: AM: Overcast
PM: Overcast

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 6:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pumps hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- Man Lift (idle)
- John Deere 65G Dozer
- CAT CS 563C Roller

General Contractor Activities for the Day:

- No contract work performed today.

Force Account

- Northwest linings on site at 7:00 AM and began placing key trench burrito consisting of from top to bottom 16 oz/sy geotextile cushion / 30 mil PVC liner / 16 oz/sy geotextile cushion.
- MM placed cement stabilized sludge from on site stockpiles over the burrito with the 624H Loader, graded it to a depth of approximately 9 inches below the surrounding asphalt in a single lift with the John Deere 65G Dozer, and compacted it with the CAT CS 563C Roller.
- Following placement of the waste, Northwest wrapped the three layer burrito around the waste.
- All geotextile seams were heat seamed. All PVC seams were either wedge welded or glued. Wedge welding was done on long straight runs and gluing was done on patches, repairs, and odd shaped seams.
- The work progressed beginning at station 3+75 working down station through station 0+00 ending at station 15+30 for a total length of 431 feet.
- Between station 0+15 and 15+30, the soil/cement stabilized sludge backfill material became saturated. The saturation was caused during its removal from the stockpile when pockets of rain water stored in the plastic covering leaked into the soil/cement stabilized waste. This caused it to be unstable in the burrito. For that reason we did not complete the burrito wrap between station 0+50 and 15+30. Or plan was to cement stabilize this saturated material on Monday.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed installation of burrito including visual observation of the welded PVC seams and PVC repairs.
- Observed placement of the soil/cement stabilized waste inside the burrito.

Material / Product Deliveries and Certification Documentation:

- 16/oz/sy non-woven geotextile, and PVC geomembrane.

Problems or Deficiencies Requiring Resolution or Follow Up:

- Saturated soil/waste condition from station 0+15 to 15+30.

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- Photos.

- 

  Top layer of PVC burrito at southwest corner.

Placing cement treated waste into burrito.

Backfilled burrito with geotextile covering cement stabilized sludge.

PVC covered waste before placing top layer of geotextile.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-44 Date: 10-17-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Clear, cold, low 45 degrees
PM: Clear, high of 60 degrees

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pumps hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- Man Lift (idle)
- John Deere 65G Dozer (idle)
- CAT CS 563C Roller (idle)

General Contractor Activities for the Day:

Force Account

- MM continued to cement stabilize soil/bentonite backfill from station 13+50 to 12+10.
- MM also cement stabilized saturated soil/cement stabilized waste placed on 10/16 from station 0+15 to 15+30.

Force Account Hours

- 300 Excavator 7AM to 12AM,

Contract Work

- MM continued removing forms from exterior of vault.
- MM's stormwater treatment subcontractor continued to treat stormwater in the Baker tank, but is having problems meeting the turbidity requirements prior to discharge.
- MM moved clean soil from the southeast portion of the site to a single stockpile on the northwest corner of the site in preparation for cleaning up the south paved area and final grading in the north area.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.

Material / Product Deliveries and Certification Documentation:

- Woven geotextile.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-45 Date: 10-18-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Clear
PM: Clear, high of 65 degrees

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 11:00AM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- Man Lift (idle)
- John Deere 65G Dozer (idle)
- CAT CS 563C Roller (idle)

General Contractor Activities for the Day:

Force Account

- MM moved cement stabilized sludge and unstabilized sludge that was not placed on Sunday into the Burrito from station 15+30 to 0+40 (96 feet). This will result in a raised area in the finished pavement in this area.

Force Account Hours

- Loader 7AM to 10AM moving waste into burrito.

Contract Work

- MM complete removal of vault wall form work.
- MM moved uncontaminated soil that was used to confine waste removed from the key trench to a single location on the northwest portion of the site.
- MM's stormwater treatment subcontractor continued to treat stormwater in the Baker tank, but is having problems meeting the turbidity requirements prior to discharge.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Left site sick at 11 AM.

Material / Product Deliveries and Certification Documentation:

- None.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- Photos.

Additional waste placed in burrito.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-46 Date: 10-19-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Clear
PM: Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- Man Lift (idle)
- John Deere 65G Dozer (idle)
- CAT CS 563C Roller (idle)

General Contractor Activities for the Day:

Force Account

- None.

Force Account Hours

- None.

Contract Work

- MM began removal of bottom whaler in the vault. Two sides were completed.
- MM placed soil fill and crushed concrete aggregate in the PVC lined key trench from station 3+70 to approximately 1+25.
- MM's stormwater treatment subcontractor continued to treat stormwater in the Baker tank, and successfully discharged approximately 11,000 gallons of treated stormwater to the storm sewer. Turbidity readings are in the range of 4 NTU's.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Located existing GW monitoring wells and provided fill information at each well to bottom of asphalt grade.
- Observed work performed by MM.
- Met with Matt Dahl and Brian O'Neal to discuss modified pumping design for treated water coming out of the vault.

- Revised the September application for payment to add DeWind's mobilization costs and provided a signed copy to Greg Lovinger.

Material / Product Deliveries and Certification Documentation:

- 210 tons of crushed concrete aggregate.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

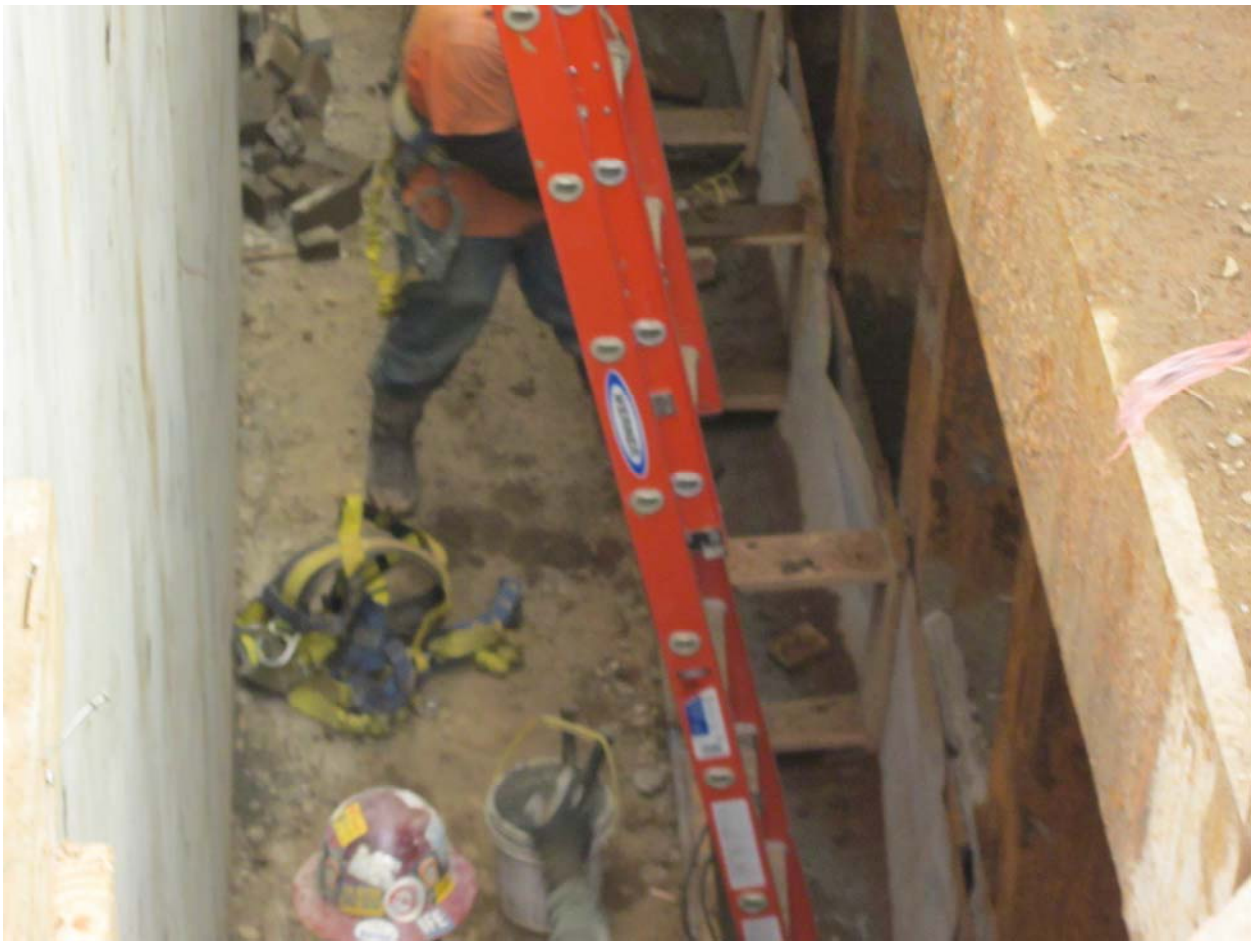
- Dahl, O'Neal, Haldeman, Balbiani.

Attachments:

- Photos.

Key trench with crushed aggregate placed station 3+70 to 1+75

NW corner of vault with forms removed.



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West side of vault with lower whaler removed.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-47 Date: 10-20-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Cloudy
PM: Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 9:30 AM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- Man Lift (idle)
- John Deere 65G Dozer (idle)
- CAT CS 563C Roller (idle)

General Contractor Activities for the Day:

Force Account

- None.

Force Account Hours

- None.

Contract Work

- MM completed removal of bottom whaler in the vault.
- MM placed soil fill and crushed concrete aggregate in the PVC lined key trench from station 1+25 to 12+25, skipping over the raised area of the PVC burrito.
- MM continued to clean up site in preparation for final cover construction.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Left site early due to lack of work going on that required PES observation.

Material / Product Deliveries and Certification Documentation:

- None.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-48 Date: 10-21-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Cloudy, light rain showers
PM: Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 10:30 AM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- Man Lift (idle)
- John Deere 65G Dozer (idle)
- CAT CS 563C Roller (idle)

General Contractor Activities for the Day:

Force Account

- None.

Force Account Hours

- None.

Contract Work

- MM completed removal of vault form work from site.
- Econo vac removed silt from Baker tank being used to treat stormwater.
- MM continued to clean up site in preparation for final cover construction.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Sampled PVC liner and geotextile removed from key trench and gave sample to Leorna for delivery to the lab for TCLP testing.
- Observed work performed by MM.
- Left site early due to lack of work going on that required PES observation.

Material / Product Deliveries and Certification Documentation:

- None.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

- Photos.

Backfilled key trench with crushed rock in place station 14+50.

General site conditions Friday 10/21/11.

Raised area of burrito at about station 0+00.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-49 Date: 10-24-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Partly Cloudy, rain over weekend
PM: Partly Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- One open top 10,000 gallon tank also for stormwater treatment.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- John Deere 65G Dozer (idle)
- CAT CS 563C Roller (idle)

General Contractor Activities for the Day:

Force Account

- Cement stabilized soil/bentonite in slurry trench station 12+10 to about 10+50.

Force Account Hours

- 300 excavator for 4 hours.

Contract Work

- MM installed pipe crossings 1, 2, and 3.
- MM cleaned up around slab footings in preparation for water proofing.
- Purcell mobilized to the site and began installing water proofing on the exterior of the vault walls. Purcell expressed concern about the condition of existing water proofing installed under the slab. They will provide a sketch indicating a method for making a continuous connection between the existing material and new material, particularly at the bottom outside edge of the base slab where the bentonite portion of the water proofing has been compromised.
- MM began spreading soil in stockpiles located near the west entrance gate to rough subgrade elevation.
- MM began setting up to install exterior piping around the vault.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Began preparation of Change Order 11.

Material / Product Deliveries and Certification Documentation:

- 24 tons Portland cement.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-50 Date: 10-25-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Partly Cloudy, Cool
PM: Partly Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- One open top 10,000 gallon tank also for stormwater treatment.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- John Deere 65G Dozer
- CAT CS 563C Roller

General Contractor Activities for the Day:

Force Account

- None.

Force Account Hours

- None.

Contract Work

- Purcell continued installing water proofing on the exterior of the vault walls and over the slab base making their connection to the existing water proofing.
- MM continued spreading soil stockpiles to rough subgrade elevation.
- MM began welding HDPE pipe for vault.

Surveying Activities for the Day:

- INCA on site today setting grade stakes for Type I final cover grading.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Continued preparation of Change Order 11 and the October Pay Request .

Material / Product Deliveries and Certification Documentation:

- Water proofing and drainage net for exterior vault walls.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- Brian O'Neal and Ray Mayhew for progress meeting.

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-51 Date: 10-26-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Partly Cloudy, Cool
PM: Partly Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- One open top 10,000 gallon tank also for stormwater treatment.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- John Deere 65G Dozer
- CAT CS 563C Roller

General Contractor Activities for the Day:

Force Account

- Labor time for getting ready to install vertical geotextile.

Force Account Hours

- Laborer.

Contract Work

- Purcell continued installing water proofing and drainage net on the exterior of the vault walls and over the slab base making their connection to the existing water proofing.
- MM continued spreading soil stockpiles to rough subgrade elevation.
- MM continued welding HDPE pipe for vault.
- MM performed asphalt grinding along daylight line of existing pavement and new pavement.

Surveying Activities for the Day:

- INCA on site today setting grade stakes for final cover grading. Grade stakes indicate that no soil will have to be taken off site, but some additional may be required to construct the subgrade surface.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Continued preparation of Change Order 11 and the October Pay Request.

Material / Product Deliveries and Certification Documentation:

- Water proofing and drainage net for exterior vault walls.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-52 Date: 10-27-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Partly Cloudy, Cool
PM: Partly cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- One open top 10,000 gallon tank also for stormwater treatment.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (idle)
- John Deere 65G Dozer
- CAT CS 563C Roller

General Contractor Activities for the Day:

Force Account

- Received 387 tons of washed rock.
- Cement treated slurry in the area of station 12+00 and 8+50 to 9+00.

Force Account Hours

- Operator 1 hour for receiving rock 3 for cement treating.
- Superintendent 1.5 hours.

Contract Work

- Purcell completed installing water proofing and drainage net on the exterior of the vault walls and over the slab base making their connection to the existing water proofing. They will have to return to install a boot around the inlet at 16.75.
- MM continued spreading soil stockpiles to rough subgrade elevation.
- MM continued welding HDPE pipe for vault.
- MM performed asphalt grinding along daylight line of existing pavement and new pavement.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Worked on site with Roger north to adjust final grading plan to lower volume of import soil necessary to complete aggregate installation under type 1 cover asphalt. Lowered elevation

30 by 0.5 feet and changed grade back to elev. 31 from 0.6% to about 0.93%.
- BSB Div. approved subcontract work to stabilize soft subgrade soils on the west side of the site. Work to begin tomorrow.

Material / Product Deliveries and Certification Documentation:

- Approximately 375 tons of 1 3/8 minus rock.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- .

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-53 Date: 10-28-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Partly Cloudy, Cool
PM: Partly cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater.
- One open top 10,000 gallon tank also for stormwater treatment.
- Two Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tanks.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- Rock crusher (Demobed)
- John Deere 65G Dozer
- CAT CS 563C Roller

General Contractor Activities for the Day:

Force Account

- Installed vertical geotextile and 1 3/8 minus gravel around vault walls to an elevation below 16.75. The method used to suspend the geotextile vertically in the drain rock worked very well.

Force Account Hours
Geotextile and rock

- Crane 3 hrs
- 300 excavator 5 hrs
- Loader 2 hrs
- Laborer 4.5 hrs
- Laborer 3 hrs
- Operator 6 hrs
- Operator 3 hrs
- Foreman 3 hrs

Cement Treating (less than full day)

- Super 2 hrs
- Operator 7 hrs
- Dozer 4 hrs
- Roller 3 hrs

Contract Work

- Soil/cement admix work completed today. Approximately 29,000 sf completed.

- As a result of the cement treating the soft soils, which appears to have resulted in some swelling of the soil, and not enough grade checking by MM during the cement treating operation, the finished surface of the cement treated soil is higher and flatter than the modified design that was requested on Thursday. It is more likely that the original design grades will be used rather than the modified grades. This will be resolved after INCA re-sets the grades for paving. An attempt was made to correct the grades at about 2:00PM today, but the cement treating was so effective that the surface of the soil was too hard to re-grade.
- MM continued welding HDPE pipe for vault and installed the outer collection pipe at elevation 12.25, the inlet pipe at elev. 16.70, and the outer riser, which terminates at the same elevation as the top of the vault.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Verified invert elev. of inlet pipe based on TBM provided by INCA and checked into hubs set by INCA on Wednesday. Based on elev. check with instrument invert is at 16.70.
- Performed a level circuit to check grades in the area of cement treating and discovered that the top of treated soil was not graded to the revised grades established on Thursday. A method of resolving this problem is pending, but the likely scenario is that the original grades will be used to construct the final cover asphalt section.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- Final grade design for type 1 cover in area of cement treating.

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

- Photos.

- Cement being added to soft subgrade soils.

Machine used to mix cement with soft subgrade soil.

Gravel being placed on the west side of the vertical geotextile along the west wall of the vault. Geotextile hooked to a cable is shown to the left.

Drain rock placed on both sides of the geotextile west side of vault.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-54 Date: 10-31-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Clear, Cool
PM: Clear

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 1:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water. One for storing turbid stormwater demobilized today.
- One open top 10,000 gallon tank also for stormwater treatment.
- One Ingersol Rand MF 62 forklifts.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank.
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.

General Contractor Activities for the Day:

Force Account

Force Account Hours
Geotextile and rock

- Crane
- 300 excavator
- Laborer
- Laborer
- Operator
- Operator
- Foreman
- Loader

Contract Work

- Installed exterior collection pipes around vaults at el 16.75
- Completed interior at vault piping and installation of link seals. Vertical risers need to be cut to finished elevation prior to placing lids
- Pipes also need to be secured with clamps.
- Continued asphalt grinding at daylight line.
- Installed pipe crossings

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- Final grade design for type 1 cover in area of cement treating.

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

- None.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-55 Date: 11-01-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Clear, Cool
PM: Clear

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 1:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water.
- One Ingersol Rand MF 62 forklift.
- Diesel Powered 70 KVA Generator.
- One 2-inch sump pump hard piped to the Baker tank (Discontinued pumping today).
- Grove 70-ton crane.
- 300 Excavator
- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.

General Contractor Activities for the Day:

Force Account

Placed drain rock on outside of vault to an elevation 5 – 6 feet below top of vault.

Force Account Hours
Geotextile and rock

- 300 excavator
- Laborer
- Laborer
- Operator
- Foreman
- Loader

Contract Work

- Prepared site around vault for pulling sheet piles.
- Placed crushed AC in Type 1 fill areas.

Surveying Activities for the Day:

- INCA on site re-setting finished grade elevations for AC paving in Type 1 area.

CQA / CM Activities for the Day:

- Observed work performed by MM.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-56 Date: 11-02-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Clear, Cool
PM: Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:45 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water was taken off line and moved out of the way until it can be taken off site.
- Diesel Powered 70 KVA Generator.
- Grove 70-ton crane (Idle).
- 300 Excavator
- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.

General Contractor Activities for the Day:

Force Account

Placed drain rock on outside of vault to an elevation 4 – 5 feet below top of vault wall after discontinuing removal of sheet pile due to caving of soil on top of exposed rock. More rock will need to be placed after sheet pile removal.

Force Account Hours
Geotextile and rock

- 300 excavator (1 hour)
- Laborer (1 hour)
- Laborer (1 hour)
- Operator (2 hours)
- Foreman (1 hour)
- Loader (1 Hour)

Contract Work

- Began pulling sheet piles at 8AM on south wall. Stopped when soil started falling into exposed drain rock where the rock had not been completed to an elevation 4 feet below the vault wall.
- Placed addition drain rock and non-woven geotextile to meet the intent of having the rock up to an elevation 4 feet below the vault wall with the rock isolated from soil by a geotextile separator. See redlines for details for completing this installation.
- Placed the 4-inch minimum layer of aggregate for the Type 1 cover in the northwest quadrant of the site. Actual thickness varies and is up to 16 inches in localized areas in the northwest corner.
- Fine graded aggregate in key trench along the west and south perimeter.
- MM continued demobilizing equipment and materials.

Surveying Activities for the Day:

- none.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Worked with MM to correct drain rock issue.
- Attended progress meeting.
- Finalized change order 11.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-57 Date: 11-03-11 **Day of Week:** Thursday
Prepared by: Mike Stewart

Weather: AM: Clear, Cool
PM: Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:45 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Two, 25,000 gallon baker tanks. One for treating contaminated water was taken off line and moved out of the way until it can be taken off site.
- Diesel Powered 70 KVA Generator.
- Grove 70-ton crane (Idle).
- 300 Excavator
- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.

General Contractor Activities for the Day:

Force Account

None.

Force Account Hours

None

Contract Work

- Completed pulling sheet piles at about 1 PM.
- Began fine grading and compacting 4-inch minimum layer of aggregate for the Type 1 cover in the northwest quadrant of the site.
- MM continued demobilizing equipment and materials.
- MM cleaned sheet piles for shipment.

Surveying Activities for the Day:

- none.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Attended progress meeting.
- Finalized change order 11.

Material / Product Deliveries and Certification Documentation:

- .

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-58 Date: 11-04-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Clear, Cool
PM: Cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Diesel Powered 70 KVA Generator.
- Grove 70-ton crane (Idle).
- 300 Excavator
- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.

General Contractor Activities for the Day:

Force Account

Placed drain rock on outside of vault to an elevation 3 to 3.5 feet below top of vault wall and covered with non-woven geotextile.

Force Account Hours
Geotextile and rock

- 300 excavator (1 hour)
- Laborer (1 hour)

Contract Work

- Continued placing and compacting 4-inch minimum thick layer of aggregate for the Type 1 cover in the northwest quadrant of the site.
- MM continued demobilizing equipment and materials including job trailer and baker tanks.

Surveying Activities for the Day:

- none.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Reviewed and prepared application for payment for October based on MM submittal received on 11/3.

Material / Product Deliveries and Certification Documentation:

- 1 ¼-inch crushed for Type 2 cover.
- Crushed concrete for Type 1 cover.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-59 Date: 11-7-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Clear, Cool
PM: Cloudy, light shower.

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 2:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Diesel Powered 70 KVA Generator.
- 300 Excavator
- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.

General Contractor Activities for the Day:

Force Account

Lakeside paved the northwest quadrant of the site from the south tie in to the elev. 30 contour (grade break). The east limits are about 275 feet from the west fence line. Lakeside performed approximately 20 relative density tests in the two-inch thick asphalt with tests ranging from 90 to 94 percent relative compaction (one at 89 but additional compactive effort was completed in this area). Lakeside will provide PES with a report of their results. Lakeside also performed some relative density tests in the aggregate layer.

MM completed additional cement admixing of soft soils around the vault area.

Force Account Hours
Cement admix

- 300 excavator (1 hour)
- Laborer (1 hour)

Contract Work

- MM worked all day Saturday preparing the site for Type I paving.
- MM continued demobilizing equipment and materials.
- MM began grading activities in the area around the vault (Type II Cover) including placement of the 6-inch layer of 1 ¼-inch crushed rock.

Surveying Activities for the Day:

- none.

CQA / CM Activities for the Day:

- Observed work performed by MM.

Material / Product Deliveries and Certification Documentation:

- 1 ¼-inch crushed for Type 2 cover.
- Crushed concrete for Type 1 cover.
- 24 tons cement.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

Paving key trench southwest corner.

Paving tie-in to existing pavement.

On-going paving in northwest quadrant of site.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-60 Date: 11-8-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy
PM: Partly cloudy

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- Diesel Powered 70 KVA Generator.
- 300 Excavator
- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.

General Contractor Activities for the Day:

Force Account

- MM completed additional cement admixing of soft soils around the vault area and along north west Property line.

- Placed geogrid and woven geotextile around vault area.

- MM re-dug trenches for future pipe work on the northeast corner of the vault. Trenches were excavated to about 36 inches below finished grade and backfilled with crushed rock.

Force Account Hours
Cement admix

- 300 excavator (6 hour)
- Laborer (6 hour)

Contract Work

- MM subcontracted a street sweeper that swept the south paved area all morning and until the afternoon.
- MM continued demobilizing equipment and materials.
- MM continued grading activities in the area around the vault including placement of the 6-inch layer of 1 ¼-inch crushed rock over geotextile and geogrid, placement of crushed concrete.

Surveying Activities for the Day:

- INCA on site setting grades for the remaining areas requiring paving, as-built trenches near vault, and as-built vault corners.

CQA / CM Activities for the Day:

- Observed work performed by MM.

Material / Product Deliveries and Certification Documentation:

- 1 ¼-inch crushed for Type 2 cover.
- Crushed concrete for Type 1 and 2 cover.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- None.

Attachments:

Example rebar on south side of buried well.

Ongoing placement of aggregates around vault area.

Ongoing Type 1 aggregate grading.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-61 Date: 11-9-11 **Day of Week:** Wednesday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy
PM: Partly cloudy

CQA Monitor Arrival Time: 9:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- 300 Excavator
- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.

General Contractor Activities for the Day:

Force Account

- MM completed additional cement admixing of soft soils in the key trench at station 12+00.
- Placed geogrid and woven geotextile around vault area and over the slurry wall.
- Began removal of fencing along north property line.

Force Account Hours
Cement admix

- 300 excavator (1 hour)
- Operator (1 hour)
- Laborers (16 hrs)

Contract Work

- MM continued grading activities in the area around the vault including placement of the 6-inch layer of 1 ¼-inch crushed rock over geotextile and geogrid, and placement of crushed concrete.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Instructed MM on the location to place geogrid and geocomposite.
- Schedule Mayes testing to perform AC testing on Nov 10th.

Material / Product Deliveries and Certification Documentation:

- 1 ¼-inch crushed for Type 2 cover.

- Crushed concrete for Type 1 and 2 cover.

Problems or Deficiencies Requiring Resolution or Follow Up:

- .

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- .

Attachments:

Geogrid over slurry wall

Geogrid over slurry wall.

Geocomposite over geogrid at proposed new entrance.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-62 Date: 11-11-11 **Day of Week:** Friday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy
PM: Rain

CQA Monitor Arrival Time: 6:30 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- 300 Excavator
- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.

General Contractor Activities for the Day:

Force Account

None.

Force Account Hours
None.

Contract Work

- MM completed placement and grading of aggregates associated with the Type 1 and 2 final cover.
- Lakeside completed paving of the remaining site. The last two passes along the front (north perimeter of the site were impacted by rain fall, which caused the asphalt to cool to quickly resulting in low relative compaction when compared with other areas of paving. (See Mayes Report from 11/11/11.
-

Surveying Activities for the Day:

- None.
-

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Instructed MM on the location to place the new fence along the north property line.
- Mayes testing on site completing asphalt density testing and limited testing of crushed concrete installation.

Material / Product Deliveries and Certification Documentation:

- Asphalt.
-

Problems or Deficiencies Requiring Resolution or Follow Up:

- Low relative compaction of limited areas of pavement along north side of site.

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- .

Attachments:

Paving completed in northwest corner of site.

Steam on pavement as light rain begins.

Paving in rain with surface water running across stable aggregate near new site entrance.

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-63 Date: 11-14-11 **Day of Week:** Monday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy, cool
PM: Partly cloudy, some sprinkles, cool

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 12:45 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.
- Mini Excavator

General Contractor Activities for the Day:

Force Account

- MM performed grading for drainage improvements along S. 200th street.

Force Account Hours

- Operator (8hrs).
- Mini Excavator (8 hrs)
- Laborer (8hrs)

Contract Work

- Essentially all work today was force account related to frontage drainage improvements.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Provided direction to MM on how to re-grade the site frontage.
- Prepared preliminary punch list and submitted to Ray Mayhew and Brian O'Neal.

Material / Product Deliveries and Certification Documentation:

-

Problems or Deficiencies Requiring Resolution or Follow Up:

Follow Up on Previous Days Problems or Deficiencies:

-

Other Action Items:

- .

Site Visitors:

- Lakeside representatives were on site looking at condition of poorly compacted asphalt. They generally agreed that the installation needed some level of repair, however no commitments were made.

Attachments:

None

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-64 Date: 11-15-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy, cold, ice on pavement
PM: Clear, cool

CQA Monitor Arrival Time: 7:00 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- 624H Loader
- John Deere 65G Dozer
- CAT CS 563C Roller
- Motor grader.
- Mini Excavator

General Contractor Activities for the Day:

Force Account

- MM continued grading for drainage improvements along S. 200th street, including removal of soil, asphalt and concrete, and placement of crushed concrete aggregate.
- Up to 4 loads (64 tons) crushed concrete aggregate.
- One load 2 – 4 inch erosion control rock.
- Up to three loads soil and debris, and two loads of broken asphalt/concrete taken off site for disposal.

Force Account Hours

- Operator (8hrs).
- Mini Excavator (8 hrs)

Contract Work

- MM performed a variety of site cleanup and demobilization activities. Including the removal of silt fencing and debris clean up.
- MM's subcontract fencing contractor began fence installation along the S. 200th street frontage.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM.
- Provided direction to MM on how to position the fence and gate.
- Met with Ray Mayhew to discuss preliminary punch list.

Material / Product Deliveries and Certification Documentation:

- Crushed concrete aggregate.
- 2 – 4 inch erosion control rock.

Problems or Deficiencies Requiring Resolution or Follow Up:

Follow Up on Previous Days Problems or Deficiencies:

- MM's subcontractor Lakeside agreed to repair poorly placed and compacted asphalt along the north side of the site. Repair will be a 1-inch thick grinding along the contact of the poorly compacted section of pavement and the well compacted pavement and an overlay of new asphalt from the grinding to the north edge of pavement. (See attached sketch).

Other Action Items:

- .

Site Visitors:

- Bob of MM on site this morning and he also recognized that the asphalt pavement condition is unacceptable and requires some level of repair.

Attachments:

None

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-65 Date: 11-29-11 **Day of Week:** Tuesday
Prepared by: Mike Stewart

Weather: AM: Partly cloudy, cold,
PM:

CQA Monitor Arrival Time: 7:30 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

Lakeside

- Paver
- Oil truck
- Roller
- Two tool trucks

Fencing contractor on site today and completed gate installation.

General Contractor Activities for the Day:

Force Account

None.

Force Account Hours

None

Contract Work

- Lakeside on site to repair pavement damaged by rainfall on 11/15/11. Started paving at 10:10 AM effectively finished at 12:00 (7-man crew 2 hours and 65 tons AC)
- Other work performed by Lakeside included placement of pavement over the burrito (2.5 crew hours plus 65 tons of asphalt)
- Placement of stormwater diversion berms starting at 1 PM and finishing at 2 PM (5 man crew 1 hour plus 16.5 tons asphalt).
- Low boys used to demobilize equipment left on site following contract work. Small roller brought on to site on a trailer attached to a service truck.

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by Lakeside.

Material / Product Deliveries and Certification Documentation:

- Hot Asphalt (65 tons burrito)
- Hot Asphalt (65 tons for repair and 16.5 for berms)

- Oil sealer.

Problems or Deficiencies Requiring Resolution or Follow Up:

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- .

Attachments:

DAILY CONSTRUCTION SUMMARY BSB INDUSTRIAL

Project Name: BSB Industrial Final Cleanup Action
Project Number: 0827 001 028 001.
Owner: BSB Diversified.
Engineer: PES Environmental
Contractors: Mid Mountain Contractors Inc.
Report No: MS-66 Dates: 12-9-11 to 12-16-11 (6 days) **Day of Week:** Friday to Friday
Prepared by: Mike Stewart

Weather: AM: Dry, cold,
PM: Dry, cold

CQA Monitor Arrival Time: 7:30 AM **CQA Monitor Departure Time**: 3:30 PM

Inventory of General Contractor/Subcontractor Equipment and Labor:

- 580 Backhoe with vibrator trench compactor
- Hyster H 230 HD Forklift
- Supply trailer
- Plate compactor for paving
- 10-yaqrd dump for paving

General Contractor Activities for the Day:

- Friday 12/9: Saw cut trenches for electrical and signal wire installation. Excavated trenches for electrical and signal wire (depth 30 inches).
- Monday 12/12:). Moved connex to allow foundation construction. Broke out asphalt for four corner foundations for connex and began excavation. Electrician installed seven 1-inch PVC conduits in trenches, serving four piezometer pressure transducers, one pressure transducer for chamber 6, one empty conduit to chamber 6, and one conduit for power supply to the pump in chamber 6. All seven terminate at the proposed northeast corner of the connex,
- Tuesday: Completed conduit installations. L & I approved backfill of the seven conduits, except for the location where they penetrate chamber 6 due to the need to demonstrate that we do not have an explosion hazrd in chamber 6 that would require special conduit penetrations into chamber 6 (Inspection reports on file). Informed Brain O'Neal of this issue) Began form work for connex foundations.
- Wednesday: Completed form work for connex foundations. Poured foundations. Backfilled and compacted trenches covering seven conduits. Left access to the ends of all seven conduits.
- Thursday: Completed trench backfill, set utility boxes, began removing water from chambers to set pipe supports.
- Friday: Completed pavement repairs. Placed small AC curb around vault to prevent stormwater from running into the chambers. Installed hot oil around concrete seals where wells were exposed and raised. Set connex on concrete blocks. Electrician pulled signal wires (5) and power cable (1), and installed ridgid conduit through chamber 6 walls in case explosion proof conduit is required by L & I.

Force Account or Extra Work

- 20 additional feet of trenching to get conduit to northest corner of connex.
- Furnish and install electrical supply (1) and signal wire (5) from sources into connex.
- Mount conduit on connex walls.
- Various additional electrical parts.

Force Account Hours

- Monday (4 for electrician).
- Tuesday (8 for electrician).
- Friday (Electrician and Labor (4 each)

Surveying Activities for the Day:

- None.

CQA / CM Activities for the Day:

- Observed work performed by MM and Electrician.
- Tuesday 12/13: delivered five asphalt cores to HWA for perm testing.
- Wednesday morning 12/14: Measured locations of valve body in chamber 1 (55 ½ inches from west face (northwest corner) of stem wall in chamber 1) and 8-inch riser in chamber 6 (61 ½ inches from east face (northeast corner) of stem wall in chamber 6). Labeled seven conduits 1, 2, 3, 4, 5, E, and P from end to end.
- Thursday and Friday observed work by MM and electrician, and updated punch list.

Material / Product Deliveries and Certification Documentation:

- Conduit on Friday 12/9.
- Form lumber on 12/13.
- Concrete Wednesday 12/14.
- Asphalt and electrical wire on Friday

Problems or Deficiencies Requiring Resolution or Follow Up:

- Follow up on L & I inspection regarding whether or not explosion proof electrical conduits are necessary for conduits entering chamber 6.

Follow Up on Previous Days Problems or Deficiencies:

- .

Other Action Items:

- .

Site Visitors:

- Monday 12/12: Dahl, O'Neal.
- Tuesday: L & I inspection (Allen Berg).

Attachments:

None