RECOMMENDATIONS FOR SUSTAINABLE SITE DESIGN

Green Landscape Plan

Final

JUNE KEY DELTA HOUSE

Delta Sigma Theta Sorority, Inc.

June 8, 2009

Prepared for:
U.S. Environmental Protection Agency
Office of Solid Waste and Emergency Response
Office of Brownfields and Land Revitalization
Washington, DC 20460

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This report is prepared for informational purposes only. Vita Nuova has relied upon outside sources for information and data presented in this report. Although all best efforts were used to confirm information and complete this report, no representation or warranties are made as to the timeliness, accuracy or completeness of the information contained herein or that the actual results will conform to any projections or recommendations contained herein. All areas are approximate. Any reliance upon this material shall be without any liability or obligation on the part of Vita Nuova LLC.

I. INTRODUCTION

The assessment of conditions contained in this report focuses on site-specific environmental and soil conditions that might affect recommendations related to sustainable landscaping and site design, stormwater management, and stormwater reuse. As each assessment is prepared as a custom response to the individual client's request for information, Vita Nuova LLC specifically requested information concerning the general condition of the site. The available site-specific information and analytical data relied upon for the assessment was obtained from information on soil conditions, infiltration rates, topography, local environment, building design details, and landscape priorities provided to Vita Nuova LLC by various entities including, but not limited to, the City of Portland, the architects—Sienna Design from November-December 2008 and Nye Architecture LLC in 2009—and the owner, Delta Sigma Theta Sorority, Inc. Recommendations consider proposed commercial activity and land use as well as analytical data reviewed for 5940 N. Albina Avenue in Portland, OR.

No inspection, sampling or laboratory testing of soils and site conditions was completed by Vita Nuova LLC. No adverse environmental conditions such as asbestos, lead paint, underground fuel storage, oil spills, PCBs, or urea formaldehyde have been included in this diagnostic report.

This written report and any verbal presentations are not intended as a warrantee or guarantee, expressed or implied, regarding the condition of the property, and should not be relied upon as such. It does not expressly represent or imply in any manner that the land or structure to which this report refers is in compliance with any of the laws, rules and regulations of any governmental authority, nor do we warrant the existence or condition of existing sewer or water systems.

Specific references for the reports and documents are provided in the *References Cited* section at the end of this report.

II. EXECUTIVE SUMMARY

Vita Nuova LLC, subcontractor to SRA, an EPA contractor, was assigned the task of assessing plans for the redevelopment of 5940 N. Albina Avenue, Portland, OR. The purpose of this assessment is to determine the best applicable practices for the site as they relate to stormwater management and sustainable landscape design.

The site was formerly a gas station that also included fuel storage tanks. The property was purchased from Arco Products Company by Delta Sigma Theta Sorority, Inc. in 1992 and is considered a brownfield.

Phase I of the comprehensive development plan for the June Key Delta House 1) increases the usable area from 876 to 2383 square feet; 2) provides a 120 seat "assembly" space; 3) adds 1335 square feet of usable landscaped exterior space; and 4) provides for future development of the project site.

The project, as it was conceived by the client, has a number of sustainable goals including: 1) to use 50%-70% recycled resources and 2) to implement other sustainable strategies acceptable for qualification under the "Living Building" sustainability program. To achieve these primary goals, Delta Sigma Theta Sorority Inc. has plans to:

1) Utilize metal cargo containers in the design of an approximately 2400 square feet public facility to demonstrate options for materials re-use in sustainable design;
2) Utilize stormwater management and rain water harvesting systems to demonstrate water conservation strategies; and to
3) Incorporate energy conserving systems (specifically photovoltaics) to demonstrate the feasibility of renewable energy systems in community development projects.

Vita Nuova has been tasked with consulting on one of the three aforementioned project goals—the introduction of water conservation strategies in a sustainable landscape plan. Vita Nuova will additionally recommend stormwater management strategies that focus on best practices in sustainable site design and more importantly, the specific impact of the June Key Delta House on the site and its ability to control stormwater runoff, maximize infiltration and possibly provide for stormwater reuse (rainwater harvesting) in the future.

Thus, this report summarizes consultant recommendations related to:

- Stormwater management
- A sustainable landscape design

Recommendations for stormwater reuse will be provided as an addendum.

These topics represent the primary assignment and opportunities listed in the Scope of Work (**Appendix A**). Recommendations in this report are based on the concepts depicted in the June Key Delta House Preliminary Site Plan (**Appendix D**), as well as information gathered by the consultants during site visits, discussions with the client and discussions with the project architect, Greg Acker of Sienna Architecture and Mark Nye of Nye Architecture.

This report was developed by Regina Winters, RA in consultation with Vita Nuova staff and represents the outcome of those site visits and consultative discussions.

III. GOALS OF SUSTAINABLE DESIGN

The objective of sustainable design, or green design, is to create and sustain a high quality of community values and environmental responsibility in design and construction of buildings, infrastructure, transport, and landscape. Additionally sustainable design applies the principles and practices of resource conservation and renewable energy design.

In the General Services Administration (GSA) publication *Sustainability Matters* (Ref. 4), sustainable design goals are intended to, "… reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments. Such an integrated approach positively impacts all phases of a building's life-cycle, including design, construction, operation and decommissioning."

The practices of sustainable design have been communicated to design professionals and the public through a number of checklists and performance standards. Two of the most well-known are *Guidelines and Performance Benchmarks and the Sustainable Sites Initiative,* Draft 2008 (Ref. 1) and the U.S. Green Building Council LEED® *Rating System* 2008 (Ref. 2). Particularly pertinent to the Cascadia Region (and the Cascadia Region Green Building Council) is the *Living Building Challenge* which presents "prerequisites" rather than "credits" for green design guidelines (Ref. 3).

Sustainable Sites Initiative represents a high environmental quality standard in site planning through water conservation, stormwater management and surface covering and landscape that cleans and restores water quality. This document is recommended as the best reference for site planning and landscape design.

The U.S. Green Building Council's LEED® *Rating System* defines the basis for rating environmental performance of buildings and systems. It emphasizes energy design analysis and building commissioning and is recommended as the best reference for architectural design and construction.

Sustainable Sites Initiative and the LEED® *Rating System* require that planning and design incorporate (1) an *integrated design process* and (2) a *well-defined program plan with explicit environmental performance goals*.

In an "integrated design process," all design and engineering specializations are made part of early program and design decisions in an iterative process. Initiating the process early in programming and design has the greatest potential for program efficiencies and cost reduction. In this process, all consulting architects and engineers develop integrated design concepts (building envelope, mechanical systems, lighting, controls, maintenance, and operation) and typically use simulation models of energy performance to compare alternatives.

Through a "well-defined program plan with explicitly environmental performance goals," environmental performance standards are quantified and measured, with commitments to exceed "minimum code compliance" appropriate to the project, and rewarded by assignment of points that establish a rating. The performance goals become benchmarks of evaluation of schematic design choices and all subsequent reviews of design, including building commissioning.

Finally, the *Living Building Challenge* designation seeks compliance with the following prerequisites: Responsible Site Selection, Limits to Growth, Habitat Exchange, Net Zero Energy, Avoidance of Red List Materials Use, Limitation of Construction Carbon Footprint, Responsible

Industry, Appropriate Materials / Service Radius, Limitation of Construction Waste, Net Zero Water, Sustainable Water Discharge, Civilized Environment Development, Healthy Air (Source Control), Healthy Air (Ventilation), Promotion of Beauty and Spirit, and Promotion of Inspiration and Education.

This project aims to meet the standards of the Living Building Challenge. The criteria for this designation exceed even those of a LEED Platinum designation.

IV. SUMMARY OF PROJECT GOALS

The primary recommendations of this report are represented by three goals:

Goal 1
Design of the June Key Delta House should meet very high standards of development that succeed as a service program incubator and teaching laboratory for water conservation and urban ecological sustainability.

Goal 2
Design and management of site and landscape should represent the best design and management practices of environmental protection.

Goal 3
Energy-efficient and resource-efficient building and site design and operation must be identified through the integrated design process.

The owner intends to achieve the above-established development goals through building construction—a stormwater management program and sustainable site design. The latter two goals are addresses in the contents of this report.

The client has identified one additional goal during the programming phase of the project:

COMMUNITY EDUCATION SERVICES
Delta Sigma Theta Sorority, Inc. hopes the new facility will serve not only as a community social service incubator, but also as a demonstration pilot for sustainable building and site practices.

It is the hope of Vita Nuova LLC that the tools imparted to the client through this process will facilitate the development of curricula designed to inform children, seniors and other constituents of the advantages and critical importance of sustainable design.

V. STORMWATER MANAGEMENT

Stormwater Management Plan

The June Key Delta House site is planned on a 15,090 square feet lot on the south side of North Ainsworth Street, between North Albina Avenue and North Borthwick Avenue in Portland, OR. The stormwater management design is based on the Simplified Approach, per Portland's 2008 Stormwater Management Manual's (SWMM) (Ref. 4). Chapter 2: Facility Design states that the method is "available for project(s) with less than 10,000 square feet total new or redeveloped impervious area, including but not limited to roofs, patios, parking areas, and driveways." The ultimate build-out of Phase I and Phase II being submitted in this application will result in 8225 square feet of impervious area.

The development site meets Category 1 requirements of the Stormwater Hierarchy described in Section 1.3.5, which requires the infiltration of the 10-year, 24-hour storm using "vegetated infiltration facilities with no overflow." Soils tested at the site (see Infiltration Test by Alder Geotechnical Services) will "drain well and infiltrate 2 inches per hour or greater allowing the stormwater to infiltrate into the surface or subsurface. Facilities that achieve total onsite infiltration do not require an offsite discharge point and therefore meet Category 1 or Category 2 requirements of the Stormwater Hierarchy."

Total on-site infiltration is accomplished by 889 square feet of infiltration facilities which can manage 10,267 square feet, exceeding the (Phase I) impervious surface area of 9297 square feet. Phase II will include an Ecoroof and will reduce the total impervious area to 8225 square feet. The 889 square feet of infiltration facilities proposed for the property can manage more than this remaining impervious area. Please refer to the "Drainage Area Calculations" sheet provided.

Two vegetated swales (north and southeast), one basin (east), and one hybrid planter (south is lined, east is unlined) will be connected hydrologically to assure uniform distribution of collected runoff. These areas will manage the majority of the site area, including the central parking area and some of the roof areas. Overflow from the swales will be managed by connection to a drywell located near the north driveway apron. Some roof area drainage will be directed to a catch basin and subsequently pumped to a rooftop cistern which will be connected for non-potable reuse within the building. Details of the rainwater harvesting and reuse system will be presented under separate cover. The remaining area and overflow from the catch basin will be directed to the southwest vegetated swale, which in turn will overflow to a second drywell located under the same parking area.

The eastern portion of the site will be landscaped and will remain permeable with the exception of an ADA accessible ramp. The east basin is located within the landscaped area and will connect with the east planter.

The north driveway apron will be traversed by a trench drain that will capture all runoff from the parking area leading toward the street and direct it to the north swale. The trench drain will also serve to convey overflows between the east and north swales. The west driveway apron will be graded to promote runoff away from the street and toward the management zones.

All sidewalk (right-of-way) areas will be constructed or modified with planting strips to manage all sidewalk runoff. The east portion of the site adjacent to the right-of-way will receive a stone infiltration trench to assure that all runoff from the sloped boundary of the site will not drain to the sidewalk or street.

With the proposed plan, all stormwater falling within the site boundaries will be managed within the site and the adjacent sidewalk areas will be managed within the right-of-way. There will be no stormwater connections to the sewer system. All overflow beyond the capacities of the infiltration zones (which exceed the 10-year storm event) will be directed to the two drywell facilities. All roof drains will connect with the swales or drywells. The center lines of all infiltration facilities are beyond the required 5-foot offset distance from foundations and property boundaries. The area known to have previously contained soil contamination will remain under an impermeable cap to prevent further movement of any potential contaminant plume, and does not correspond with any of the areas designated for infiltration facilities.

Calculation of the total area to be managed by the designated infiltration zones is performed by the Simplified Method (Section 2.2.1 of the SWMM) using a Sizing Factor of 0.09 for the swales and basin and 0.06 for the unlined planter. The Drainage Area Calculations (**Appendix C**) demonstrate that the area managed by the proposed stormwater infrastructure will exceed the area required for compliance in Portland.

See **Figure 1** for Drawing 1 of 2 - Stormwater Management Plan for which the following conditions apply:

1) The "Simplified Approach" has been used to size all stormwater management facilities per Section 2.2.1 of SWMM.
2) All stormwater falling within the property limits is directed toward planted infiltration facilities.
3) Total infiltration facility area is square feet. Using the "Simplified Approach," this area corresponds to a managed impervious area of 10,267 square feet, per Section 2.3.3 and Appendix C.3 of SWMM.
4) Total impervious area reduction is 5793 square feet, reducing the total impervious area to 9297 square feet.
5) All unlined infiltration facilities meet the property boundary offset of 5 feet (to centerline of facility) per Exhibit 2-1 of SWMM.
6) There is no stormwater connection to the City sewer system, consistent with Category 1 facility criteria per Section 1.3 of SWMM.
7) All sidewalk (right-of-way) runoff is directed toward planting strips.
8) No stormwater runoff flows directly to any UICs or drywells per Section 1.3 of SWMM. Drywells are used exclusively to manage overflow from planted infiltration facilities in excess of the 10-year, 24-hour storm.
9) All designs for stormwater management facilities including planters, vegetated swales and infiltration basins shall meet design specifications provided in Appendix G.1 of SWMM.

VI. SUSTAINABLE LANDSCAPING

Sustainable Landscaping Plan
The main purpose of any sustainable landscape plan is to provide or support water resource protection. When combined with urban ecology programming, the sustainable landscape plan serves not only as a demonstration of the benefits of environmentally responsible landscape design, but also as a tool of instruction for urban site development in general.

Sustainable or "green" features in landscape design are generally cost-effective. In some cases they have been found to be lower cost than conventional landscaping.

Appendix B provides a "lexicon" of representative green infrastructure practices, with definitions and references.

Preliminary recommendations for sustainable landscaping and site design as part of the June Key Delta House Redevelopment Plan are shown on attached **Figure 2** – Drawing 2 of 2 – Sustainable Landscape Plan.

The Plan illustrates how the following *principles* of sustainable landscaping and site design might apply to the entire site.

Natural and Cultural Conservation
Remediate / reuse valued site and building features.

Water Retention and Filtration
Use porous paving and tree structural cells to reduce runoff.

Site Maintenance
Use native plantings to minimize watering and mowing.
Limit salting and sanding of roads and walks.
Practice recycling.

Program
Promote water conservation education as well as urban ecology education.
Provide long-term options for program additions.

The plan recommends *practices* of sustainable landscaping and site design as follows:

1. Planted swales and water-retaining cells (structural soil cells) at tree basins will store rainwater for native tree and plant landscaping.
2. A rainwater retention (harvesting) system.
3. Incorporate the following elements of green infrastructure:
    - **Native planting**
    - **Tree planting / urban forestry**
    - **Structural soil cells**
    - **Porous paving**
    - **Bioswales / Rain gardens**
    - **Rainwater harvesting**

Figure 2 – Drawing 2 of 2 – Sustainable Landscape Plan was prepared to illustrate opportunities for sustainable landscaping with the following limitations:

Design Approach

The landscaping plan, **Figure 2** - Drawing 2 of 2, has been prepared in accordance with the 2008 Portland Stormwater Management Manual, Section 2.3.2: Landscape Requirements, Appendix D.1: Landscape Submittal Guide and Appendix F.4: Planting Templates and Plant Lists.

The intent of the plan is to begin compliance with the submittal requirements of the SWMM, although there are issues that require additional review and design. The plan shall be considered preliminary and not for construction pending comment and approval of all applicable regulatory agencies. It is assumed that other design professionals will further develop this plan to obtain the final approval(s).

Stormwater Facility Design

Basin, swales and planters as shown on plan require detailed design by others. Refer to SWMM Section 2.3: Facility Design and Appendix G.4 (as well as other applicable sections) for guideline requirements. Structures shown on plan are intended to convey the general type and location of the facilities as they relate to the stormwater plan sheet 1 of 2.

Soil Medium for Stormwater Facilities

Soil medium shall be as described in Section 2.3.2: Landscape Requirements. It is anticipated that on-site inspection / analysis will occur to verify composition.

Planting Plan

The planting plan has been developed utilizing template examples and plant selections as found in the SWMM. Plant selections were made with consideration for zones A and B for each structure. Placement and density of material may require adjustment based on final facility design, as well as plant availability or substitutions.

Irrigation

An irrigation system shall be designed by others to meet SWMM requirements.

Non-Stormwater Plantings

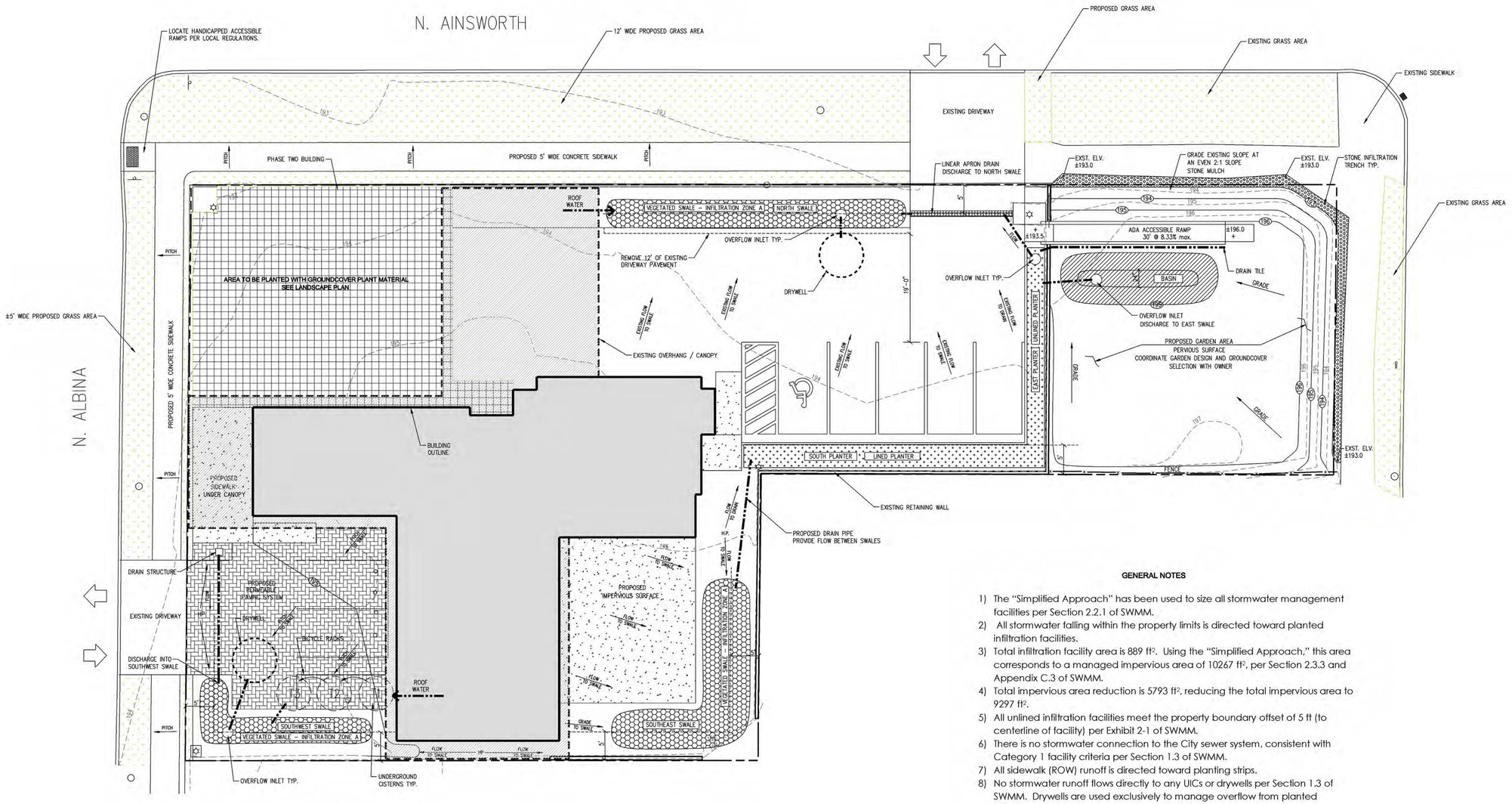
All landscape areas, other than basin, swales and planters shall be planted with trees, shrubs or groundcover. These areas shall receive a hemlock bark mulch cover. There shall be no turf grass areas on site. It is assumed that grassed areas are permissible adjacent to street within City's right-of-way.

Detailed design of the "Proposed Garden Area" shall be coordinated with the client and, if applicable, approved by appropriate regulatory agencies. Temporary hemlock mulch shall be placed over the area until a final design / planting plan is developed.

VII. REFERENCES CITED

Reference 1: Sustainable Sites Initiative, http://www.sustainablesites.org.
Reference 2: LEED® Rating System, http://www.usgbc.org/leed.
Reference 3: The Living Building Challenge, http:/www./livingbuilding.org or http://www.cascadiagbc.org.
Reference 4: Portland Stormwater Management Manual, http://www.portlandonline.com/bes/index.cfm?&a=55741.

Building Design References
Reference 5: Simonstown High School Hostel (Architect: Paul Cooper; G.C. Waynes Custoe Creations), http://weburbanist.com/2008/05/26/cargo-container-homes-and-offices/.
Reference 6: Victoria, British Columbia (Architect: Keith Dewey), http://www.zigloo.ca/index.
Reference 7: 12 Container House and Kalkin House (Architect: Adam Kalkin), www.architectureandhygiene.com/12conHouse/12con_main.html and http://www.shelburnemuseum.org/buildings_and_grounds/detail.php?id=5.



GENERAL NOTES

1) The "Simplified Approach" has been used to size all stormwater management facilities per Section 2.2.1 of SWMM.
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3) Total infiltration facility area is 889 ft². Using the "Simplified Approach," this area corresponds to a managed impervious area of 10267 ft², per Section 2.3.3 and Appendix C.3 of SWMM.
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9) All designs for stormwater management facilities including planters, vegetated swales, and infiltration basins shall meet design specifications provided in Appendix G.1 of SWMM.

PRELIMINARY
NOT FOR CONSTRUCTION

5-21-09

STORM WATER PLAN

GRAPHIC SCALE

10 0 10 20

Delta Sigma Theta
Gas Station Conversion
PORTLAND, OREGON

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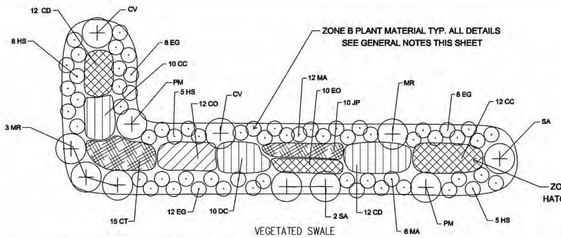
www.vitanuova.net • Offices Nationwide

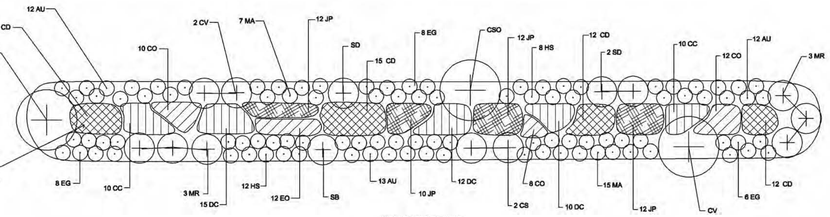
DESIGNED	DRAWN
SCALE	
DATE	5-8-09
PROJECT NO.	
DRAWING	
SITE PLAN:	
1 OF 2	
SHEET NO.	



ZONE B PLANT MATERIAL TYP. ALL DETAILS SEE GENERAL NOTES THIS SHEET

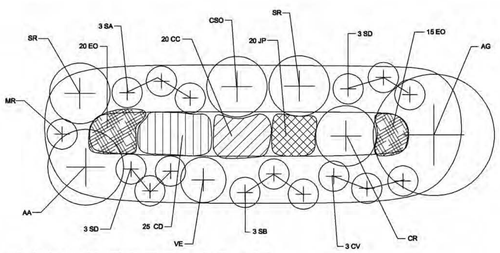
NOTE: ADJUST PLANT QUANTITIES AND LOCATIONS AS REQUIRED PER SWALE NOTES THIS SHEET. TYPICAL ALL SWALES.

VEGETATED SWALE
SOUTHWEST SWALE
NTS



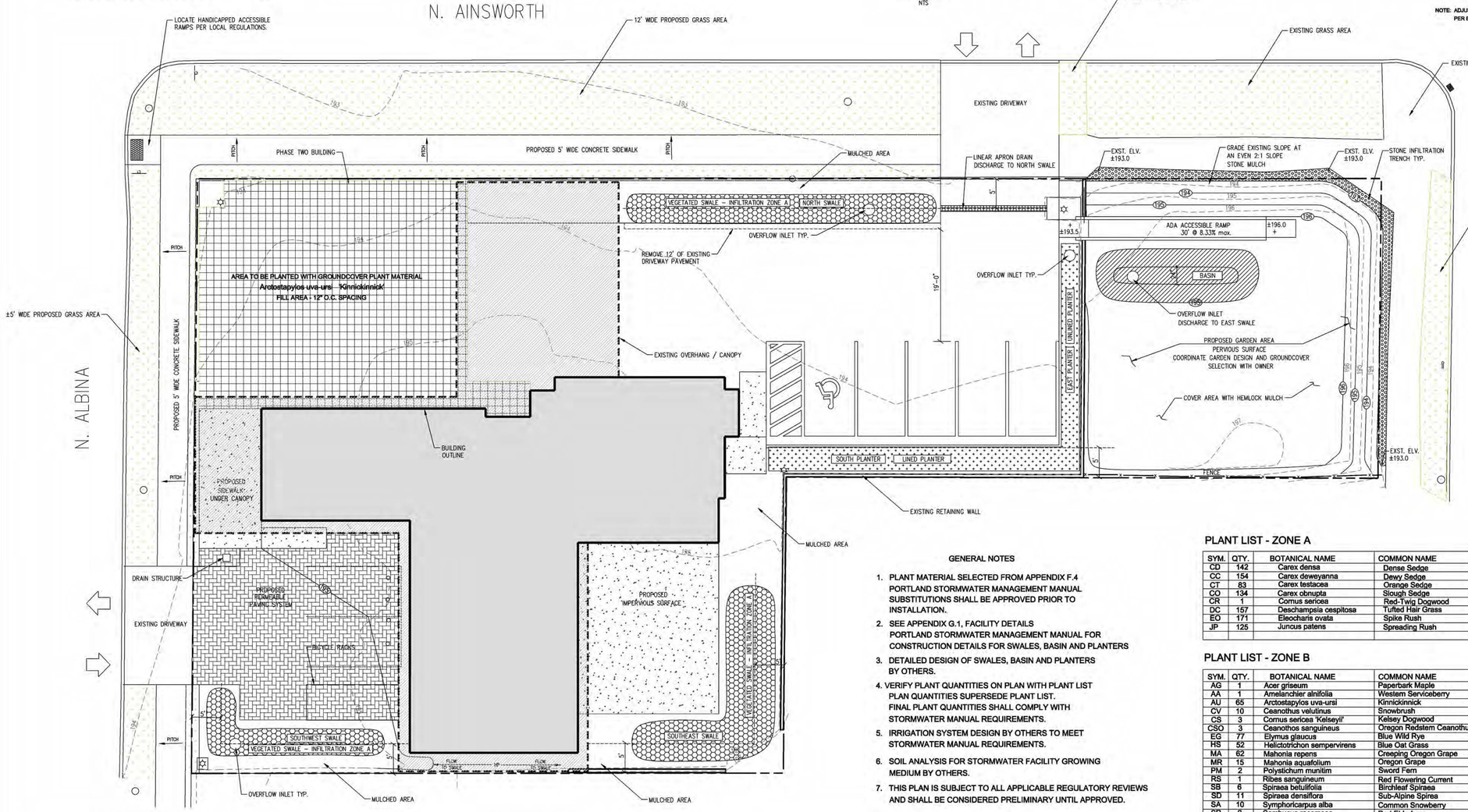
ZONE A PLANT MATERIAL SHOWN AS HATCHED POLYGONS. TYP. ALL DETAILS SEE NOTES 2 & 3 THIS SHEET

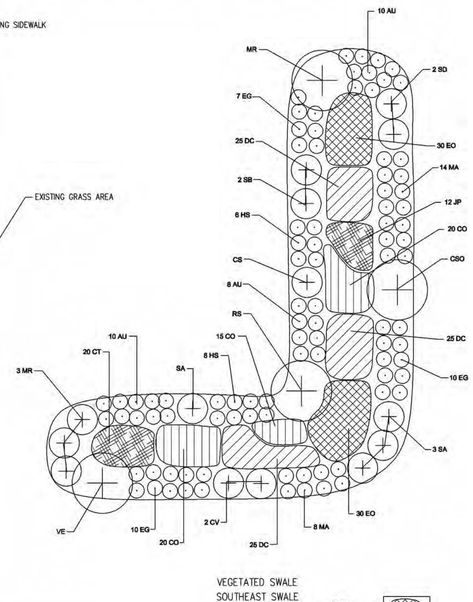
VEGETATED SWALE
NORTH SWALE
NTS



NOTE: ADJUST PLANT QUANTITIES AND LOCATIONS AS REQUIRED PER BASIN NOTES THIS SHEET.

BASIN
NTS





VEGETATED SWALE
SOUTHEAST SWALE
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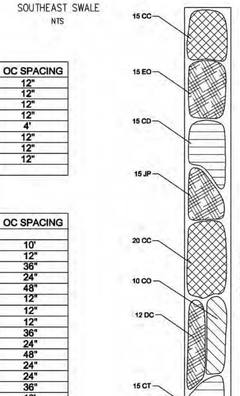
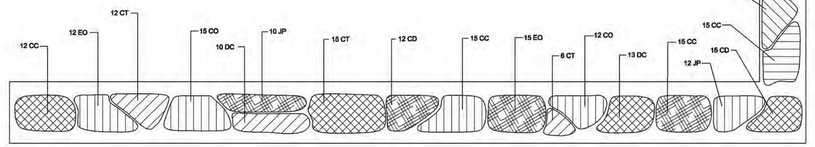


PLANT LIST - ZONE A

SYM.	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	EVERGREEN	DECIDUOUS	OC SPACING
CD	142	Carex densa	Dense Sedge	1 GAL	Y		12"
CC	154	Carex deweyanna	Dewy Sedge	1 GAL	Y		12"
CT	83	Carex testacea	Orange Sedge	1 GAL	Y		12"
CO	134	Carex obnupta	Slough Sedge	1 GAL	Y		12"
CR	1	Cornus sericea	Red-Twig Dogwood	1 GAL		Y	4'
DC	167	Deschampsia cespitosa	Tufted Hair Grass	1 GAL	Y		12"
EO	171	Eleocharis ovata	Spike Rush	1 GAL	Y		12"
JP	125	Juncus patens	Spreading Rush	1 GAL	Y		12"

PLANT LIST - ZONE B

SYM.	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	EVERGREEN	DECIDUOUS	OC SPACING
AG	1	Acer griseum	Paperbark Maple	1 GAL		Y	
AA	1	Amelanchier alnifolia	Western Serviceberry	1 GAL		Y	10'
AU	65	Arctostapylos uva-ursi	Kinnickinnick	1 GAL	Y		12"
CV	10	Ceanothus velutinus	Snowbrush	1 GAL	Y		36"
CS	3	Cornus sericea 'Kelseyii'	Kelsey Dogwood	1 GAL		Y	24"
CSO	3	Ceanothos sanguineus	Oregon Redstem Ceanothus	1 GAL	Y		48"
EG	77	Elymus glaucus	Blue Wild Rye	1 GAL	Y		12"
HS	52	Helictotrichon sempervirens	Blue Oat Grass	1 GAL	Y		12"
MA	62	Mahonia repens	Creeping Oregon Grape	1 GAL	Y		12"
MR	15	Mahonia aquafolium	Oregon Grape	1 GAL	Y		36"
PM	2	Polystichum munitim	Sword Fern	1 GAL	Y		24"
RS	1	Ribes sanguineum	Red Flowering Current	1 GAL		Y	48"
SB	6	Spiraea betulifolia	Birchleaf Spiraea	1 GAL		Y	24"
SD	11	Spiraea densiflora	Sub-Alpine Spirea	1 GAL		Y	24"
SA	10	Symphoricarpus alba	Common Snowberry	1 GAL		Y	36"
SR	2	Sambucus racemosa	Red Elderberry	1 GAL		Y	10'
VE	3	Viburnum edule	Highbush Cranberry	1 GAL		Y	48"



NOTE: ADJUST PLANT QUANTITIES AND LOCATIONS AS REQUIRED PER PLANTER NOTES THIS SHEET.
FINAL PLANTER DESIGN BY OTHERS.

SOUTH PLANTER
LINED PLANTER
NTS

GENERAL NOTES

1. PLANT MATERIAL SELECTED FROM APPENDIX F.4 PORTLAND STORMWATER MANAGEMENT MANUAL SUBSTITUTIONS SHALL BE APPROVED PRIOR TO INSTALLATION.
2. SEE APPENDIX G.1, FACILITY DETAILS PORTLAND STORMWATER MANAGEMENT MANUAL FOR CONSTRUCTION DETAILS FOR SWALES, BASIN AND PLANTERS
3. DETAILED DESIGN OF SWALES, BASIN AND PLANTERS BY OTHERS.
4. VERIFY PLANT QUANTITIES ON PLAN WITH PLANT LIST PLAN QUANTITIES SUPERSEDE PLANT LIST. FINAL PLANT QUANTITIES SHALL COMPLY WITH STORMWATER MANUAL REQUIREMENTS.
5. IRRIGATION SYSTEM DESIGN BY OTHERS TO MEET STORMWATER MANUAL REQUIREMENTS.
6. SOIL ANALYSIS FOR STORMWATER FACILITY GROWING MEDIUM BY OTHERS.
7. THIS PLAN IS SUBJECT TO ALL APPLICABLE REGULATORY REVIEWS AND SHALL BE CONSIDERED PRELIMINARY UNTIL APPROVED.

VEGETATED SWALE NOTES

1. Provide protection from all vehicle traffic, equipment staging, and foot traffic in proposed infiltration areas prior to, during, and after construction.
2. Dimensions:
   a. Width of swale: 5' - 12'.
   b. Depth of swale ((from top of growing medium to overflow elevation); Simplified: 9", Presumptive: 6"-12".
   c. Longitudinal slope of swale: 6.0% or less.
   d. Flat bottom width: 2'.
   e. Side slopes of swale: 3:1 maximum.
3. Setbacks (from centerline of facility):
   a. Infiltration swales must be 10' from foundations and 5' from property lines.
   b. Flow-through swales must be lined with connection to approved discharge point according to SWMM Section 1.3.
4. Overflow:
   a. Overflow required for Simplified Approach
   b. Inlet elevation must allow for 2" of freeboard, minimum.
   c. Protect from debris and sediment with strainer or grate.
5. Piping: shall be ABS Sch.40, cast iron, or PVS Sch.40. 3" pipe required for up to 1,500 sq ft of impervious area, otherwise 4" min. Piping must have 1% grade and follow the Uniform Plumbing Code.
6. Drain rock:
   a. Size for infiltration swale: 1½" - ¾" washed
   b. Size for flow-through swale: ¾" washed
   c. Depth for Simplified: 12"
   d. Depth for Presumptive: 0-48", see calcs.
7. Separation between drain rock and growing medium: Use filter fabric (see SWMM Exhibit 2-4 Geotextile table) or a gravel lens (¾ - ⅛ inch washed, crushed rock 2 to 3 inches deep).
8. Growing medium:
   a. 18" minimum
   b. See Appendix F.3 for specification or use sand/loam/compost 3-way mix.
9. Vegetation: Follow landscape plans otherwise refer to plant list in SWMM Appendix F. Minimum container size is 1 gallon. # of plantings per 100sf of facility area:
   a. Zone A (wet): 115 herbaceous plants OR 100 herbaceous plants and 4 small shrubs.
   b. Zone B (moderate to dry): 1 tree AND 3 large shrubs / small trees AND 4 small shrubs AND 140 groundcover plants.
   The delineation between Zone A and B shall be either at the outlet elevation or the check dam elevation, whichever is lowest.
10. Waterproof liner: Shall be 30 mil PVC or equivalent for flow-through facilities.
11. Install washed pea gravel or river rock to transition from inlets and splash pad to growing medium.
12. Check dams: Shall be placed according to facility design. Refer to SW-340 for profile and spacing.
13. Inspections: Call BDS IVR Inspection Line, (503) 823-7000, for appropriate inspections.

PLANTER NOTES

1. Provide protection from all vehicle traffic, equipment staging, and foot traffic in proposed infiltration areas prior to, during, and after construction.
2. Dimensions:
   a. Width of flow-through planter: 18" minimum.
   b. Width of infiltration planter: 30" minimum.
   c. Depth of planter (from top of growing medium to overflow elevation). Simplified: 12"; Presumptive: 6"- 18".
   d. Slope of planter: 0.5% or less.
3. Setbacks (from centerline of facility):
   a. Infiltration planters must be 10' from foundations and 5' from property lines.
   b. Flow-through planters must be less than 30" in height above surrounding area if within 5 feet of property line.
4. Overflow:
   a. Overflow required for Simplified Approach.
   b. Inlet elevation must allow for 2" of freeboard, minimum.
   c. Protect from debris and sediment with strainer or grate.
5. Piping: shall be ABS Sch.40, cast iron, or PVS Sch.40. 3" pipe required for up to 1,500 sq ft of impervious area, otherwise 4" min. Piping must have 1% grade and follow the Uniform Plumbing Code.
6. Drain rock:
   a. Size for infiltration planter: 1½" - ¾" washed
   b. Size for flow-through planter: ¾" washed
   c. Depth for Simplified: 12"
   d. Depth for Presumptive: 0-48", see calcs.
7. Separation between drain rock and growing medium: Use filter fabric (see SWMM Exhibit 2-4 Geotextile table) or a gravel lens (¾ - ⅛ inch washed, crushed rock 2 to 3 inches deep).
8. Growing medium:
   a. 18" minimum
   b. See Appendix F.3 for specification or use sand/loam/compost 3-way mix.
9. Vegetation: Follow landscape plans otherwise refer to plant list in SWMM Appendix F. Minimum container size is 1 gallon.
   # of plantings per 100sf of facility area:
   a. Zone A (wet) 115 herbaceous plants, OR
   b. Zone A (wet) 100 herbaceous plants and 4 small shrubs.
10. Planter walls:
    a. Material shall be stone, brick, concrete, wood, or other durable material (no chemically treated wood).
    b. Concrete, brick, or stone walls shall be included on foundation plans.
11. Waterproof liner: Shall be 30 mil PVC or equivalent, for flow-through facilities.
12. Install washed pea gravel or river rock to transition from inlet or splash pad to growing medium.
13. Inspections: Call BDS IVR Inspection Line, (503) 823-7000, for appropriate inspections.

BASIN NOTES

1. Provide protection from all vehicle traffic, equipment staging, and foot traffic in proposed infiltration areas prior to, during, and after construction.
2. Dimensions:
   a. Width of basin: 9' minimum.
   b. Depth of basin (from top of growing medium to overflow elevation); Simplified: 12", Presumptive: 9'-18".
   c. Flat bottom width: 2' min.
   d. Side slopes of basin: 3:1 maximum.
3. Setbacks (from midpoint of facility):
   a. Infiltration basins must be 10' from foundations and 5' from property lines.
   b. Flow-through swales must be lined with connection to approved discharge point according to SWMM Section 1.3.
4. Overflow:
   a. Overflow required for Simplified Approach.
   b. Inlet elevation must allow for 2" of freeboard, minimum.
   c. Protect from debris and sediment with strainer or grate.
5. Piping: shall be ABS Sch.40, cast iron, or PVC Sch.40. 3" pipe required for up to 1,500 sq ft of impervious area, otherwise 4" min. Piping must have 1% grade and follow the Uniform Plumbing Code.
6. Drain rock:
   a. Size for infiltration basin: 1½" - ¾" washed
   b. Size for flow-through basin: ¾" washed
   c. Depth for Simplified: 12"
   d. Depth for Presumptive: 0-48", see calcs.
7. Separation between drain rock and growing medium: Use filter fabric (see SWMM Exhibit 2-5) or a gravel lens (¾ - ⅛ inch washed, crushed rock 2 to 3 inches deep).
8. Growing medium:
   a. 18" minimum
   b. See Appendix F.3 for specification or use sand/loam/compost 3-way mix.
9. Vegetation: Follow landscape plans otherwise refer to plant list in SWMM Appendix F. Minimum container size is 1 gallon. # of plantings per 100sf of facility area):
   a. Zone A (wet): 115 herbaceous plants OR 100 herbaceous plants and 4 shrubs
   b. Zone B (moderate to dry): 1 tree AND 3 large shrubs AND 4 medium to small shrubs.
   The delineation between Zone A and B shall be either at the outlet elevation or the check dam elevation, whichever is lowest.
10. Install washed pea gravel or river rock to transition from inlets and splash pad to growing medium.
11. Inspections: Call BDS IVR Inspection Line, (503) 823-7000, for appropriate inspections.

PRELIMINARY
NOT FOR CONSTRUCTION
5-21-09

LANDSCAPING PLAN

GRAPHIC SCALE
10 0 10 20

N

Delta Sigma Theta
Gas Station Conversion
PORTLAND, OREGON

Vita Nuova, LLC
Tel: 203.270.3413 ◆ Fax: 203.702.5277
www.vitanuova.net ◆ Offices Nationwide

DESIGNED	DRAWN
SCALE	
DATE	5-8-09
PROJECT NO.	
DRAWING	
SITE PLAN:	
2 OF 2	
SHEET NO.	

Appendix A

Workplan
City of Portland, Oregon Delta Sigma Theta - Gas Station Conversion
Sustainability Pilot

The following statement of work details the activities to be conducted by Vita Nuova, as a subcontractor supporting SRA, to address site preparation, cleanup, and redevelopment at a former gas station site in Portland, Oregon (EPA Region 10). The project will be undertaken by the Delta Sigma Theta Sorority at 5940 North Albina St. Given the limited budget and short time frame for this project, Vita Nuova will produce a single deliverable in the form of a Green Landscape Plan and **Final Report**, described in detail after Task 4, below.

Task 1: Review Existing Documents.
Vita Nuova will review all plans, specs and reports relating to the former gas station site, including the Phase 2 Site Assessment that is currently underway through the City of Portland Brownfields Grant. While the aim of this task will be to gain an overview of the project, Vita Nuova will pay special attention to details that relate to site preparation, landscaping, stormwater management, and rainwater harvesting.

Task 2: Conduct On-site Inspection
Vita Nuova will meet key local contacts in Portland for a thorough inspection of the site. During this visit, all parties will once again review project conditions, concerns and objectives. Vita Nuova will plan a meeting with project owners and their architects.

Task 3: Analyze Site Preparation and Water Management Options and Prepare Draft Report
Vita Nuova will evaluate strategies to prepare the site for redevelopment, focusing on techniques, materials and design details that have sustainable value. This analysis will cover three areas:

- Site preparation and cleanup that focuses on sustainable practices such as reusing existing materials
- Water management including stormwater management and rainwater harvesting
- Sustainable landscape design

The final part of Task 3 will be to present the draft report to the clients, and conduct a phone conference call to clarify details, discuss concerns, and gather feedback.

Task 4: Prepare Final Report
Based on the feedback gathered in the previous step, Vita Nuova will prepare a Green Landscape Plan that will help advance the project, enabling the clients to resolve details that relate to site cleanup and preparation, water management and landscape design.

Deliverable: Green Landscape Plan for Site Preparation, Water Management and Landscape Design
This report will address the following details:

- Site cleanup and preparation.
- Water management, including stormwater management and rainwater harvesting
- Sustainable landscape design

Tasks & deliverables **Dates**

Site visit: Within 1 month of receiving relevant documents and agreement to proceed from the EPA

Conference call to discuss draft findings: Within 4-6 weeks of visit

Final report: Within 2 months of site visit

Appendix B: Sustainable Practices and Definitions

Appendix B lists the features of sustainable infrastructure, with definitions and web-based resources. Each of the features may be considered in a comprehensive approach to sites and building integration.

Native planting
A cost-effective measure by which to reduce municipal costs and improve environmental benefits is to replace traditional lawn planting and maintenance with native planting. Native planting conserves water and eliminates the need for pesticides and chemical fertilizers. Native plants grow well together—they evolved growing along side one another—and to predictable sizes. They do not need watering (except during initial planting), nor do they require chemical fertilizers or any of the commercial biocides—herbicides, insecticides and fungicides. They are adapted to local conditions and resistant to local insects. In contrast, manicured lawns and bark-mulch beds (typical of commercial landscapes) rely upon synthetic chemicals, pesticides and fertilizers. Additional negative impacts of traditional landscape include noise and air pollution from lawn cutting, emitting exhaust fumes and air-borne chemicals. Mowers emit 10-12 times as much pollution as a typical auto, string trimmers 21 times and blowers 34 times. See: www.nps.gov/plants.

Alternatives to pesticide use in landscape maintenance: Part of watershed management is to reduce pollutants from stormwater surges, especially those that flood lawn and agricultural areas that carry fertilizers, chemical pesticides and other toxins into adjacent water bodies. Reducing and eliminating the source pollutants increases the effectiveness of native planting, riparian buffers, and access to water for recreation. Extensive web-based resources include: www.epa.gov/pesticides and www.nrdc.org/health/pesticides/.

Alternatives to salt use for de-icing: The common practice of salting roadways for snow-ice melting creates significant harmful pollution of surface and groundwater, with negative effects on the environment, human health and groundwater systems. Salt may attract deer, increasing accident hazard. The abrasives—sand, gravel, pumice—are acceptable but messy and degrade to dust, which can create low visibility conditions and make dry roads slippery. Studies by Vladimir Novotny at Northwestern University address these alternatives. Also see: www.epa.gov/owm/mtb/ice.pdf.

Tree Planting / Urban Forestry
Trees are indicators of a community's ecological health. When trees are large and healthy, the ecological systems that support them—soil, air and water—are also healthy. Healthy trees provide valuable environmental benefits. The greater the tree cover and the less the impervious surface, the more ecosystem services are produced: reducing stormwater runoff, increasing air and water quality, storing and sequestering atmospheric carbon, and reducing energy consumption due to direct shading of residential buildings. An ideal design strategy is to combine urban parking with porous paving water storage, which allows trees to have sufficient water without a large soil bulb. For discussion of benefits of urban trees see: www.walkable.org/download/22_benefits.pdf

Structural Soil Cells
Structural soil cells are modular interlocking plastic frameworks placed around landscaped tree roots, originally developed by Dr. James Urban, landscape architect. The cells provide support for paving and contain soil and loose aggregate to store water for urban tree root systems. They are commonly used to create a "green oasis" for parking and streetscapes. They permit closer spacing

of trees and less soil, while also directing stormwater to tree roots. There are a number of reference examples, see: www.toronto.ca/environment/pdf/james_urban and www.deeproot.com/pdfs/PNW_Trees_article.pdf.

Porous Paving

Porous pavement allows rainwater to seep through the surface to a subsurface layer, where it may be absorbed into the ground or stored. This increases groundwater recharge, reduces pollutants in stormwater runoff and helps to alleviate flooding and contamination to streams. Porous pavement is a permeable pavement surface with a stone reservoir underneath. The reservoir temporarily stores surface runoff before infiltrating into the subsoil. Porous pavement often appears the same as traditional asphalt or concrete but is manufactured without "fine" materials, and instead incorporates void spaces that allow for infiltration, ideal for low traffic, parking areas and walkways. In extremely dense urban areas, porous pavement has been used in redevelopment projects, where it treats and stores stormwater without consuming extra land. Porous pavement can also be used on individual sites where a parking lot is being resurfaced. See: www.epa.gov/OWM/mtb/porouspa.pdf.

Bioswales

A bioswale is a landscape swale designed as a water filter, to remove silt and pollution from surface runoff water. It consists of a swaled drainage course with gently sloped sides (less than 6%) and filled with vegetation, compost and / or riprap. It is typically planted with hardy grasses and moisture-tolerant plants and wildflowers. The water's flow path, winding within the wide and shallow ditch, is designed to maximize the time water spends in the swale, which aids the trapping of pollutants and silt. Plants act as biofilters, removing phosphorous, soil sediments, and other pollutants. Several classes of water pollutants may be arrested with bioswales: silt, inorganic contaminants, organic chemicals, and pathogens. Water leaving a bioswale is cleaner than when it came in. See: www.ia.nrcs.usda.gov/news/brochures/bioswale.

Rain Gardens

A variation of a bioswale is a rain garden. A rain garden is a natural or shallow depression designed to capture and soak up stormwater runoff from roofs or other impervious areas around buildings and driveways, walkways, including compacted lawn areas. Rain gardens can be used as a buffer to wateredge buffers and shoreline areas to capture runoff from the landscape before it enters a lake, pond or river. The rain garden is planted with suitable trees, shrubs, flowers, and other plants, providing bird habitat and a natural filter for runoff to soak into the ground and protect water quality. There are many websites on the topic. See, for example: dnr.wi.gov/org/water/wm/nps/rg/index.htm.

Rainwater Harvesting

Rainwater harvesting is the collection and storage of rain from roofs or from a surface catchment for future use. The water is generally stored in rainwater tanks or directed into mechanisms that recharge groundwater. This is appropriate when there is enough rain for collection and conventional water resources either do not exist or are at risk of being over-used to supply a large population. Rainwater harvesting can provide lifeline water for human consumption, reduce water bills and the need to build reservoirs, which may require the use of valuable land. Rainwater harvesting has been practiced in arid and semi-arid areas, and has provided drinking water, domestic water, water for livestock, water for small irrigation, and a way to replenish groundwater levels. Rainwater harvesting in urban areas adds means to collect supplemental water for landscape watering requirements, to increase soil moisture for greenery, to increase the groundwater table through recharge, to mitigate urban flooding and to improve the quality of groundwater. At a household level, harvested rainwater can be used for flushing toilets and

washing laundry. There are many web-based resources, see: www.twdb.state.tx.us/publications/reports/RainwaterHarvestingManual_3rdedition.pdf.

Graywater Systems

Fresh water is a precious resource. Its uses should be restricted to potable water. Any water that has been used once, except water from toilets, is called graywater. It can be reused for many other purposes, especially landscape irrigation. Plants thrive on used water containing small bits of compost. Dish, shower, sink, and laundry water comprise 50-80% of residential "waste" water. The benefits of graywater recycling include:

- Lower fresh water use and related costs of supply.
- Less strain on septic tank or treatment plant capacity.
- Graywater treatment in topsoil is highly effective.
- Less energy and chemical use.
- Reclamation of otherwise wasted nutrients, helping to improve land fertility.

The Gray Water Policy Center provides guidelines for code compliance of various systems. See: www.oasisdesign.net/graywater/law/index.htm.

Water-saving Fixtures

Water costs can be significantly reduced. Taking simple water saving measures can save fresh water. About 70% of the total water used in the home and offices is for toilet flushing, laundry and baths. Water-saving fixtures are standard options on such appliances, indicated by EPA Energy Star ratings. Water use can be cut as much as 90% in some cases. See: www.epa.gov/OW/you/chap3.html.

Appendix C: Stormwater Drainage Calculations

DRAINAGE CALCULATIONS - DELTA HOUSE

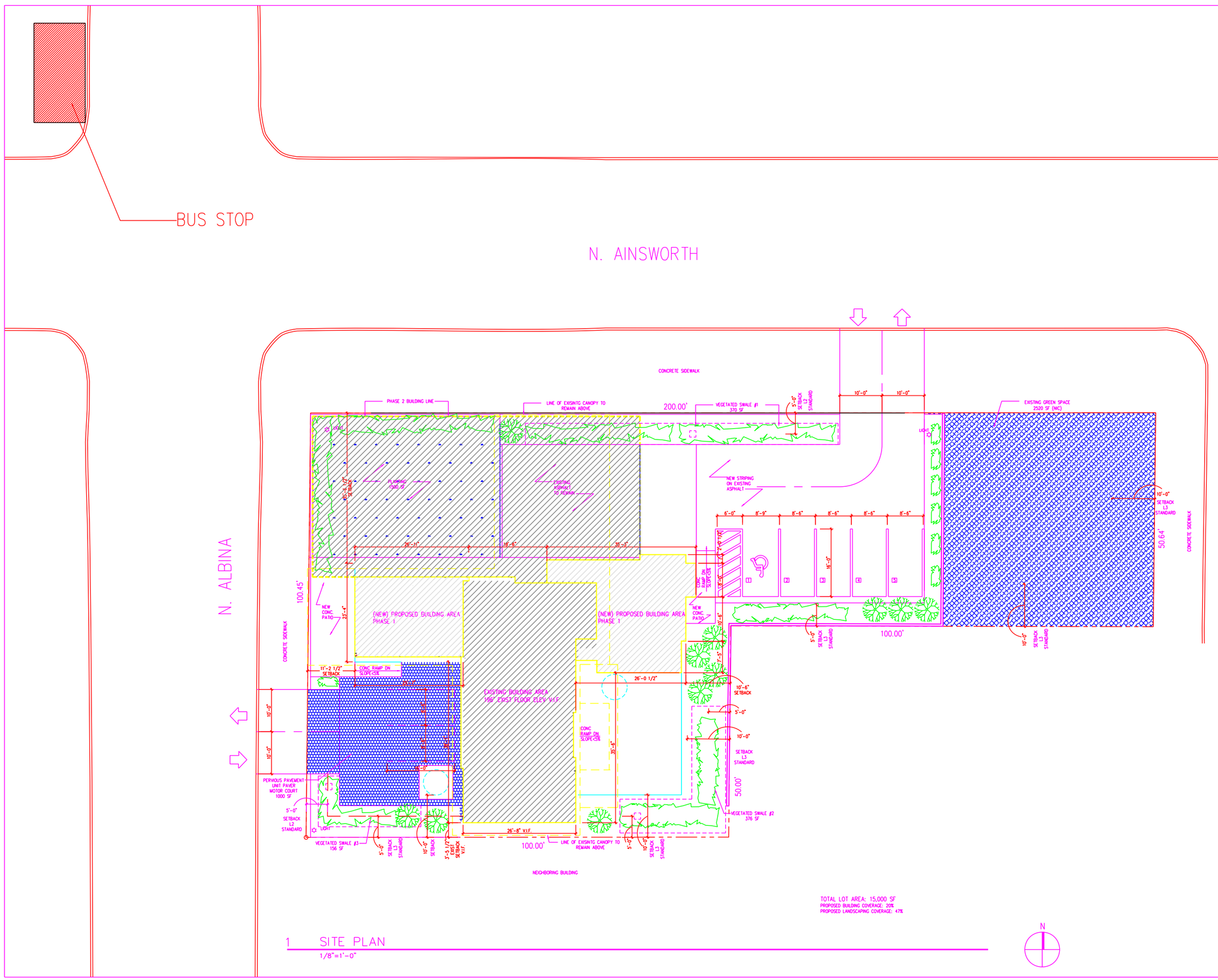
Phase 1:			TOTAL SITE AREA =	**15090**	**ft2**
Pervious Area					
Pervious Pavers =	1031	ft2			
Grassy Area =	1614	ft2			
Landscaped Area =	2259	ft2			
Infiltration Facilities =	889	ft2			
TOTAL	**5793**	**ft2**			
Impervious Area = 15,090 -	5793	=	**9297**	**ft2**	

Facility	**Area**		**Sizing Factor**	**Impervious Area Managed**	
N Vegetated Swale	253	ft2	0.09	2811	ft2
E Basin	70	ft2†	0.09	778	ft2
E Planter (unlined)	70	ft2	0.06	1167	ft2
SE Vegetated Swale	333	ft2	0.09	3700	ft2
SW Vegetated Swale	163	ft2	0.09	1811	ft2
TOTALS	**889**	**ft2**		**10267**	**ft2**

Phase 2:			TOTAL SITE AREA =	**15090**	**ft2**
Pervious Area					
Pervious Pavers =	1031	ft2			
Grassy Area =	0	ft2			
Landscaped Area =	2259	ft2			
Ecoroof =	2686	ft2			
Infiltration Facilities =	889	ft2			
TOTAL	**6865**	**ft2**			
Impervious Area = 15,090 -	6865	=	**8225**	**ft2**	

Facility	**Area**		**Sizing Factor**	**Impervious Area Managed**	
N Vegetated Swale	253	ft2	0.09	2811	ft2
E Basin	70	ft2	0.09	778	ft2
E Planter (unlined)	70	ft2†	0.06	1167	ft2
SE Vegetated Swale	333	ft2	0.09	3700	ft2
SW Vegetated Swale	163	ft2	0.09	1811	ft2
TOTALS	**889**	**ft2**		**10267**	**ft2**

Appendix D: June Key Delta House Preliminary Site Plan



1 SITE PLAN
1/8"=1'-0"

architecture company
sienna
411 sw sixth
portland, oregon
97204.1602
503.227.5616 v
503.227.3590 f

june key
delta house

5940 N ALBINA AVE
PORTLAND, OR 97217
DELTA SIGMA THETA SORORITY INC
1540 NE AINSWORTH ST
PORTLAND, OR 97211
project no: 27643

NOT FOR CONSTRUCTION

03 75% DESIGN DEVELOPMENT 10.21.08
02 ELECTRICAL DEVELOPMENT 04.22.08
01 50% DESIGN DEVELOPMENT 03.07.08

Drawn By Checked By Date

Sheet Title
SITE PLAN

Sheet Scale
1/16"=1'-0"

Sheet No.
A100

Appendix E: Site Assessment Report

WorleyParsons Komex
resources & energy

Environment & Water Resources

9611 NE 117th Street. Suite 2800
Vancouver, WA 98662, USA
Telephone: +1 360 567 4329
Facsimile: +1 360 253 7699
www.worleyparsons.com

27 October 2008

Proj. No.: H0670C
File Loc.: Portland

City of Portland
Bureau of Environmental Services
1120 SW 5th Avenue
Room 1000
Portland, OR 97204

Dear Ms. Bildersee:

RE: ADDITIONAL SITE ASSESSMENT REPORT, 5940 N. ALBINA AVENUE, PORTLAND, OREGON.

Dear Ms. Bildersee:

Please find enclosed the Additional Site Assessment Report for property located at 5940 N. Albina Avenue, Portland, OR.

If you have any questions regarding this report, please do not hesitate to call (360) 567 4329. It was a pleasure working with you on this project.

Sincerely,
WorleyParsons Komex

James R. Farrow, RG

Project Manager

enc.

CC The Deltas c/o Chris Poole-Jones (2 copies)
Sienna Architecture Company (one copy)

WorleyParsons Komex

resources & energy

CITY OF PORTLAND

Additional Site Assessment Report

5940 N. Albina Avenue, Portland OR 97217

590205

15 October 2008

Environment & Water Resources

9611 NE 117th Street, Suite 2800
Vancouver, WA 98662 USA
Telephone: +1 360 567 4329
Facsimile: +1 360 253 7699
worleyparsons.com

CITY OF PORTLAND
ADDITIONAL SITE ASSESSMENT REPORT
5940 N. ALBINA AVENUE, PORTLAND, OR 97217

Do not delete this line

James Farrow, an Oregon Registered Geologist, as an employee of WorleyParsons Komex, with expertise in geology, has reviewed the report with the title Additional Site Assessment Report. His signature and stamp appear below.

_____
James Farrow.
R.G. #G2135
October 2008

Do not delete this line

PROJECT 590205 – ADDITIONAL SITE ASSESSMENT REPORT

REV	DESCRIPTION	ORIG	REVIEW	WORLEY-PARSONS APPROVAL	DATE	CLIENT APPROVAL	DATE
A	Final	J. Farrow	M. Trudell	N/A	Oct 13 2008	N/A	

CITY OF PORTLAND
ADDITIONAL SITE ASSESSMENT REPORT
5940 N. ALBINA AVENUE, PORTLAND, OR 97217

Disclaimer

The information presented in this document was compiled and interpreted exclusively for the purposes stated in Section 1 of the document. WorleyParsons Komex provided this report for City of Portland solely for the purpose noted above.

WorleyParsons Komex has exercised reasonable skill, care, and diligence to assess the information acquired during the preparation of this report, but makes no guarantees or warranties as to the accuracy or completeness of this information. The information contained in this report is based upon, and limited by, the circumstances and conditions acknowledged herein, and upon information available at the time of its preparation. The information provided by others is believed to be accurate but cannot be guaranteed.

WorleyParsons Komex does not accept any responsibility for the use of this report for any purpose other than that stated in Section 1 and does not accept responsibility to any third party for the use in whole or in part of the contents of this report. Any alternative use, including that by a third party, or any reliance on, or decisions based on this document, is the responsibility of the alternative user or third party.

Any questions concerning the information or its interpretation should be directed to James Farrow.

CITY OF PORTLAND
ADDITIONAL SITE ASSESSMENT REPORT
5940 N. ALBINA AVENUE, PORTLAND, OR 97217

CONTENTS RIGHT-CLICK AND UPDATE ENTIRE TABLE. CHECK REPORT PAGE NUMBERS!

Table

CITY OF PORTLAND
ADDITIONAL SITE ASSESSMENT REPORT
5940 N. ALBINA AVENUE, PORTLAND, OR 97217

Figures

Appendicies

LIST OF ACRONYMS AND ABBREVIATIONS

AMSL	above mean sea level
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes (collectively referenced)
COCs	chemicals of concern
DEQ	State of Oregon Department of Environmental Quality
ft	feet
kg	kilograms
LUST	Leaking underground storage tank
mg	milligrams
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
NE	Northeast
PID	photoionization detector
ppm	parts per million
QAP	Quality Assurance Plan
TCLP	Threshold Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
TPHdx	total petroleum hydrocarbons as diesel
TPHgx	total petroleum hydrocarbons as gasoline
TTLC	Total Threshold Limit Concentration
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VOC	volatile organic compound

CITY OF PORTLAND
ADDITIONAL SITE ASSESSMENT REPORT
5940 N. ALBINA AVENUE, PORTLAND, OR 97217

1. INTRODUCTION

This Additional Site Assessment Report has been prepared by WorleyParsons Komex for the City of Portland Brownfield Program (the City). The scope of work was developed based on information provided to WorleyParsons Komex by Ms. Jenn Bildersee of the City and Mark Nye of Sienna Architects (Sienna) in City Work Order 1451430. Additional environmental assessment was undertaken at the former gasoline service station facility located at 5940 N. Albina Avenue (the Site) to determine the quality of soil in areas where it is proposed by Sienna to infiltrate storm water (Figures 1 and 2).

All field work was supervised by Oregon Registered Geologist Mr. James Farrow (R.G. #G2135).

1.1 Background

The Site was occupied by an ARCO gasoline service station from 1963 to approximately 1989 (Hart Crowser, 1989). The facility is listed by the Oregon Department of Environmental Quality (DEQ) as a leaking underground storage tank (LUST) case (DEQ, 1990).

In 1989, a divestment site screening and excavation of five (5) underground storage tanks (USTs) was performed by Hart Crowser (Hart Crowser, 1989). Five soil borings (B-1 through B-5) were advanced at the Site to a maximum depth of 41.5 feet below ground surface (bgs) during this initial investigation and significant petroleum hydrocarbons soil impact was detected in the area of the USTs (Figure 3). Soil contamination was also observed beneath “intact” USTs subsequent to their excavation (Hart Crowser, 1989). Approximately 20 cubic yards of petroleum hydrocarbon impacted soil was excavated from the UST area to a maximum depth of 14 feet below grade. Deeper excavation of impacted soil was reportedly not conducted due to the proximity of building structures. Impacted soil in excess of the calculated site clean-up goals of 80 ppm for gasoline range hydrocarbons and 500 ppm for diesel and heavier range hydrocarbons was left in place in this area (Hart Crowser, 1989 and 1990b). A maximum total petroleum hydrocarbon (TPH) concentration of 1,600 ppm was detected at 13 feet below grade in the former UST area (Hart Crowser, 1989).

In 1990, one additional soil boring (B-6) was drilled to 58 feet in the area of the former USTs (Hart Crowser, 1990a) (Figure 3). Significant petroleum hydrocarbon soil impact was detected to approximately 45 feet below grade. A soil vapor well was installed within this borehole with a screen interval from 5 to 45 feet below grade. Corrective action by soil vapor extraction was proposed in March 1990 and a soil vapor extraction test was performed at this well in early 1990. However, no record was available to suggest that a program of remediation by soil vapor extraction was performed to clean-up remaining soil impact (Hart Crowser, 1990b).

In 1990, two remaining zones of petroleum hydrocarbon contamination were identified in the area of the former USTs by Hart Crowser (Hart Crowser, 1990b) (Figure 3).

On August 9, 1990, the DEQ provided ARCO with a No Further Action (NFA) letter based on the following (DEQ, 1990):

- *The tanks and accessible contaminated soils have been excavated and removed from the Site;*
- *The venting of deeper gasoline contamination has been accomplished in accordance with the Corrective Action Plan for the Site;*
- *The soils aerated at the surface were tested and found to be within the appropriate cleanup standards for gasoline and diesel;*
- *There is little concern that groundwater could have been influenced by the contamination due to the depth to groundwater; and*
- *Natural degradation appears capable of reducing any residual contamination to near background levels without adverse impacts.*

However, based on the historical soil analytical data available it appears that the lateral and vertical extent of remaining soil impact was not defined.

It is currently proposed by Sienna to construct a community center at the property that will have a number of swales for storm water infiltration (Sienna, 2008) (Figure 4).

1.2 Objective

The objective of soil sampling was to determine the soil quality conditions in areas of the Site where it has been proposed by Sienna to infiltrate storm water. Remaining petroleum hydrocarbon soil impact in these areas could potentially be mobilized to groundwater by infiltrating rain water if significant contaminant mass exists.

1.3 Chemicals of Concern

The following chemicals of concern (COCs) have been identified based on a review or past site investigations and the history of site activity; TPHs and benzene, toluene, ethylbenzene and xylenes (BTEX). The potential presence of these COCs was addressed in the analytical schedule for the soil samples collected as part of the investigation.

2. SITE DESCRIPTION AND PHYSICAL SITE SETTING

The Site is situated at an elevation of approximately 200 feet above mean sea level (AMSL) in the northwest portion of the district of northeast (NE) Portland, Oregon, approximately 1.75 miles NE of the Willamette River and one mile south of the Columbia River (Figure 1). The Site is currently occupied by a former ARCO gasoline service station.

The topography in the immediate Site vicinity generally slopes toward the north in the direction of the Columbia Slough and Columbia River.

2.1 Regional Hydrogeology

The Site is located in the Portland Basin; a sub-basin of the Willamette Groundwater Basin. The Willamette Basin is a topographic and structural trough that lies between the Coast Range and the Cascade Range. The basin is divided into five sedimentary sub-basins that are separated by local uplands of the Columbia River Basalt Group lavas (USGS, 2005). Seven regional hydrogeologic units with similar regional hydrogeologic properties are defined in the Willamette Basin. Specifically, the Site is located in the Upper Sedimentary Unit. In the Portland Basin, the unit is largely comprised of coarse-grained Missoula Flood deposits with late Pleistocene and Holocene alluvium, and unconsolidated terrace deposits along major water courses (USGS, 2005).

2.2 Site Geology and Hydrogeology

The Site is situated on Pleistocene age catastrophic flood deposits composed of silts and sand. Approximately 5 to 10 feet beneath ground surface are Pleistocene-age coarser-grained facies consisting of gravels and local boulders (USGS, 1991). The Miocene to Pliocene-age Troutdale Formation, comprised of conglomerates with interbeds of sandstone, siltstone and claystone, is present approximately 100 feet beneath ground surface (USGS, 1991).

The Site is located approximately one mile northeast of an un-named fault likely associated with the Portland Hills – Clackamas River Structural Zone (USGS, 1991).

Based on the Site's elevation and distance from the Columbia River, first regional groundwater beneath the Site is likely present at a depth of approximately 100 feet bgs. However, isolated perched groundwater may be present at shallower depths. Regional groundwater beneath the Site is anticipated to flow to the north in the direction of the Columbia River, a likely point of groundwater discharge.

3. FIELD INVESTIGATION

3.1 Pre-Field Activities and Permitting

Prior to the commencement of any subsurface disturbances, WorleyParsons Komex contacted Underground Service Alert of Oregon (Dig Alert) regarding the planned subsurface work at the Site (Dig Alert Number 8196234). Prior to drilling activities, the soil borehole location was cleared using a hand-auger to a depth of approximately 5 feet bgs. Additionally, each boring location was swept for utilities and other possible drilling obstructions using hand held geophysical tools by Locates Down Under of Oregon City, Oregon.

3.2 Soil Sampling

On September 15 and 16, 2008, soil borings were advanced using either a truck-mounted hollow stem auger drilling rig or a direct-push geoprobe rig operated by Cascade Drilling (Cascade) of Clackamas, Oregon, under the supervision of WorleyParsons Komex from the following locations (Figure 4):

WP-1: This boring was advanced using a hollow stem auger drilling rig in the extreme southwest portion of the Site immediately south of the southern fuel dispenser island. It is proposed to construct vegetated swale #3 for storm water infiltration in this area (Sienna, 2008).

WP-2: This boring was advanced using a direct push geoprobe rig in the extreme north central portion of the Site immediately north of the northern fuel dispenser island. It is proposed to construct vegetated swale #1 for storm water infiltration in this area (Sienna, 2008). The boring is located immediately adjacent to the former service station canopy and an overhead electrical cable therefore the boring could not be drilled using the hollow stem auger rig.

WP-3, WP-4 and WP-5: These borings were advanced using a hollow stem auger drilling rig in the extreme southeastern portion of the Site adjacent to the former UST area. It is proposed to construct vegetated swale #2 in this area for storm water infiltration (Sienna, 2008). Previous site investigations performed by Hart Crowser have identified petroleum hydrocarbon soil contamination in the area of the former USTs. The lateral and vertical extent of this contamination had not been delineated.

WP-6: This boring was advanced using a direct push geoprobe rig in the southern area of existing soil contamination identified by Hart Crowser in 1991 (Figure 2). It is proposed to construct an above grade rainwater cistern in this area and construction would involve the excavation of soil in this area (Sienna, 2008). This borehole was added to the drilling schedule on September 16th 2008 by Sienna.

Soil samples were collected in five foot intervals in 18-inch modified California split-spoon samplers using the hollow stem auger rig. Soil samples were collected continuously in 4 foot long, 1.5 inch diameter clear acetate sleeves within a 4 foot long core barrel using the direct push geoprobe rig. Soil

samples were collected at various depths and transferred to 12-ounce glass jars provide by Coffey Laboratories (Coffey), of Portland, Oregon, a State-certified hazardous waste laboratory.

Soil samples were described in the field for lithologic, hydrogeologic, and geotechnical properties using the Unified Soil Classification System (USCS). This information was placed on field boring logs provided in Appendix A. In addition, soil sub-samples were collected for field volatile organic compound (VOC) headspace testing using a photoionization detector (PID). The results of field VOC headspace testing were recorded on the field boring logs provided in Appendix A.

Sampling and drilling equipment was decontaminated using a three-rinse wash prior to use at each boring location. Soil borings were back-filled with bentonite chips.

State of Oregon Geotechnical Borehole Reports completed by Cascade are provided in Appendix B.

3.3 Soil Analysis

Soil samples were temporarily stored in a chilled ice-chest prior to being submitted under chain of custody to Coffey for the following analyses:

- Total petroleum hydrocarbons as gasoline (TPHgx) in accordance with United States Environmental Protection Agency (USEPA) Method 8015;
- Total petroleum hydrocarbons as diesel (TPHdx) in accordance with USEPA Method 8015; and
- BTEX in accordance with USEPA Method 8021.

A composite soil sample representative of investigation-derived soil waste was also analyzed for total cadmium, lead and chromium in accordance with USEPA Method 6020 for soil disposal purposes. Threshold Characteristic Leaching Procedure (TCLP) analyses was not performed on this sample as the results of total metals analysis did not exceed the 20 times rule-of-thumb criteria that would warrant TCLP analysis.

3.4 Waste Disposal

Decontamination water and soil cuttings produced during the activities described above were temporarily stored on-Site in separate United States Department of Transportation (USDOT) approved 55-gallon drums. On October 10, 2008, the drums and contents were transported and disposed of at Hillsboro Landfill by Stratus Corporation, Gaston, Oregon. A copy of the non-hazardous manifest is provided in Appendix C.

4. FIELD INVESTIGATION RESULTS AND DISCUSSION

4.1 Subsurface Soil Conditions

The predominant lithology encountered during the Site assessment was medium to coarse gravelly sand and sandy gravel below an approximate 3 to 5 foot thickness of surficial sandy/gravelly clay. The lithology generally became increasing sandy towards the maximum depth drilled of 61.5 feet at boring WP-5.

Surficial fine-grained deposits likely represent Pleistocene age catastrophic flood deposits and the deeper sands and gravels likely represent coarser-grained Pleistocene age deposits described in Section 2.2.

Groundwater was not encountered during this investigation to the total depth of each boring. Field soil borehole logs are provided in Appendix A.

4.1.1 Soil Analytical Results

Total Petroleum Hydrocarbons and BTEX

The results of TPHgx, TPHdx and BTEX analysis are presented in Table 1. A complete copy of the laboratory results, including chain-of-custody documentation and quality assurance/quality control (QA/QC) data, is provided in Appendix D.

TPHgx and TPHdx were not detected over the laboratory reporting limits in any of the soil samples analyzed. Similarly, benzene and ethylbenzene were not detected in any of the soil samples analyzed. A toluene concentration of 0.5 milligrams per kilogram (mg/kg) was detected in a soil sample collected from soil boring WP-5 at 45 feet bgs. A xylenes concentration of 0.4 mg/kg was detected in a soil sample collected from soil boring WP-5 at 15 feet bgs.

Total petroleum hydrocarbons in excess of carbon range C_{24} were detected at 200 mg/kg, above the laboratory method detection limit of 100 mg/kg, in soil samples collected from 5 feet and 40 feet bgs, respectively, at soil borings WP-5 and WP-6.

Metals

The results of metals analysis are presented in Table 2. A complete copy of the laboratory results, including chain-of-custody documentation and quality assurance/quality control (QA/QC) data, is provided in Appendix D.

Total chromium and lead concentrations of 10 and 7.7 mg/kg were detected in the composite soil sample collected to classify generated waste for disposal. These concentrations appear to be representative of natural background concentrations. Total cadmium was not detected above a detection limit of 0.38 mg/kg.

4.1.2 Quality Assurance/Quality Control Results

During drilling activities, one trip blank and one equipment blank quality assurance/quality control (QA/QC) sample were collected for each of the two sampling days and submitted to Coffey for TPHgx analysis. TPH was not detected above the specified laboratory reporting limit (Table 2). A desktop review of the official laboratory report was conducted by WorleyParsons Komex in order to assure that reported laboratory matrix spikes and surrogate recovery concentrations were all within acceptable limits. QA/QC checks, blank samples, and surrogate recoveries were found to be within prescribed acceptable criteria.

5. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are reached based on the results of this assessment:

- The predominant lithology encountered during the Site assessment was medium to coarse gravelly sand and sandy gravel below an approximate 3 to 5 foot thickness of surficial sandy/gravelly clay. The lithology generally became increasing sandy towards the maximum depth drilled of 61.5 feet at soil boring WP-5.
- Groundwater was not encountered at any of the boring locations to a depth of 61.5 feet bgs.
- TPHgx and TPHdx were not detected over the laboratory reporting limits in any of the soil samples analyzed. Similarly, benzene and ethylbenzene were not detected in any of the soil samples analyzed. A toluene concentration of 0.5 mg/kg was detected in a soil sample collected from soil boring WP-5 at 45 feet bgs. A xylenes concentration of 0.4 mg/kg was detected in a soil sample collected from soil boring WP-5 at 15 feet bgs. Soil boring WP-5 is located in the former UST area immediately east of the former "zones of remaining contamination" identified by Hart Crowser in 1990.
- Total petroleum hydrocarbons in excess of carbon range C_{24} were detected in soil samples collected from soil borings WP-5 and WP-6 at 200 mg/kg. Based on a review of chromatograms performed by the laboratory, these heavy-end hydrocarbons are likely related to weathered hydrocarbons and possible minor motor oil contamination.
- Based on the results of soil sample analysis conducted at WP-6, it appears petroleum hydrocarbon soil contamination previously identified in the area of the two former 4,000-gallon USTs has either been remediated by corrective action performed by Hart Crowser in 1990 or has degraded naturally over the last 18 years to concentrations well below the previously calculated site clean-up goal of 80 ppm for gasoline range hydrocarbons and 500 ppm for diesel and heavier range hydrocarbons. It is likely that other areas of remaining soil contamination previously identified at the site have similarly been effectively remediated or have degraded.
- Based on the fate and transport properties of remaining contamination it is considered unlikely that such isolated and low level contamination would migrate to groundwater as a result of future on-Site rainwater infiltration.
- Total cadmium, chromium and lead appear to be at natural background concentrations.

6. CLOSURE/LIMITATIONS

This document has been prepared for the exclusive use of the City of Portland as it pertains to the Additional Environmental Site Assessment conducted at 5940 N. Albina Avenue, Portland Oregon 97217. The environmental consulting services described herein were performed using that degree of care and skill ordinarily exercised under similar circumstances by reputable qualified environmental consultants practicing at this or similar locations. No other warranty, either expressed or implied, is made as to the professional advice included in this report. These services will be performed consistent with our agreement with our client.

Opinions and recommendations contained in this report are intended only for the client, purposes, locations, time frames, and project parameters indicated. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

If you have any questions regarding this report, please contact the undersigned at (360) 456-4329.

Respectfully submitted,

WorleyParsons Komex

James R. Farrow, R.G
Project Manager and Senior Hydrogeologist

Mark Trudell, Ph.D., R.G.
Senior Hydrogeologist

7. REFERENCES

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Tables

CITY OF PORTLAND
ADDITIONAL SITE ASSESSMENT REPORT
5940 N. ALBINA AVENUE, PORTLAND, OR 97217

Figures

APPENDIX A: BORING LOGS

APPENDIX B: STATE OF OREGON DWR GEOTECHNICAL BORE HOLE REPORTS

APPENDIX C: NON-HAZARDOUS WASTE MANIFEST

APPENDIX D: LABORATORY ANALYTICAL DATA

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Table 1

Soil Sample Analytical Results For Total Petroleum Hydrocarbons and BTEX
5940 N. Albina Avenue

Sample ID	TPH HCID			BTEX			
	Gasoline (C4-C12)	Diesel (C10-C22)	>C24 Hydrocarbons	Benzene	Toluene	Ethylbenzene	Total Xylenes
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
WP1-5	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP1-10	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP1-25	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP1-40	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP1-50	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP2-5	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP2-15	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP2-25	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP2-40	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP3-5	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP3-10	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP3-25	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP3-45	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP3-50	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP4-5	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP4-10	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP4-25	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP4-40	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP4-50	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP5-5	<5.0	<25	**200**	<0.25	<0.25	<0.25	<0.25
WP5-15	<5.0	<25	<100	<0.25	<0.25	<0.25	**0.4**
WP5-30	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP5-45	<5.0	<25	<100	<0.25	**0.5**	<0.25	<0.25
WP5-60	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP6-15	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP6-25	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP6-35	<5.0	<25	<100	<0.25	<0.25	<0.25	<0.25
WP6-40	<5.0	<25	**200**	<0.25	<0.25	<0.25	<0.25
EB-1*	<0.25*	--	--	--	--	--	--
EB-2*	<0.25*	--	--	--	--	--	--
TB-1*	<0.25*	--	--	--	--	--	--
TB-2*	<0.25*	--	--	--	--	--	--

Notes:

1) TPH HCID = total petroleum hydrocarbons with hydrocarbon identification.

2) mg/kg = milligrams per kilograms

3) <5.0 = non detected above the laboratory method detection limit.

4) BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes

5) -- = not analyzed

6) * = QA/QC water sample measured in ug/L (micrograms per liter)

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Table 2

Soil Sample Analytical Results For Metals Including Waste Disposal Criteria
5940 N. Albina Avenue

Analyte	Units	Sample ID	TTLC Regulatory Levels (Non-RCRA)	TCLP Regulatory Levels (RCRA)	20 Times TCLP Regulatory Levels
		COMP			
			-	-	-
Cadmium	mg/L	No Analysis	-	1	20
Total Chromium	mg/L	No Analysis	-	5	100
Lead	mg/L	No Analysis	-	5	100
Cadmium	mg/kg	<0.38	100	-	-
Total Chromium	mg/kg	**10**	2500	-	-
Lead	mg/kg	**7.7**	1000	-	-

Notes:

1) mg/kg = milligrams per kilogram.

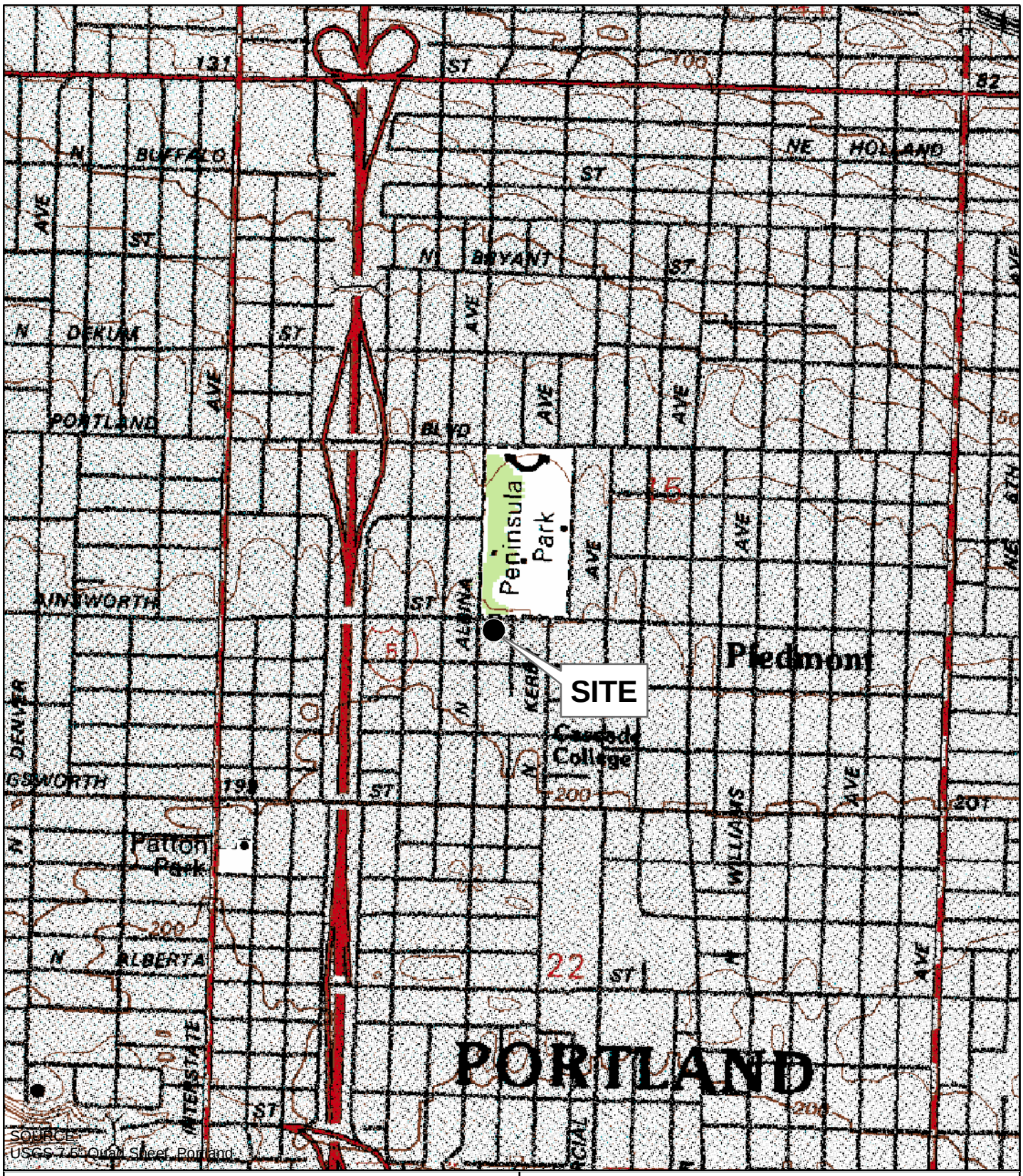
2) mg/L = milligrams per liter

3) TCLP = threshold characteristic leaching procedure. The TCLP represents the leachable concentration of a constituent that may be present before a waste is classified as a RCRA hazardous waste.

4) TTLC = Total Threshold Limit Concentration.
The TTLC represents the total concentration of a constituent that may be present before a waste is classified as hazardous.

5) <0.38 = non detected above laboratory method reporting limit.

6) RCRA = Resource Conservation and Recovery Act.



CITY OF PORTLAND, OR
5940 N. ALBINA AVE.

WorleyParsons Komex
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0 1,000
Feet

SITE VICINITY MAP

SWL	JF	9/2008
6BESC10		1

CITY OF PORTLAND, OR
5940 N. ALBINA AVE.

WorleyParsons Komex
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N
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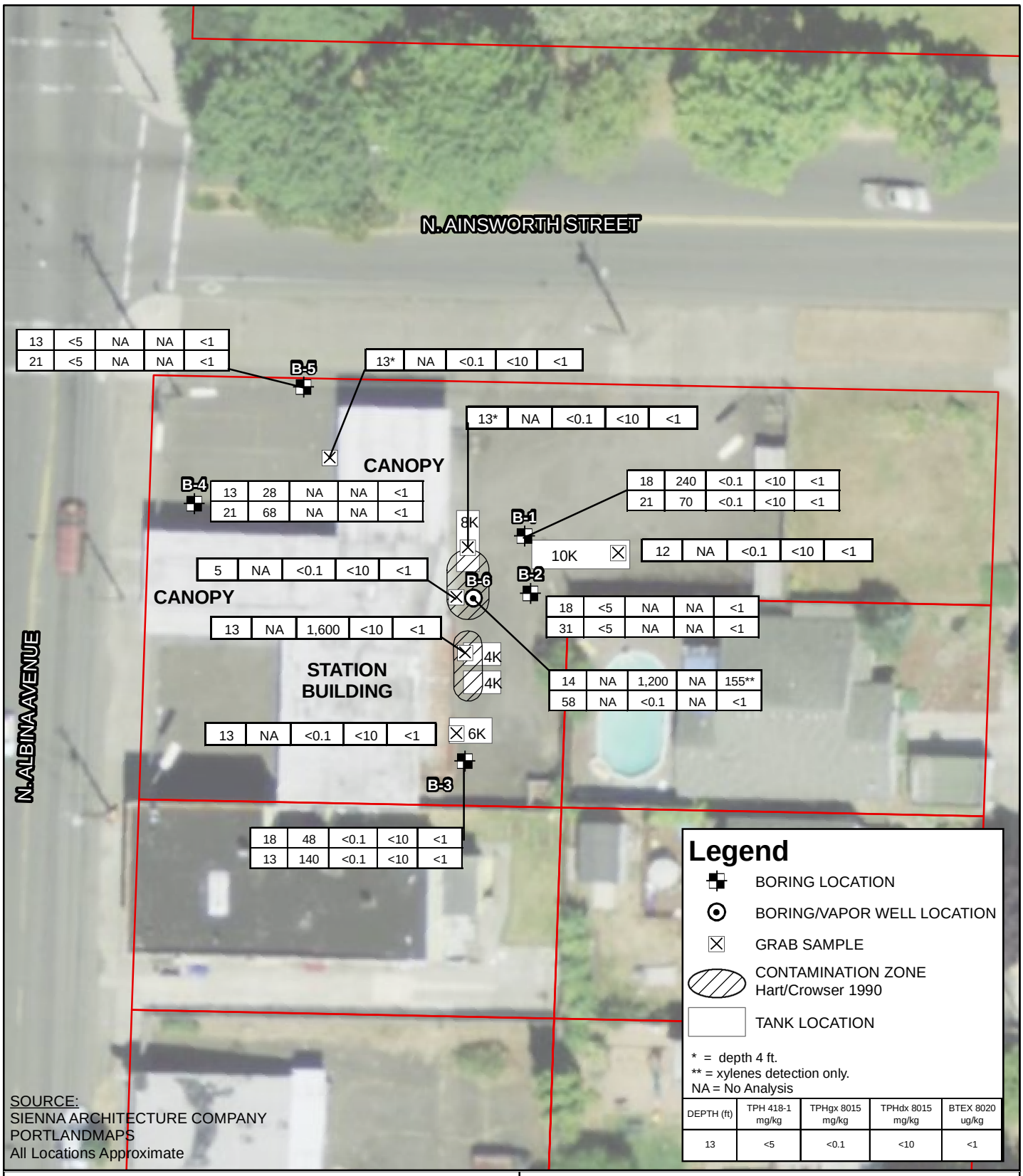
0 40
Feet

SITE MAP

SWL	JF	9/2008
6BESC10	**2**	



CITY OF PORTLAND, OR
5940 N. ALBINA AVE.

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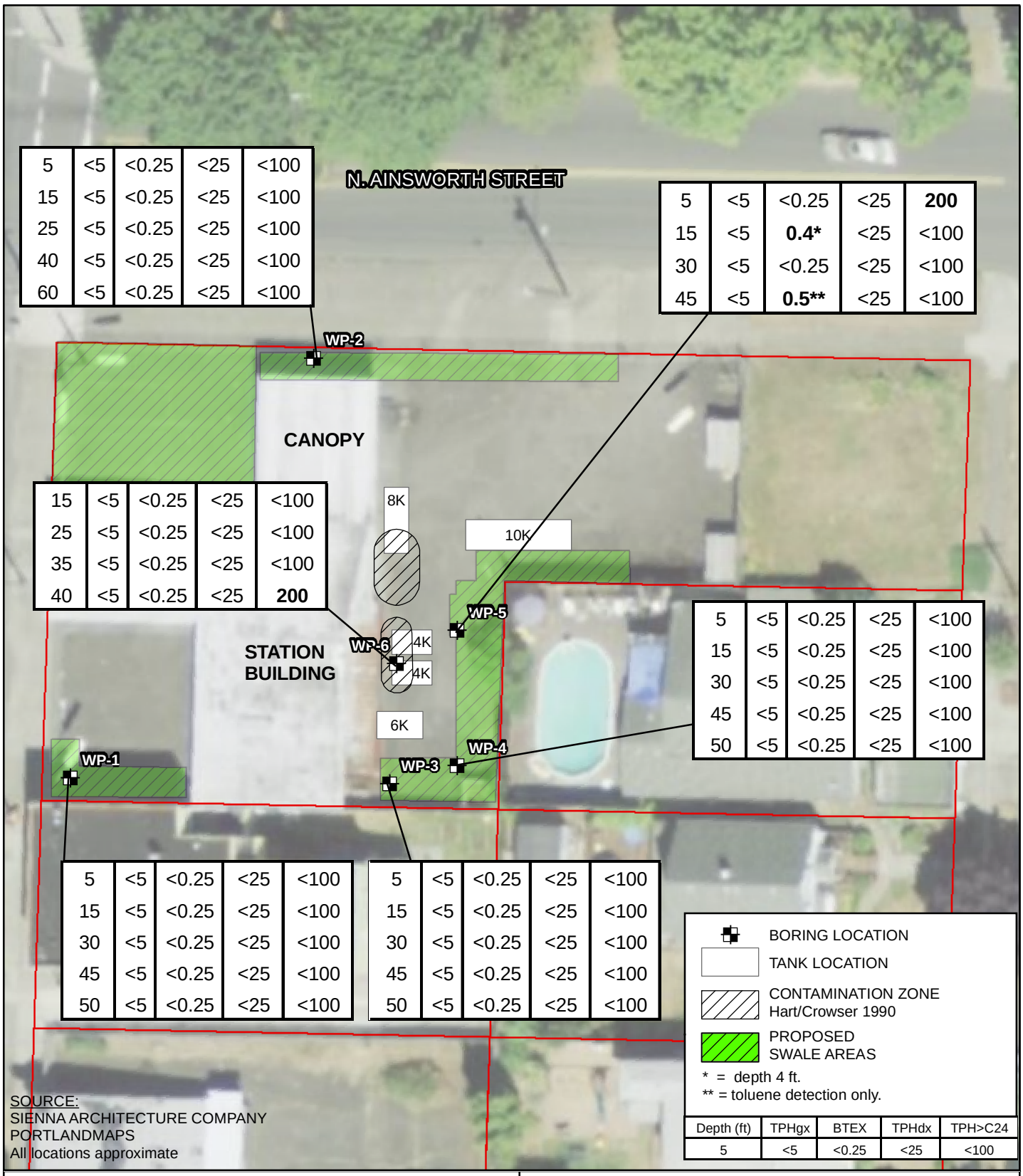
Feet

SITE PLAN - HISTORICAL SOIL SAMPLING RESULTS

SWL	JF	10/2008
6BESC10	3	



SOURCE:
SIENNA ARCHITECTURE COMPANY
PORTLANDMAPS
All locations approximate

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5940 N. ALBINA AVE.

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N W E S
0 30
Feet

SITE PLAN - INVESTIGATION RESULTS

SWL	JF	10/2008
6BESC10	4	

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Borehole # WP-1

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.15.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 51.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm)	Remarks
0	Ground Surface							
0	***Asphalt***							
1	***Clay*** Medium brown, plastic, moist.	CL						Hand Augered to 5 feet No Odor
2								
3	***Sandy Gravel*** Medium brown, with clay.	GW						
4								
5				9			1	
			WP 1-5	10				No Odor
				26				
6								
7								
8								
9	***Sandy Gravel*** Medium brown, clay.							
				12			1.4	
10			WP 1-10	12				No Odor
				13				
11		SW						
12								
13								
14	***Sandy Gravel*** Medium brown, locally clayey, moist.							
				18			0.0	
15		GW	WP 1-15	28				No Odor
				30				
16								
17								
18								
19	Medium brown, brown gray							
				24			0.0	
20			WP 1-20	30				No Odor
				30				
21								

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Borehole # WP-1

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.15.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 51.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1–1000	Remarks
22–29		Gray brown, moist-damp.	GW	WP 1-25	9 / 18 / 24			0.0	No Odor
30		***Sand*** Dark brown gray, medium grained, moist-damp.	SP	WP 1-30	12 / 20 / 15			0.0	No Odor
35				WP 1-35	17 / 18 / 30			0.1	No Odor
38–39		Locally clayey	SP						
40				WP 1-40	11 / 22 / 18			0.5	No Odor

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Borehole # WP-1

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.15.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 51.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1 – 1000	Remarks
43									
44		***Sand*** Gray/brown, fine sand, moist	SP						
					28			0.0	
45				WP 1-45	50				No Odor
46									
47									
48									
49									
					28			0.0	
50				WP 1-50					No Odor
51			SP						
52		End of Borehole							
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									

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Borehole # WP-2

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Direct Push
Hole Diameter: 2"
Drill Date: 9.16.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 40
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1 – 1000	Remarks
0		Ground Surface							
0		***Concrete***							
1		***Clay*** Medium brown, gravelly, moist.	CL		N/A				
3		***Sandy Gravel*** Dark brown, moist.	GW					0.0	No Odor
5				WP 2-5	N/A				
10			GW					0.0	No Odor
12				WP 2-10	N/A				
15			GW					0.0	No Odor
17				WP 2-15	N/A				
20			GW					0.0	No Odor
21									

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Borehole # WP-2

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Direct Push
Hole Diameter: 2"
Drill Date: 9.16.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 40
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1 – 1000	Remarks
22				WP 2-20	N/A				
23									
24									
25			GW					0.0	No Odor
26				WP 2-25	N/A				
27									
28									
29									
30		Medium brown/gray, moist	GW					0.0	No Odor
31									
32				WP 2-30	N/A				
33									
34									
35			GW					0.0	No Odor
36									
37		***Gravely Sand*** Brown/gray		WP 2-35	N/A				
38									
39			SW						
40		End of Borehole		WP 2-40	N/A			0.0	No Odor
41									
42									

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Borehole # WP-3

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.15.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 51.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Description	USCS Soil Classification	Sample Number	Blow Counts	PID (ppm)	Remarks
0	Ground Surface					
	Asphalt					
1	***Clay*** Dark brown/gray sandy clay	CL				Hand Augered to 5 feet
2	Light brown clay, locally sandy.					
3					0.0	
4						
				8		
5	***Sandy Gravel*** Medium brown gray	GW	WP 3-5	12	0.0	No Odor
				15		
6						
7						
8						
9						
				26		
10		GW	WP 3-10	30	0.2	No Odor
				25		
11						
12						
13						
14	Slightly clayey, moist-wet.					
				12		
15		GW	WP 3-15	15	0.0	No Odor
				22		
16						
17						
18	***Gravelly Sand*** Medium brown gray with clay, moist.					
19						
				21		
20		SW	WP 3-20	27	0.0	No Odor
				28		
21						

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Borehole # WP-3

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.15.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 51.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1–1000	Remarks
22–24									
25			SW	WP 3-25	21 / 30 / 37			0.3	No Odor
26–29		Dark brown/gray fine- to medium-grained sand, moist.							
30			SW	WP 3-30	20 / 22 / 25			0.0	No Odor
31–34									
35			SW	WP 3-35	13 / 13 / 17			0.1	No Odor
36–39									
40				WP 3-40	13 / 23 / 35			0.0	No Odor
41–42									

WorleyParsons Komex
resources & energy

Borehole # WP-3

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.15.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 51.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm)	Remarks
43		***Sand*** Gray brown, fine grained sand, moist.							
44									
45		fine- to medium-grain sand	SP	WP 3-45	25 35 27			1.4	No Odor
46									
47									
48									
49									
50				WP 3-50	15 17 20			0.0	No Odor
51			SP						
52		End of Borehole							
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									

PID (ppm) 1 1000

WorleyParsons Komex
resources & energy

Borehole # WP-4

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.15.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 51.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1 – 1000	Remarks
0		Ground Surface							
0		***Asphalt***							
1		***Clay*** Medium brown clay, plastic.	CL						Hand Augered to 5 feet No Odor
2									
3		***Sandy Gravel*** Medium brown gray							
4									
5			GW	WP 4-5	10 / 10 / 10			0.0	No Odor
6									
7									
8									
9									
10			GW	WP 4-10	11 / 15 / 19			0.0	No Odor
11									
12									
13									
14									
15			GW	WP 4-15	22 / 22 / 22			0.0	No Odor
16									
17									
18		***Gravelly Sand*** Medium brown, moist.							
19									
20			SW	WP 4-20	20 / 50			0.0	No Odor
21									

WorleyParsons Komex
resources & energy

Borehole # WP-4

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.15.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 51.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1–1000	Remarks
22									
23									
24									
25			SW	WP 4-25	20 50			0.9	No Odor
26									
27									
28									
29		Dark brown/gray medium-grained sand,			25			0.0	
30			SW	WP 4-30	25				No Odor
31					25				
32									
33									
34		With gravel.			25			0.0	
35			SW	WP 4-35	27				No Odor
36					15				
37									
38									
39		No gravel			18			0.0	
40			SW	WP 4-40	18				No Odor
41					20				
42									

WorleyParsons Komex
resources & energy

Borehole # WP-4

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.15.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 51.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm)	Remarks
43		Dark brown/gray sand, medium grained, moist.						1 – 1000	
44					14			0.0	
45			SW	WP 4-45	30				No Odor
					45				
46									
47									
48									
49									
					17			0.0	
50			SW	WP 4-50	30				No Odor
					50				
51									
52		End of Borehole							
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									

WorleyParsons Komex
resources & energy

Borehole # WP-5

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.16.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 61.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1–1000	Remarks
0		Ground Surface							
0		***Asphalt***							
1		***Gravelly Sand*** Dark gray black, moist, no odor, possible fill.	SW						Hand Augered to 5 feet. No Odor
2									
3									
4									
5		Medium brown/gray.	SW	WP 5-5	7 10 10			0.0	No Odor
6									
7									
8									
9									
10		Locally clayey.	SW	WP 5-10	2 3 7			0.0	No Odor
11									
12									
13									
14									
15			SW	WP 5-15	26 27 22			0.0	No Odor
16									
17									
18									
19		***Sandy Gravel and Gravelly Sand*** Medium brown/gray sandy gravel and gravelly sand, moist.							
20			SW/GW	WP 5-20	21 30 30			0.0	No Odor
21									

WorleyParsons Komex
resources & energy

Borehole # WP-5

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.16.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 61.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1 – 1000	Remarks
22									
23									
24		***Sandy Gravel*** Medium brown/gray, moist.							
					22			0.1	
25			GW	WP 5-25	28				No Odor
					35				
26									
27									
28									
29									
					15			0.8	
30			SW	WP 5-30	15				No Odor
					15				
31									
32									
33									
34									
					30			0.6	
35			SW	WP 5-35	52				No Odor
36									
37									
38		***Sand*** Medium brown/gray, uniform (medium) grain size, moist.							
39									
					22			0.3	
40			SP	WP 5-40	32				No Odor
					38				
41									
42									

WorleyParsons Komex
resources & energy

Borehole # WP-5

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Hollow Stem Auger
Hole Diameter: 8"
Drill Date: 9.16.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 61.5
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1–1000	Remarks
43									
44									
45		Gray brown, fine grained, moist,	SP	WP 5-45	30 32 32			0.3	No Odor
46									
47									
48									
49									
50		Medium to coarse grained	SP	WP 5-50	20 22 17			0.0	No Odor
51									
52									
53									
54									
55			SP	WP 5-55	17 18 21			0.0	No Odor
56									
57									
58									
59		Medium brown/gray, medium- to coarse-grained sand.							
60			SW	WP 5-60	25 25 25			0.0	No Odor
61									
62		End of Borehole							
63									

WorleyParsons Komex
resources & energy

Borehole # WP-6

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Geoprobe
Hole Diameter: 2"
Drill Date: 9.16.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 40
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm)	Remarks
0	Ground Surface							
0	***Asphalt***							
1	***Clay*** Medium brown, moist, no odor.	CL						
2	***Gravely Sand*** Brown/gray, moist.	SP		N/A				
5		GW					0.0	No Odor
7	***Sandy Gravel*** Medium brown/gray, moist.		WP 6-5	N/A				
10		GW					0.0	No Odor
12			WP 6-10	N/A				
14	Medium brown/gray, moist.							
15		GW					0.0	No Odor
17			WP 6-15	N/A				
20		GW					0.0	No Odor
21								

WorleyParsons Komex
resources & energy

Borehole # WP-6

PROJECT # 590205

Project Name: BES-Albina
Client: BES-Albina
Location: 5940 Albina Avenue
Drilled by: Cascade
Drilling Method: Geoprobe
Hole Diameter: 2"
Drill Date: 9.16.2008
Compiled by: JF

Sampling Method: Drive
Latitude:
Longitude:
Borehole Depth: 40
Well Depth: N/A
TOC Elevation: N/A

SUBSURFACE PROFILE

Depth (ft)	Graphic Log	Description	USCS Soil Classification	Sample Number	Blow Counts	Recovery	Sample Type	PID (ppm) 1 – 1000	Remarks
22				WP 6-20	N/A				
23									
24									
25			GW					0.0	No Odor
26									
27				WP 6-25	N/A				
28									
29									
30		Medium brown/gray, coarse sand, locally fine sand interbeds, moist.	SW					0.0	No Odor
31									
32				WP 6-30	N/A				
33									
34		Locally clayey.							
35			SW					0.4	No Odor
36									
37				WP 6-35	N/A				
38									
39									
40		End of Borehole	SW	WP 6-40	N/A			0.0	No Odor
41									
42									

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

MULT 96357

09-30-2008

(1) OWNER/PROJECT

Hole Number SB-1

First Name _____ Last Name _____

Company Portland Alumnae Chapter Delta Sigma

Address PO Box 4265

City Portland State OR Zip 97208

(2) TYPE OF WORK

☐ New ☐ Deepening ☒ Abandonment ☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☒ Hollow stem auger
☐ Rotary Mud ☐ Cable ☐ Push Probe
☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanet
○ Uncased Permanent ○ Slope Stablity
○ Other
Other: _____

(5) USE OF HOLE

Soil Samples

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 50.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
4.25	0	50	Bentonite Grout	0	4	4	S
			Bentonite Chips	4	10	6	S
			Concrete	10	50	8	S

Backfill placed from 50 ft. to 4 ft. Material Bentonite

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County Multnomah Twp 1.00 N N/S Range 1.00 E E/W WM

Sec 15 NE 1/4 of the SE 1/4 Tax Lot 2300

Tax Map Number _____ Lot _____

Lat ° ' " or _____ DMS or DD

Long ° ' " or _____ DMS or DD

◉ Street address of hole ○ Nearest address

5940 Albina Ave. Portland OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐

WATER BEARING ZONES

Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Fill Material	0	3
Sandy Silt and Gravels	3	50

Date Started 09-16-2008 Completed 09-16-2008

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Grout	50	10	8	S
Bentonite Chips	10	4	6	S
Concrete	4	0	4	S

Date Started 09-16-2008 Completed 09-16-2008

Professional Certification

(to be signed by an Oregon licensed water or monitoring well constructor, or Oregon registered geologist or civil engineer).

I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 10578 Date _____

Electronically Submitted

First Name Jeff Last Name Townsend

Affiliation Cascade Drilling, Inc

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.37

(6) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(7) CASING/SCREENS

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

(8) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

Comments/Remarks

The Hole was dry, no water found.

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) SUBSURFACE LOG

Material	From	To

(12) ABANDONMENT LOG

Material	From	To	Amt	sacks/ lbs

Map of Hole

Cascade Project No. P08324

Oregon Water Resources Department (OWRD) requires completion of a Geotechnical Hole Report if any of the following apply:

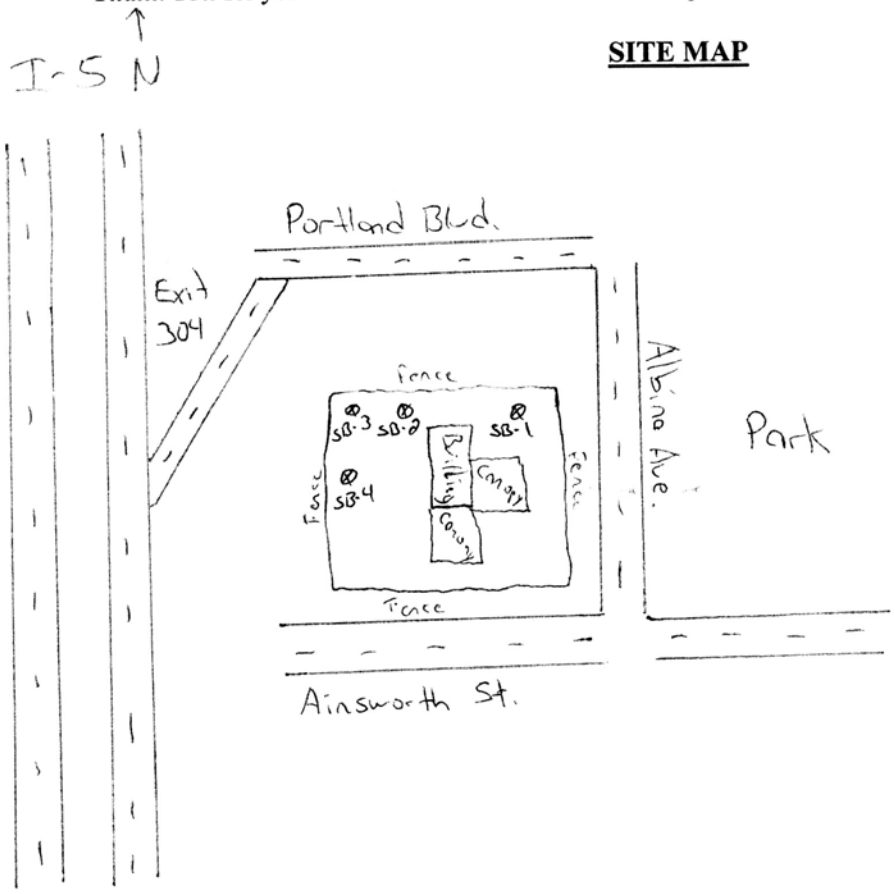
- Geotechnical hole is greater than 18 feet deep;
- Within 50 feet of a water supply or monitoring well;
- Used to make a determination of water quality;
- Constructed in an area of known or reasonably suspected contamination.

In order to comply with OWRD requirements, please provide a Site Map:

Map shall include an approximate scale of north arrow. Upon completion of well activities, a site map with each well location identified must be filed with each Geotechnical Hole Report (OR 690-240-035).

Thank You for your information and assistance on compliance with Oregon Administrative Rules.

SITE MAP



Site Address: 5940 ALBINA AVE – PORTLAND, OR

Client: WORLEY PARSONS

Date: _____

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

MULT 96361

09-30-2008

(1) OWNER/PROJECT

Hole Number GP 1

First Name _____ Last Name _____

Company Portland Alumnae Chapter Delta Sigma

Address PO Box 4265

City Portland State OR Zip 97208

(2) TYPE OF WORK

☐ New ☐ Deepening ☒ Abandonment ☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☐ Hollow stem auger
☐ Rotary Mud ☐ Cable ☒ Push Probe
☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanet
○ Uncased Permanent ○ Slope Stablity
○ Other

Other: _____

(5) USE OF HOLE

Soil Sample

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 40.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
2	0	40	Concrete	0	1	50	P
			Bentonite	2	40	100	P

Backfill placed from 0 ft. to 40 ft. Material Bentonite

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County Multnomah Twp 1.00 N N/S Range 1.00 E E/W WM

Sec 15 NE 1/4 of the SE 1/4 Tax Lot 2300

Tax Map Number _____ Lot _____

Lat ° ' " or _____ DMS or DD

Long ° ' " or _____ DMS or DD

◉ Street address of hole ○ Nearest address

5940 Albina Ave Portland OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐

WATER BEARING ZONES

Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Concrete	0	1
Course Sand	1	40

Date Started 09-16-2008 Completed 09-16-2008

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Concrete	0	2	50	P
Bentonite	2	40	100	P

Date Started 09-16-2008 Completed 09-16-2008

Professional Certification (to be signed by an Oregon licensed water or monitoring well constructor, or Oregon registered geologist or civil engineer).

I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 10586 Date _____

Electronically Submitted

First Name Jeff Last Name Townsend

Affiliation Cascade Drilling, Inc

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.37

(6) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(7) CASING/SCREENS

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

(8) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

Comments/Remarks

Hole was dry, no water of found.

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

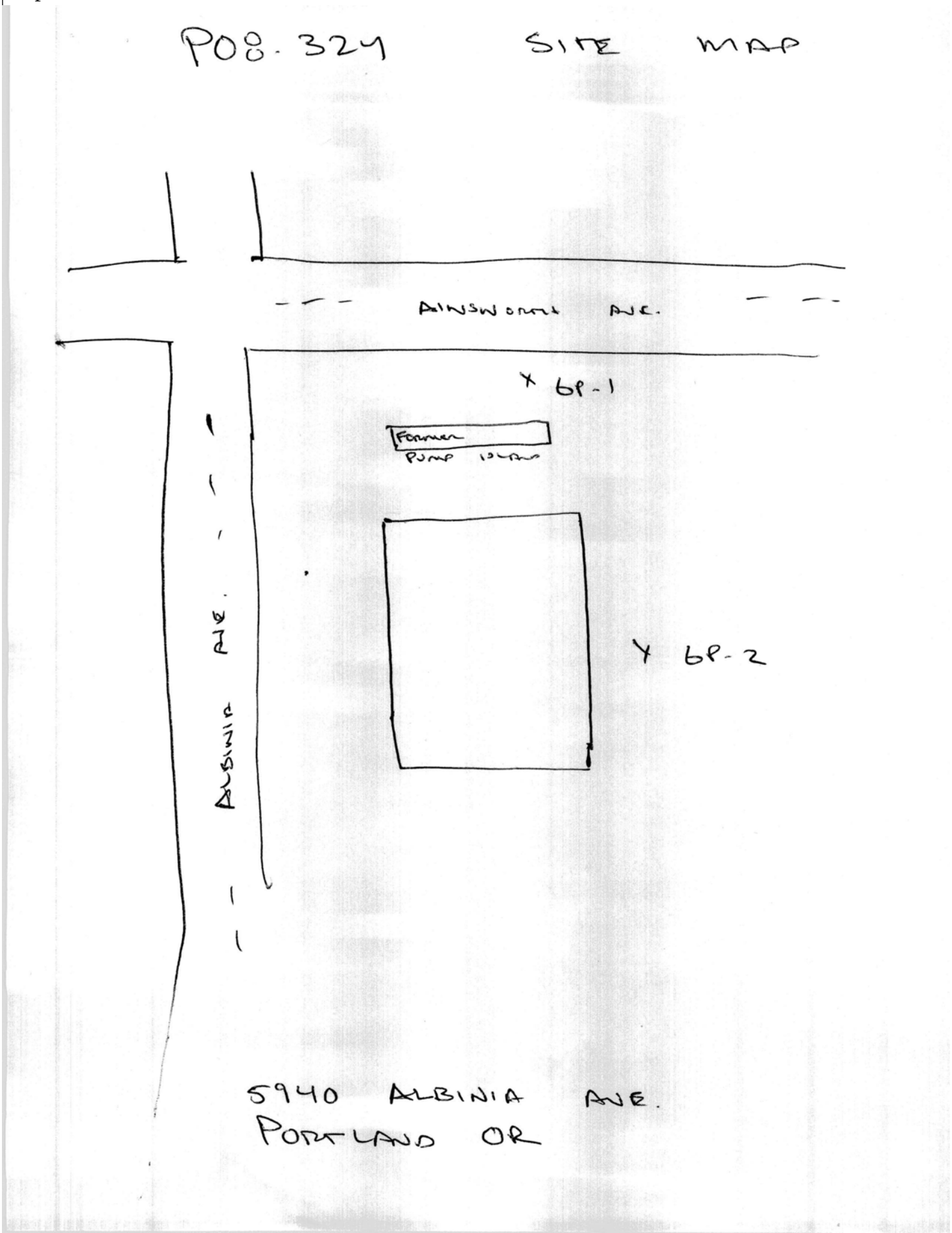
(11) SUBSURFACE LOG

Material	From	To

(12) ABANDONMENT LOG

Material	From	To	Amt	sacks/ lbs

Map of Hole


POS. 324
SITE MAP
AINSWORTH AVE.
X GP-1
Former
PUMP ISLAND
ALBINIA AVE.
X GP-2
5940 ALBINIA AVE.
PORTLAND OR

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

MULT 96362

09-30-2008

(1) OWNER/PROJECT

Hole Number GP 2

First Name _____ Last Name _____

Company Portland Alumnae Chapter Delta Sigma

Address PO Box 4265

City Portland State OR Zip 97208

(2) TYPE OF WORK

☐ New ☐ Deepening ☒ Abandonment ☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☒ Hollow stem auger
☐ Rotary Mud ☐ Cable ☐ Push Probe
☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanet
○ Uncased Permanent ○ Slope Stablity
○ Other

Other: _____

(5) USE OF HOLE

Soil Samples

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 40.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
2	0	40	Concrete	0	2	50	P
			Bentonite	2	40	100	P

Backfill placed from _____ ft. to _____ ft. Material _____

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County Multnomah Twp 1.00 N N/S Range 1.00 E E/W WM

Sec 15 NE 1/4 of the SE 1/4 Tax Lot 2300

Tax Map Number _____ Lot _____

Lat ° ' " or .00000000 DMS or DD

Long ° ' " or _____ DMS or DD

◉ Street address of hole ○ Nearest address

5940 Albina Ave Portland OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐

WATER BEARING ZONES

Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Concrete	0	1
Coarse Sand	1	40

Date Started 09-16-2008 Completed 09-16-2008

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Concrete	0	2	50	P
Bentonite	2	40	100	P

Date Started 09-16-2008 Completed 09-16-2008

Professional Certification (to be signed by an Oregon licensed water or monitoring well constructor, or Oregon registered geologist or civil engineer).

I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 10586 Date _____

Electronically Submitted

First Name Tyler Last Name Day

Affiliation Cascade Drilling, Inc

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.37

(6) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(7) CASING/SCREENS

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

(8) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

Comments/Remarks

Hole was dry, no water found.

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

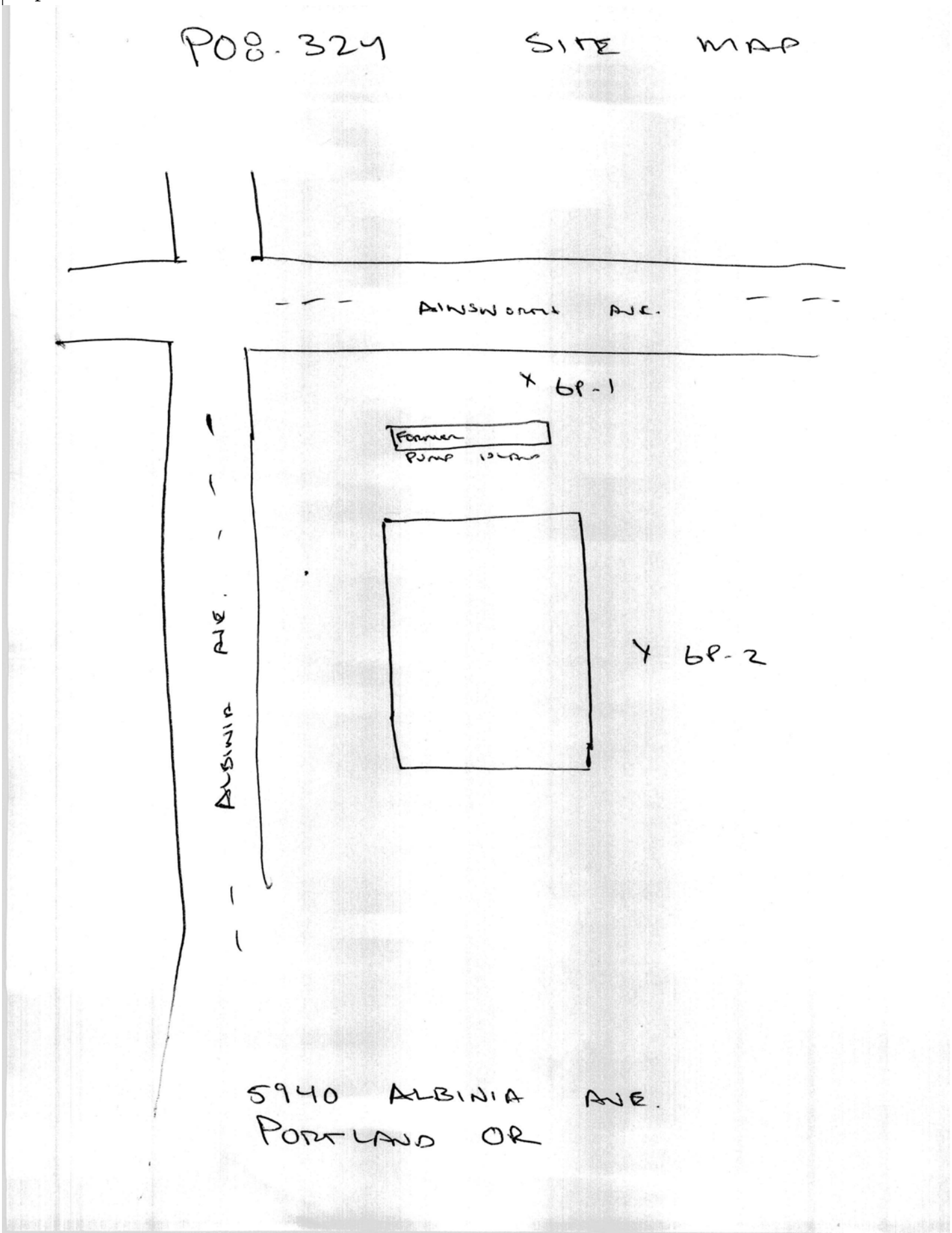
(11) SUBSURFACE LOG

Material	From	To

(12) ABANDONMENT LOG

Material	From	To	Amt	sacks/ lbs

Map of Hole


POS. 324
SITE MAP
AINSWORTH AVE.
X GP-1
Former
PUMP ISLAND
ALBINIA AVE.
X GP-2
5940 ALBINIA AVE.
PORTLAND OR

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

MULT 96358

09-30-2008

(1) OWNER/PROJECT

Hole Number SB-2

First Name _____ Last Name _____

Company Portland Alumnae Chapter Delta Sigma

Address PO Box 4265

City Portland State OR Zip 97208

(2) TYPE OF WORK

☐ New ☐ Deepening ☒ Abandonment ☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☒ Hollow stem auger
☐ Rotary Mud ☐ Cable ☐ Push Probe
☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanet
○ Uncased Permanent ○ Slope Stablity
○ Other

Other: _____

(5) USE OF HOLE

Soil Samples

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 60.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
4.25	0	60	Concrete	0	4	4	S
			Bentonite Chips	4	10	6	S
			Bentonite Grout	10	60	8	S

Backfill placed from 60 ft. to 4 ft. Material Bentonite

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County Multnomah Twp 1.00 N N/S Range 1.00 E E/W WM

Sec 15 NE 1/4 of the SE 1/4 Tax Lot 2300

Tax Map Number _____ Lot _____

Lat ° ' " or _____ DMS or DD

Long ° ' " or _____ DMS or DD

◉ Street address of hole ○ Nearest address

5940 Albina Ave. Portland OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐

WATER BEARING ZONES

Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Fill Material	0	3
Sandy Silt and Gravels	3	60

Date Started 09-16-2008 Completed 09-16-2008

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Grout	60	10	8	S
Bentonite Chips	10	4	6	S
Concrete	4	0	4	S

Date Started 09-16-2008 Completed 09-16-2008

Professional Certification

(to be signed by an Oregon licensed water or monitoring well constructor, or Oregon registered geologist or civil engineer).

I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 10525 Date _____

Electronically Submitted

First Name Jeff Last Name Townsend

Affiliation Cascade Drilling, Inc

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.37

(6) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(7) CASING/SCREENS

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

(8) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

Comments/Remarks

Hole was dry, no water found.

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) SUBSURFACE LOG

Material	From	To

(12) ABANDONMENT LOG

Material	From	To	Amt	sacks/ lbs

Map of Hole

Cascade Project No. P08324

Oregon Water Resources Department (OWRD) requires completion of a Geotechnical Hole Report if any of the following apply:

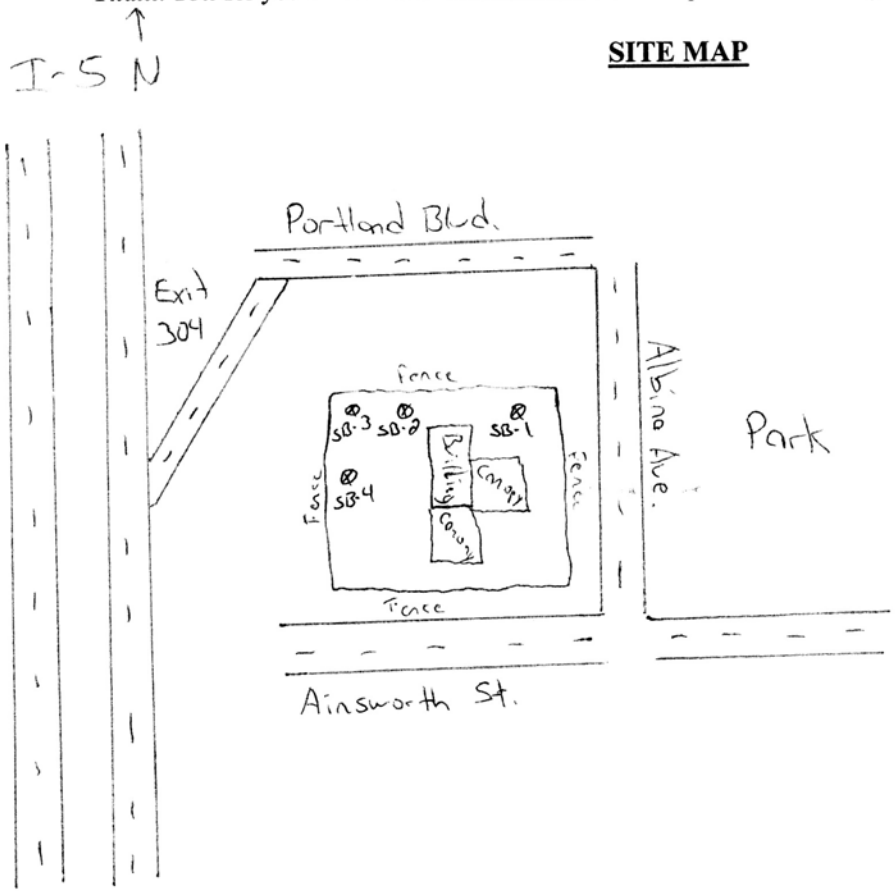
- Geotechnical hole is greater than 18 feet deep;
- Within 50 feet of a water supply or monitoring well;
- Used to make a determination of water quality;
- Constructed in an area of known or reasonably suspected contamination.

In order to comply with OWRD requirements, please provide a Site Map:

Map shall include an approximate scale of north arrow. Upon completion of well activities, a site map with each well location identified must be filed with each Geotechnical Hole Report (OR 690-240-035).

Thank You for your information and assistance on compliance with Oregon Administrative Rules.

SITE MAP



Site Address: 5940 ALBINA AVE – PORTLAND, OR

Client: WORLEY PARSONS

Date:

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

MULT 96359

09-30-2008

(1) OWNER/PROJECT

Hole Number SB-3

First Name _____ Last Name _____

Company Portland Alumnae Chapter Delta Sigma

Address PO Box 4265

City Portland State OR Zip 97208

(2) TYPE OF WORK

☐ New ☐ Deepening ☒ Abandonment ☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☒ Hollow stem auger
☐ Rotary Mud ☐ Cable ☐ Push Probe
☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanet
○ Uncased Permanent ○ Slope Stablity
○ Other

Other: _____

(5) USE OF HOLE

Soil Samples

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 50.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
4.25	0	50	Concrete	0	4	4	S
			Bentonite Chips	4	10	6	S
			Bentonite Grout	10	50	6	S

Backfill placed from 50 ft. to 4 ft. Material Bentonite

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County Multnomah Twp 1.00 N N/S Range 1.00 E E/W WM

Sec 15 NE 1/4 of the SE 1/4 Tax Lot 2300

Tax Map Number _____ Lot _____

Lat ° ' " or _____ DMS or DD

Long ° ' " or _____ DMS or DD

◉ Street address of hole ○ Nearest address

5940 Albina Ave. Portland, OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐

WATER BEARING ZONES

Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Fill Material	0	3
Sandy Silt and Gravels	3	50

Date Started 09-15-2008 Completed 09-15-2008

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Grout	50	10	6	S
Bentonite Chips	10	4	6	S
Concrete	4	0	4	S

Date Started 09-16-2008 Completed 09-16-2008

Professional Certification (to be signed by an Oregon licensed water or monitoring well constructor, or Oregon registered geologist or civil engineer).

I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 10525 Date _____

Electronically Submitted

First Name Jeff Last Name Townsend

Affiliation Cascade Drilling, Inc

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.37

(6) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(7) CASING/SCREENS

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

(8) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

Comments/Remarks

Hole was dry, no water found.

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) SUBSURFACE LOG

Material	From	To

(12) ABANDONMENT LOG

Material	From	To	Amt	sacks/ lbs

Map of Hole

Cascade Project No. P08324

Oregon Water Resources Department (OWRD) requires completion of a Geotechnical Hole Report if any of the following apply:

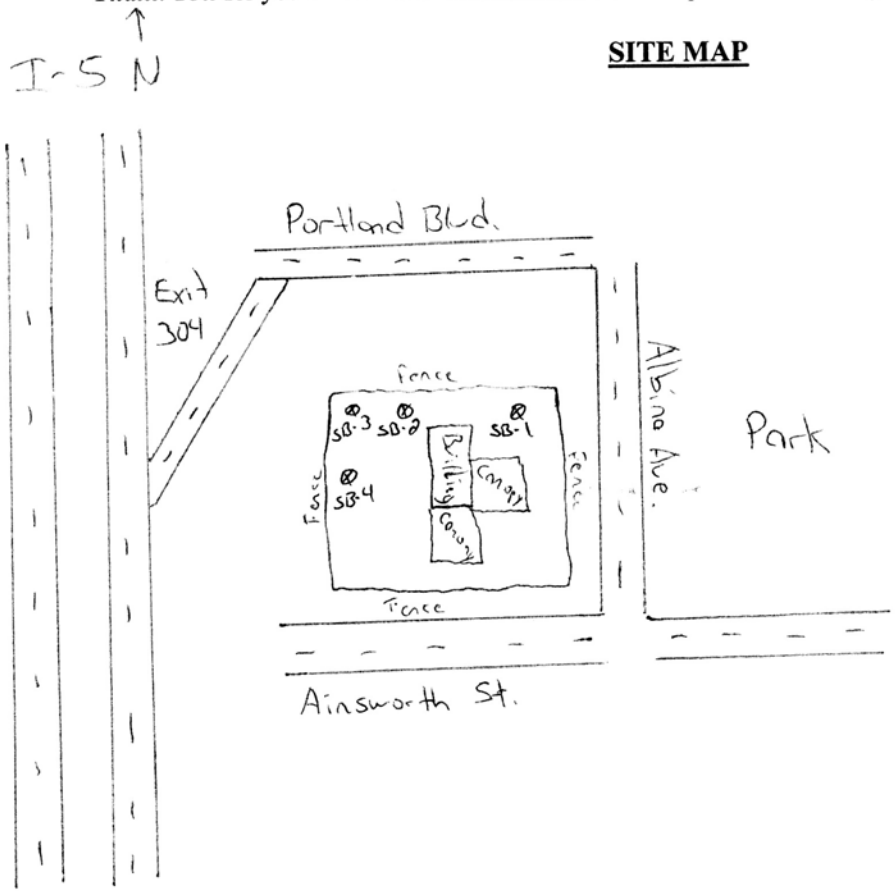
- Geotechnical hole is greater than 18 feet deep;
- Within 50 feet of a water supply or monitoring well;
- Used to make a determination of water quality;
- Constructed in an area of known or reasonably suspected contamination.

In order to comply with OWRD requirements, please provide a Site Map:

Map shall include an approximate scale of north arrow. Upon completion of well activities, a site map with each well location identified must be filed with each Geotechnical Hole Report (OR 690-240-035).

Thank You for your information and assistance on compliance with Oregon Administrative Rules.

SITE MAP



Site Address: 5940 ALBINA AVE – PORTLAND, OR

Client: WORLEY PARSONS

Date: _____

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

MULT 96360

09-30-2008

(1) OWNER/PROJECT

Hole Number SB-4

First Name _____ Last Name _____

Company Portland Alumnae Chapter Delta Sigma

Address PO Box 4265

City Portland State OR Zip 97208

(2) TYPE OF WORK

☐ New ☐ Deepening ☒ Abandonment ☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☒ Hollow stem auger
☐ Rotary Mud ☐ Cable ☐ Push Probe
☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanet
○ Uncased Permanent ○ Slope Stablity
○ Other
Other: _____

(5) USE OF HOLE

Soil Samples

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 50.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
4.25	0	50	Concrete	0	4	4	S
			Bentonite Chips	4	10	6	S
			Bentonite Grout	10	50	6	S

Backfill placed from 4 ft. to 50 ft. Material Bentonite
Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County Multnomah Twp 1.00 N N/S Range 1.00 E E/W WM

Sec 15 NE 1/4 of the SE 1/4 Tax Lot 2300

Tax Map Number _____ Lot _____

Lat ° ' " or _____ DMS or DD

Long ° ' " or _____ DMS or DD

◉ Street address of hole ○ Nearest address

5940 Albiina Ave. Portland, OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐

WATER BEARING ZONES

Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Fill Material	0	3
Sandy Silt and Gravels	3	50

Date Started 09-16-2008 Completed 09-16-2008

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Grout	50	10	6	S
Bentonite Chips	10	4	6	S
Concrete	4	0	4	S

Date Started 09-16-2008 Completed 09-16-2008

Professional Certification

(to be signed by an Oregon licensed water or monitoring well constructor, or Oregon registered geologist or civil engineer).

I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 10525 Date _____

Electronically Submitted

First Name Jeff Last Name Townsend

Affiliation Cascade Drilling, Inc

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.37

(6) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(7) CASING/SCREENS

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

(8) WELL TESTS

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units

Comments/Remarks

Hole was dry, no water was found.

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) SUBSURFACE LOG

Material	From	To

(12) ABANDONMENT LOG

Material	From	To	Amt	sacks/ lbs

Map of Hole

Cascade Project No. P08324

Oregon Water Resources Department (OWRD) requires completion of a Geotechnical Hole Report if any of the following apply:

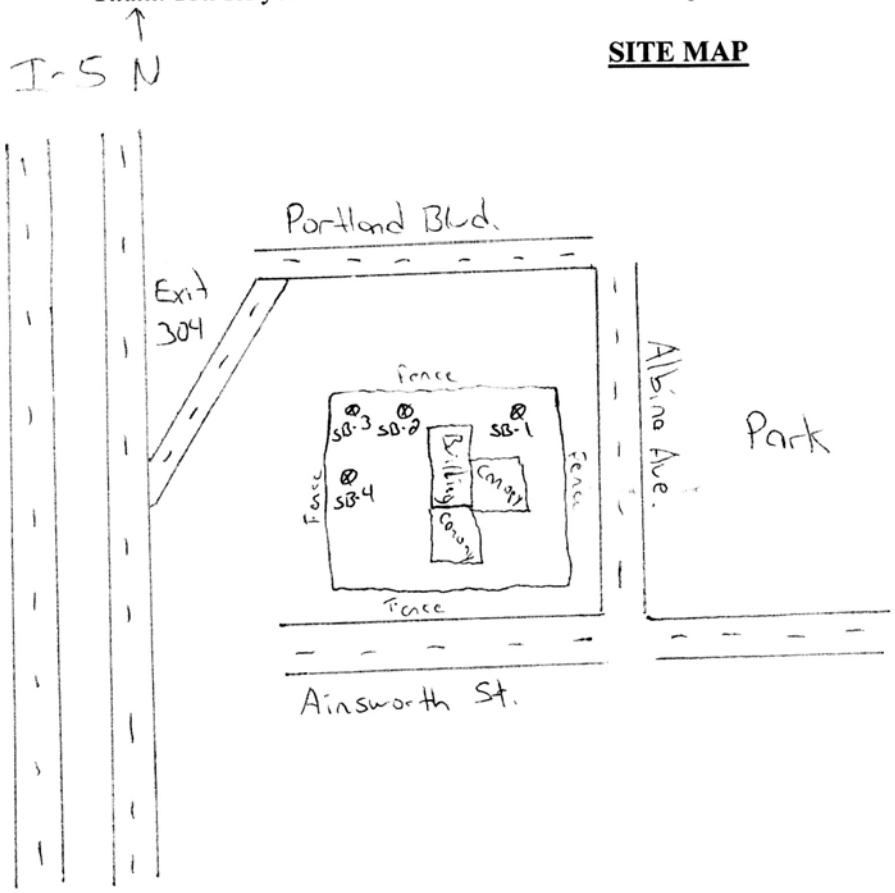
- Geotechnical hole is greater than 18 feet deep;
- Within 50 feet of a water supply or monitoring well;
- Used to make a determination of water quality;
- Constructed in an area of known or reasonably suspected contamination.

In order to comply with OWRD requirements, please provide a Site Map:

Map shall include an approximate scale of north arrow. Upon completion of well activities, a site map with each well location identified must be filed with each Geotechnical Hole Report (OR 690-240-035).

Thank You for your information and assistance on compliance with Oregon Administrative Rules.

SITE MAP



Site Address: 5940 ALBINA AVE – PORTLAND, OR

Client: WORLEY PARSONS

Date: _____

Cascade Project No. P08324

Oregon Water Resources Department (OWRD) requires completion of a Geotechnical Hole Report if any of the following apply:

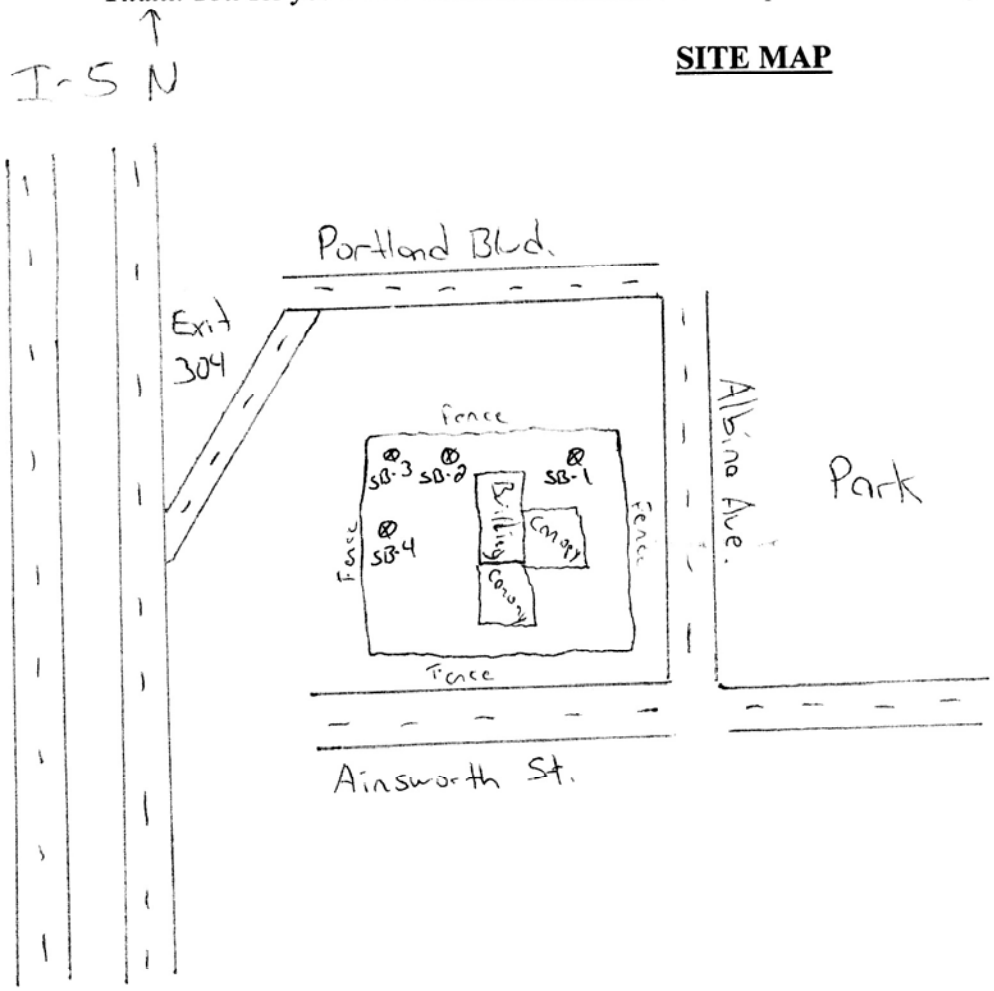
- Geotechnical hole is greater than 18 feet deep;
- Within 50 feet of a water supply or monitoring well;
- Used to make a determination of water quality;
- Constructed in an area of known or reasonably suspected contamination.

In order to comply with OWRD requirements, please provide a Site Map:

Map shall include an approximate scale of north arrow. Upon completion of well activities, a site map with each well location identified must be filed with each Geotechnical Hole Report (OR 690-240-035).

Thank You for your information and assistance on compliance with Oregon Administrative Rules.

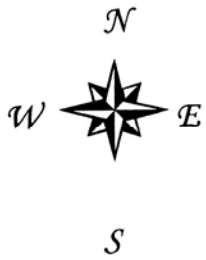
SITE MAP



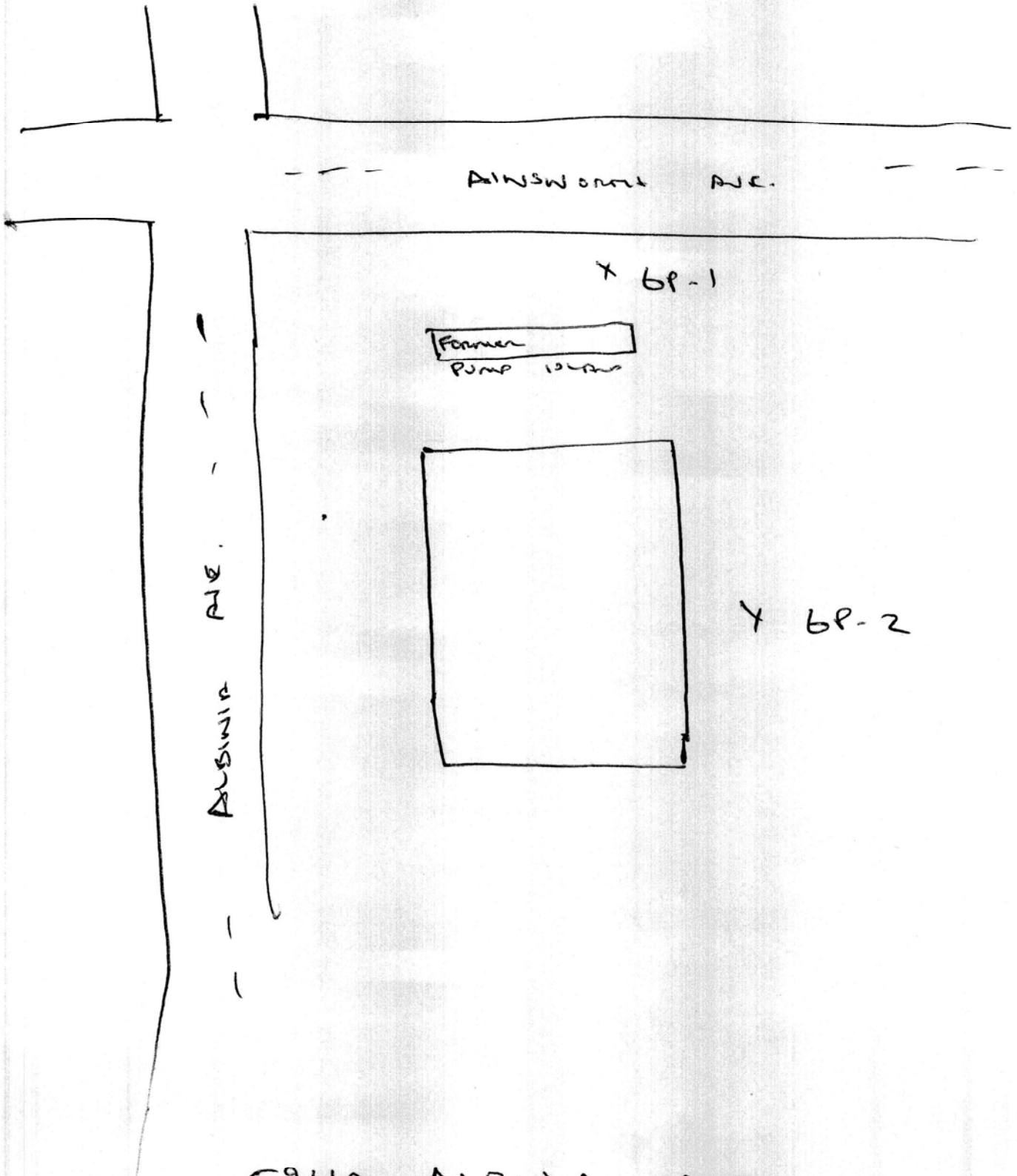
Site Address: 5940 ALBINA AVE – PORTLAND, OR

Client: WORLEY PARSONS

Date: _____



POS. 324 SITE MAP



5940 ALBINIA AVE.
PORTLAND OR

WASTE MANAGEMENT

Hillsboro Landfill, Inc
3205 SE Minter Bridge
Hillsboro, OR, 97123
Ph: (503)-640-9427

Original
Ticket# 1177301

Customer Name STRATUSCORP STRATUS CORPORATI
Ticket Date 10/10/2008
Payment Type Credit Account
Manual Ticket#
Hauling Ticket#
Route
State Waste Code
Manifest na
Destination
PO P08232.01D
Profile 1022660R (SOIL BORINGS)
Generator OR-CITYOFPORT CITY OF PORTLAND - BES - DELTA

Carrier STRATUS CORPORATION
Vehicle# 5
Container
Driver scott
Check#
Billing # 0000371
Gen EPA ID
Grid

Volume

	Time	Scale	Operator	Inbound		
In	10/10/2008 13:44:57	Inbound 2	sdm		Gross	21500 lb
Out	10/10/2008 13:53:53	Outbound	jlr		Tare	12860 lb
					Net	8640 lb
					Tons	4.32

Comments

Consumer Comments? We want to know. Please call.

	Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1	Cont Soil Pet-RGC-	100	4.32	Tons				MULT-IN
2	EVL-Env Fee Lg. -	100	1	Load				MULT-IN
3	AF1-Approval Fee S	100	1	Each				MULT-IN

P04232-01

Total Tax
Total Ticket

Driver's Signature

403WM

Pyxis Laboratories

Cover Letter: Page 1 of 1
Report Date: October 7, 2008
Job Number: A80916AM Worleypars
Purchase Order: 59020500
Project Name: ALBINA
Project No: BES ALBINA

COVER LETTER

James Farrow
Worley Parsons
9611 NE 117th Ave., Suite 2800
Vancouver, WA 98662

Dear James Farrow,

Enclosed please find Pyxis Laboratories analytical report Job Number A80916AM organized into the following sections:

Section	*Pages*
Cover Letter	1-1
Commentary and Notes	1-3
Sample Results	1-5
Batch Specific QC	1-1
Lab Specific QC	1-1
Surrogate Specific QC	1-3

This report is available in PDF format for you to view or download anytime from **oll.pyxislab.com** with a valid username and password. If you do not have an online account with us, please give Customer Services a call and ask them to establish one.

Should you have any questions about this report or any other matter, please do not hesitate to contact us. We are here to help you.

Customer Service, Portland:		
Mark Leed	MarkLeed@pyxislab.com	(503) 254-1794 ext.216
Customer Service, Redmond:		
Steve Castellano	StevenCastellano@pyxislab.com	(541) 548-0972
Quality Services:		
Linda Bangs	LindaBangs@pyxislab.com	(503) 254-1794 ext.204

Thank you for allowing Pyxis to be of service to you, we appreciate your business.

Sincerely,

Technical Services

Sincerely,

Quality Services

Pyxis Laboratories, LLC.
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Pyxis Laboratories

Report Date: October 7, 2008
Job Number: A80916AM
Custabbr: Worleypars

COMMENTARY AND NOTES

Job Comments:

The samples listed on the next page were received at the Portland branch of Pyxis Labs on 9/16/2008 as job number A80916AM.

Sample Comments:

All samples were properly preserved, in good condition, and in the appropriate containers. All results pertain only to samples submitted, are for the sole and exclusive use of the above-named client, and are provided under the terms and conditions of the Pyxis chain of custody. Samples will be kept a maximum of 15 days from the report date unless prior arrangements have been made.

Method Comments:

Recommended holding time was in accordance with method specific and/or data quality objectives specified in the Pyxis QAP. All analyses were performed according to the Pyxis QAP and met requirements of NELAC standards as documented in the Sample Results section of this report.

Footnotes:

The Notes column at the Method line on Sample Results pages indicates which Pyxis branch performed the analyses and contains any applicable data qualifiers.

1. Analysis done at Portland Branch, ORELAP# OR100028
2. Analysis done at Redmond Branch

Data Qualifiers:

B	Blank Contamination	MI	Matrix Interference
CV	Calculated Value	R	RPD ouside limit
D	Diluted out of range	RE	Re-Extracted and Re-Analyzed
E	Analyte Concentration Exceeds Range	S	Spike Recovery Outside Limit
H	Holding time exceeded	X	Non ORELAP accredited
J	Estimated Value, below LOQ	RP	Due to SR's proximity to MRL

Acronyms and Abbreviations:

Pyxis	Pyxis Laboratories, LLC.
NELAC	National Environmental Laboratory Accreditation Conference
ORELAP	Oregon Environmental Laboratory Accreditation Program
LOQ	Limit of Quantitation
LRL	Laboratory Reporting Limit
MCL	Maximum Containment Level
MRL	Method Reporting Limit
NA	Not Applicable
ND	None Detected at or Above LOQ
NP	Not Provided
NC	Not Calculable
QAP	(Pyxis Laboratories) Quality Assurance Plan
RPD	Relative Percent Difference

Units of Measure:

g = grams
mg = milligrams
ug = micrograms
L = liter

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Pyxis Laboratories

Report Date: October 7, 2008
Job Number: A80916AM
Custabbr: Worleypars

SAMPLE IDENTIFICATION

Field ID / Lab ID	Collect Date/Time	Collected By	Container	Size	Matrix / Preservative
WP5-5					**Soil**
80916AM1n	09/16/2008 08:00	Client	Glass	8oz.	None
WP5-10					**Soil**
80916AM2n	09/16/2008 08:00	Client	Glass	8oz.	None
WP5-15					**Soil**
80916AM3n	09/16/2008 08:00	Client	Glass	8oz.	None
WP5-20					**Soil**
80916AM4n	09/16/2008 08:00	Client	Glass	8oz.	None
WP5-25					**Soil**
80916AM5n	09/16/2008 08:00	Client	Glass	8oz.	None
WP5-30					**Soil**
80916AM6n	09/16/2008 08:00	Client	Glass	8oz.	None
WP5-40					**Soil**
80916AM7n	09/16/2008 08:00	Client	Glass	8oz.	None
WP5-45					**Soil**
80916AM8n	09/16/2008 08:00	Client	Glass	8oz.	None
WP5-50					**Soil**
80916AM9n	09/16/2008 08:00	Client	Glass	8oz.	None
WP5-55					**Soil**
80916AM10	09/16/2008 09:15	Client	Glass	8oz.	None
WP6-35					**Soil**
80916AM11	09/16/2008 13:00	Client	Glass	8oz.	None
WP6-40					**Soil**
80916AM12	09/16/2008 13:30	Client	Glass	8oz.	None
WP2-5					**Soil**
80916AM13	09/16/2008 13:30	Client	Glass	8oz.	None
WP2-10					**Soil**
80916AM14	09/16/2008 13:30	Client	Glass	8oz.	None
WP2-15					**Soil**
80916AM15	09/16/2008 13:30	Client	Glass	8oz.	None
WP2-20					**Soil**
80916AM16	09/16/2008 13:30	Client	Glass	8oz.	None
WP2-25					**Soil**

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Pyxis Laboratories

Report Date: October 7, 2008
Job Number: A80916AM
Custabbr: Worleypars

SAMPLE IDENTIFICATION

Field ID / Lab ID	Collect Date/Time	Collected By	Container	Size	Matrix / Preservative
WP2-25					**Soil**
80916AM17	09/16/2008 13:30	Client	Glass	8oz.	None
WP2-30					**Soil**
80916AM18	09/16/2008 13:30	Client	Glass	8oz.	None
WP2-35					**Soil**
80916AM19	09/16/2008 13:30	Client	Glass	8oz.	None
WP2-40					**Soil**
80916AM20	09/16/2008 14:30	Client	Glass	8oz.	None
WP5-60					**Soil**
80916AM21	09/16/2008 09:15	Client	Glass	8oz.	None
EB2					**Water**
80916AM22h	09/16/2008 09:15	Client	Vial	40ml	HCl
80916AM22h	09/16/2008 09:15	Client	Vial	40ml	HCl
TB2					**Water**
80916AM23h	09/16/2008 09:15	Client	Vial	40ml	HCl
80916AM23h	09/16/2008 09:15	Client	Vial	40ml	HCl
COMP					**Soil**
80916AM24	09/16/2008 09:15	Client	Glass	8oz.	None
WP6-5					**Soil**
80916AM25	09/16/2008 09:15	Client	Glass	8oz.	None
WP6-10					**Soil**
80916AM26	09/16/2008 09:15	Client	Glass	8oz.	None
WP6-15					**Soil**
80916AM27	09/16/2008 09:15	Client	Glass	8oz.	None
WP6-20					**Soil**
80916AM28	09/16/2008 09:15	Client	Glass	8oz.	None
WP6-25					**Soil**
80916AM29	09/16/2008 09:15	Client	Glass	8oz.	None
WP6-30					**Soil**
80916AM30	09/16/2008 09:15	Client	Glass	8oz.	None

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Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP5-5 (A80916AM-1)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	200.	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP5-15 (A80916AM-3)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	0.4	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP5-30 (A80916AM-6)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP5-45 (A80916AM-8)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X

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Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP5-45 (A80916AM-8)									
EPA 8021: Volatile Organic Chemicals									1
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	0.5	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP6-35 (A80916AM-11)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP6-40 (A80916AM-12)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	200.	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP2-5 (A80916AM-13)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X

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Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP2-5 (A80916AM-13)									
EPA 8021: Volatile Organic Chemicals									1
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP2-15 (A80916AM-15)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP2-25 (A80916AM-17)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP2-40 (A80916AM-20)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X

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Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP2-40 (A80916AM-20)									
EPA 8021: Volatile Organic Chemicals									1
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP5-60 (A80916AM-21)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
EB2 (A80916AM-22)									
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	0.25	mg/L	1	8090365		09/29/08	MAC	
TB2 (A80916AM-23)									
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	0.25	mg/L	1	8090365		09/29/08	MAC	
COMP (A80916AM-24)									
EPA 6020: Inorganic Chemicals									1
Cadmium	ND	0.38	mg/Kg	100	8090369		09/27/08 04:50	CV	X
Chromium	10.	1.9	mg/Kg	100	8090369		09/27/08 04:50	CV	X
Lead	7.7	0.38	mg/Kg	100	8090369		09/27/08 04:50	CV	X
WP6-15 (A80916AM-27)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X

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SAMPLE RESULTS

Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP6-15 (A80916AM-27)									
EPA 8021: Volatile Organic Chemicals									1
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X
WP6-25 (A80916AM-29)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090367		09/29/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090349		09/26/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090349		09/26/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090365		09/29/08	MAC	X

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Pyxis Laboratories

Report Date: October 7, 2008
Job Number: A80916AM
Custabbr: WORLEYPARS

Client Specific QC

Analyte	Sample Result	Units	Sample Duplicate Result	RPD	Limit	Matrix Spike Result	%Recovery	Limit	Matrix Spike Duplicate Result	%Recovery	Limit	RPD	Limit	Notes
EPA 6020														
LabID: 80916AM24n 7 8	**BatchID: 8090369-6**													
Cadmium	0	mg/Kg	0	**0**	35	56	**100**	75-125						
Chromium	10	mg/Kg	10	**0**	35	65	**98**	75-125						
Lead	7.7	mg/Kg	15	**64**	35	74	**119**	75-125						
NW TPH-Dx														
LabID: 80916AM15n 16	**BatchID: 8090349-6**													
Diesel	0	mg/Kg	0	**0**	50									
Hydrocarbons heavier than C24	0	mg/Kg	0	**0**	50									
LabID: 80916AM3n 17	**BatchID: 8090349-13**													
Diesel	0	mg/Kg	0	**0**	50									
Hydrocarbons heavier than C24	0	mg/Kg	0	**0**	50									

See Narrative for explanation of notes and abbreviations

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Laboratory Specific Quality Control Results

Report Date: October 7, 2008
Job Number: A80916AM
Custabbr: WORLEYPARS

Analyte	Result	True Value	Units	%Recovery	Limits	RPD	RPD Limit	Notes
EPA 6020								
Continuing Calibration Verif. CPI-3 **BatchID:** 8090369-18								
Cadmium	9.5	10	mg/L	**95**	75.-125.			
Chromium	10	10	mg/L	**100**	75.-125.			
Lead	9.6	10	mg/L	**96**	75.-125.			
Initial Calibration Verif. JTB-9 **BatchID:** 8090369-1								
Cadmium	2.4	2.5	mg/L	**96**	75.-125.			
Chromium	11	10	mg/L	**110**	75.-125.			
Lead	9.8	10	mg/L	**98**	75.-125.			
Laboratory Control Sample CPIMULTI8 **BatchID:** 8090369-4								
Cadmium	1.9	2	mg/L	**97**	80.-120.			
Chromium	2	2	mg/L	**100**	80.-120.			
Lead	2	2	mg/L	**100**	80.-120.			

See Narrative for explanation of notes and abbreviations

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Analyte	%Recovery	Limit	Notes
NW TPH-Dx **Batch:** 8090349			
80916AM11n-3 Sample Result			
o-Terphenyl (Surr.)	128	50.-150.	
80916AM12n-4 Sample Result			
o-Terphenyl (Surr.)	105	50.-150.	
80916AM13n-5 Sample Result			
o-Terphenyl (Surr.)	112	50.-150.	
80916AM15n-6 Sample Result			
o-Terphenyl (Surr.)	112	50.-150.	
80916AM17n-7 Sample Result			
o-Terphenyl (Surr.)	108	50.-150.	
80916AM1n-8 Sample Result			
o-Terphenyl (Surr.)	109	50.-150.	
80916AM20n-9 Sample Result			
o-Terphenyl (Surr.)	113	50.-150.	
80916AM21n-10 Sample Result			
o-Terphenyl (Surr.)	111	50.-150.	
80916AM27n-11 Sample Result			
o-Terphenyl (Surr.)	115	50.-150.	
80916AM29n-12 Sample Result			
o-Terphenyl (Surr.)	109	50.-150.	
80916AM3n-13 Sample Result			
o-Terphenyl (Surr.)	105	50.-150.	
80916AM6n-14 Sample Result			
o-Terphenyl (Surr.)	117	50.-150.	
80916AM8n-15 Sample Result			
o-Terphenyl (Surr.)	117	50.-150.	

See Narrative for explanation of notes and abbreviations

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Analyte	%Recovery	Limit	Notes
NW TPH-Gx **Batch:** 8090365			
80916AM11n-2 Sample Result			
Fluorobenzene (Surr)	130	70.-130.	
Trifluorotoluene (Surr)	120	70.-130.	
80916AM12n-3 Sample Result			
Fluorobenzene (Surr)	100	70.-130.	
Trifluorotoluene (Surr)	110	70.-130.	
80916AM13n-4 Sample Result			
Fluorobenzene (Surr)	100	70.-130.	
Trifluorotoluene (Surr)	100	70.-130.	
80916AM15n-5 Sample Result			
Fluorobenzene (Surr)	99	70.-130.	
Trifluorotoluene (Surr)	100	70.-130.	
80916AM17n-6 Sample Result			
Fluorobenzene (Surr)	110	70.-130.	
Trifluorotoluene (Surr)	110	70.-130.	
80916AM1n-7 Sample Result			
Fluorobenzene (Surr)	110	70.-130.	
Trifluorotoluene (Surr)	110	70.-130.	
80916AM20n-8 Sample Result			
Fluorobenzene (Surr)	95	70.-130.	
Trifluorotoluene (Surr)	91	70.-130.	
80916AM21n-9 Sample Result			
Fluorobenzene (Surr)	110	70.-130.	
Trifluorotoluene (Surr)	110	70.-130.	
80916AM22h1-10 Sample Result			
Fluorobenzene (Surr)	110	70.-130.	

See Narrative for explanation of notes and abbreviations

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Analyte	%Recovery	Limit	Notes
NW TPH-Gx **Batch:** 8090365			
80916AM22h1-10 Sample Result			
Trifluorotoluene (Surr)	110	70.-130.	
80916AM23h1-11 Sample Result			
Fluorobenzene (Surr)	110	70.-130.	
Trifluorotoluene (Surr)	110	70.-130.	
80916AM27n-12 Sample Result			
Fluorobenzene (Surr)	92	70.-130.	
Trifluorotoluene (Surr)	92	70.-130.	
80916AM29n-13 Sample Result			
Fluorobenzene (Surr)	110	70.-130.	
Trifluorotoluene (Surr)	110	70.-130.	
80916AM3n-14 Sample Result			
Fluorobenzene (Surr)	74	70.-130.	
Trifluorotoluene (Surr)	69	70.-130.	
80916AM6n-15 Sample Result			
Fluorobenzene (Surr)	110	70.-130.	
Trifluorotoluene (Surr)	100	70.-130.	
80916AM8n-16 Sample Result			
Fluorobenzene (Surr)	100	70.-130.	
Trifluorotoluene (Surr)	98	70.-130.	

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Pyxis Laboratories

Cover Letter: Page 1 of 1
Report Date: October 8, 2008
Job Number: A80915AH Worleypars
Purchase Order: 59020500
Project Name: ALBINA
Project No: BES ALBINA

COVER LETTER

James Farrow
Worley Parsons
9611 NE 117th Ave., Suite 2800
Vancouver, WA 98662

Dear James Farrow,

Enclosed please find Pyxis Laboratories analytical report Job Number A80915AH organized into the following sections:

Section	*Pages*
Cover Letter	1-1
Commentary and Notes	1-4
Sample Results	1-5
Batch Specific QC	1-1
Surrogate Specific QC	1-4

This report is available in PDF format for you to view or download anytime from **oll.pyxislab.com** with a valid username and password. If you do not have an online account with us, please give Customer Services a call and ask them to establish one.

Should you have any questions about this report or any other matter, please do not hesitate to contact us. We are here to help you.

Customer Service, Portland:		
Mark Leed	MarkLeed@pyxislab.com	(503) 254-1794 ext.216
Customer Service, Redmond:		
Steve Castellano	StevenCastellano@pyxislab.com	(541) 548-0972
Quality Services:		
Linda Bangs	LindaBangs@pyxislab.com	(503) 254-1794 ext.204

Thank you for allowing Pyxis to be of service to you, we appreciate your business.

Sincerely,

Technical Services

Sincerely,

Quality Services

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Pyxis Laboratories

Report Date: October 8, 2008
Job Number: A80915AH
Custabbr: Worleypars

COMMENTARY AND NOTES

Job Comments:

The samples listed on the next page were received at the Portland branch of Pyxis Labs on 9/15/2008 as job number A80915AH.

Sample Comments:

All samples were properly preserved, in good condition, and in the appropriate containers. All results pertain only to samples submitted, are for the sole and exclusive use of the above-named client, and are provided under the terms and conditions of the Pyxis chain of custody. Samples will be kept a maximum of 15 days from the report date unless prior arrangements have been made.

Method Comments:

Recommended holding time was in accordance with method specific and/or data quality objectives specified in the Pyxis QAP. All analyses were performed according to the Pyxis QAP and met requirements of NELAC standards as documented in the Sample Results section of this report.

Footnotes:

The Notes column at the Method line on Sample Results pages indicates which Pyxis branch performed the analyses and contains any applicable data qualifiers.

1. Analysis done at Portland Branch, ORELAP# OR100028
2. Analysis done at Redmond Branch

Data Qualifiers:

B	Blank Contamination	MI	Matrix Interference
CV	Calculated Value	R	RPD ouside limit
D	Diluted out of range	RE	Re-Extracted and Re-Analyzed
E	Analyte Concentration Exceeds Range	S	Spike Recovery Outside Limit
H	Holding time exceeded	X	Non ORELAP accredited
J	Estimated Value, below LOQ	RP	Due to SR's proximity to MRL

Acronyms and Abbreviations:

Pyxis	Pyxis Laboratories, LLC.
NELAC	National Environmental Laboratory Accreditation Conference
ORELAP	Oregon Environmental Laboratory Accreditation Program
LOQ	Limit of Quantitation
LRL	Laboratory Reporting Limit
MCL	Maximum Containment Level
MRL	Method Reporting Limit
NA	Not Applicable
ND	None Detected at or Above LOQ
NP	Not Provided
NC	Not Calculable
QAP	(Pyxis Laboratories) Quality Assurance Plan
RPD	Relative Percent Difference

Units of Measure:

g = grams
mg = milligrams
ug = micrograms
L = liter

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SAMPLE IDENTIFICATION

Field ID / Lab ID	Collect Date/Time	Collected By	Container	Size	Matrix / Preservative
WP1-5					**Soil**
80915AH1n	09/15/2008 08:00	Client	Glass	8oz.	None
WP1-10					**Soil**
80915AH2n	09/15/2008 08:00	Client	Glass	8oz.	None
WP1-15					**Soil**
80915AH3n	09/15/2008 08:00	Client	Glass	8oz.	None
WP1-20					**Soil**
80915AH4n	09/15/2008 08:00	Client	Glass	8oz.	None
WP1-25					**Soil**
80915AH5n	09/15/2008 08:00	Client	Glass	8oz.	None
WP1-30					**Soil**
80915AH6n	09/15/2008 08:00	Client	Glass	8oz.	None
WP1-35					**Soil**
80915AH7n	09/15/2008 08:00	Client	Glass	8oz.	None
WP1-40					**Soil**
80915AH8n	09/15/2008 08:00	Client	Glass	8oz.	None
WP1-45					**Soil**
80915AH9n	09/15/2008 08:00	Client	Glass	8oz.	None
WP1-50					**Soil**
80915AH10n	09/15/2008 09:00	Client	Glass	8oz.	None
WP3-5					**Soil**
80915AH11n	09/15/2008 10:00	Client	Glass	8oz.	None
WP3-10					**Soil**
80915AH12n	09/15/2008 10:00	Client	Glass	8oz.	None
WP3-15					**Soil**
80915AH13n	09/15/2008 10:00	Client	Glass	8oz.	None
WP3-20					**Soil**
80915AH14n	09/15/2008 10:00	Client	Glass	8oz.	None
WP3-25					**Soil**
80915AH15n	09/15/2008 10:00	Client	Glass	8oz.	None
WP3-30					**Soil**
80915AH16n	09/15/2008 10:00	Client	Glass	8oz.	None
WP3-35					**Soil**

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Pyxis Laboratories

Report Date: October 8, 2008
Job Number: A80915AH
Custabbr: Worleypars

SAMPLE IDENTIFICATION

Field ID / Lab ID	Collect Date/Time	Collected By	Container	Size	Matrix / Preservative
WP3-35					**Soil**
80915AH17n	09/15/2008 10:00	Client	Glass	8oz.	None
WP3-40					**Soil**
80915AH18n	09/15/2008 10:00	Client	Glass	8oz.	None
WP3-45					**Soil**
80915AH19n	09/15/2008 10:00	Client	Glass	8oz.	None
WP3-50					**Soil**
80915AH20n	09/15/2008 11:00	Client	Glass	8oz.	None
WP4-5					**Soil**
80915AH21n	09/15/2008 13:00	Client	Glass	8oz.	None
WP4-10					**Soil**
80915AH22n	09/15/2008 13:00	Client	Glass	8oz.	None
WP4-15					**Soil**
80915AH23n	09/15/2008 13:00	Client	Glass	8oz.	None
WP4-20					**Soil**
80915AH24n	09/15/2008 13:00	Client	Glass	8oz.	None
WP4-25					**Soil**
80915AH25n	09/15/2008 13:00	Client	Glass	8oz.	None
WP4-30					**Soil**
80915AH26n	09/15/2008 13:00	Client	Glass	8oz.	None
WP4-35					**Soil**
80915AH27n	09/15/2008 13:00	Client	Glass	8oz.	None
WP4-40					**Soil**
80915AH28n	09/15/2008 13:00	Client	Glass	8oz.	None
WP4-45					**Soil**
80915AH29n	09/15/2008 13:00	Client	Glass	8oz.	None
WP4-50					**Soil**
80915AH30n	09/15/2008 14:30	Client	Glass	8oz.	None
WP TB 1					**Water**
80915AH31n	09/15/2008 14:00	Client	Glass	8oz.	None
80915AH31h	09/15/2008 14:00	Client	Vial	40ml	HCl
WP EB 1					**Water**
80915AH32n	09/15/2008 14:00	Client	Glass	8oz.	None

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Pyxis Laboratories

Report Date: October 8, 2008
Job Number: A80915AH
Custabbr: Worleypars

SAMPLE IDENTIFICATION

Field ID / Lab ID	Collect Date/Time	Collected By	Container	Size	Matrix / Preservative
WP EB 1					**Water**
80915AH32h	09/15/2008 14:00	Client	Vial	40ml	HCl
80915AH32h	09/15/2008 14:00	Client	Vial	40ml	HCl

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Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP1-5 (A80915AH-1)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	30.	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP1-10 (A80915AH-2)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP1-25 (A80915AH-5)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP1-40 (A80915AH-8)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X

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Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP1-40 (A80915AH-8)									
EPA 8021: Volatile Organic Chemicals									1
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP1-50 (A80915AH-10)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	30.	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP3-5 (A80915AH-11)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP3-10 (A80915AH-12)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X

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Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP3-10 (A80915AH-12)									
EPA 8021: Volatile Organic Chemicals									1
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP3-25 (A80915AH-15)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP3-45 (A80915AH-19)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP3-50 (A80915AH-20)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X

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2392 S Hwy 97 Suite B, Redmond, OR, 97756, (541) 548-0972, FAX (541) 548-6345

Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP3-50 (A80915AH-20)									
EPA 8021: Volatile Organic Chemicals									1
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP4-5 (A80915AH-21)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP4-10 (A80915AH-22)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP4-25 (A80915AH-25)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X

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Parameter	Results	MRL	Unit	Dilution	Batch	Extracted	Analyzed	Analyst	Notes
WP4-25 (A80915AH-25)									
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP4-40 (A80915AH-28)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP4-50 (A80915AH-30)									
EPA 8021: Volatile Organic Chemicals									1
Benzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Ethylbenzene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Toluene	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
Total Xylenes	ND	0.25	mg/kg	1	8090292		09/25/08	MAC	X
NW TPH-Dx: Extractable Organics									1
Diesel	ND	25.	mg/Kg	1	8090255		09/23/08	R K	X
Hydrocarbons heavier than C24	ND	100.	mg/Kg	1	8090255		09/23/08	R K	X
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	5.	mg/kg	1	8090293		09/25/08	MAC	X
WP TB 1 (A80915AH-31)									
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	0.25	mg/L	1	8090293		09/25/08	MAC	
WP EB 1 (A80915AH-32)									
NW TPH-Gx: Extractable Organics									1
Gasoline	ND	0.25	mg/L	1	8090293		09/25/08	MAC	

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Pyxis Laboratories

Client QC:
Report Date: October 8, 2008
Job Number: A80915AH
Custabbr: WORLEYPARS

Client Specific QC

Analyte	Sample Result	Units	Sample Duplicate Result	RPD	Limit	Matrix Spike Result	%Recovery	Limit	Matrix Spike Duplicate Result	%Recovery	Limit	RPD	Limit	Notes
NW TPH-Dx														
LabID: 80915AH15n 18	**BatchID: 8090255-6**													
Diesel	0	mg/Kg	0	**0**	50									
Hydrocarbons heavier than C24	0	mg/Kg	0	**0**	50									
LabID: 80915AH8n 19	**BatchID: 8090255-17**													
Diesel	0	mg/Kg	0	**0**	50									
Hydrocarbons heavier than C24	0	mg/Kg	0	**0**	50									

See Narrative for explanation of notes and abbreviations

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Analyte	%Recovery	Limit	Notes
NW TPH-Dx **Batch:** 8090255			
80915AH10n-3 Sample Result			
o-Terphenyl (Surr.)	117	50.-150.	
80915AH11n-4 Sample Result			
o-Terphenyl (Surr.)	102	50.-150.	
80915AH12n-5 Sample Result			
o-Terphenyl (Surr.)	109	50.-150.	
80915AH15n-6 Sample Result			
o-Terphenyl (Surr.)	109	50.-150.	
80915AH19n-7 Sample Result			
o-Terphenyl (Surr.)	113	50.-150.	
80915AH1n-8 Sample Result			
o-Terphenyl (Surr.)	111	50.-150.	
80915AH20n-9 Sample Result			
o-Terphenyl (Surr.)	118	50.-150.	
80915AH21n-10 Sample Result			
o-Terphenyl (Surr.)	104	50.-150.	
80915AH22n-11 Sample Result			
o-Terphenyl (Surr.)	105	50.-150.	
80915AH25n-12 Sample Result			
o-Terphenyl (Surr.)	107	50.-150.	
80915AH28n-13 Sample Result			
o-Terphenyl (Surr.)	104	50.-150.	
80915AH2n-14 Sample Result			
o-Terphenyl (Surr.)	113	50.-150.	
80915AH30n-15 Sample Result			
o-Terphenyl (Surr.)	117	50.-150.	

See Narrative for explanation of notes and abbreviations

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Analyte	%Recovery	Limit	Notes
NW TPH-Dx **Batch:** 8090255			
80915AH5n-16 Sample Result			
o-Terphenyl (Surr.)	113	50.-150.	
80915AH8n-17 Sample Result			
o-Terphenyl (Surr.)	104	50.-150.	
NW TPH-Gx **Batch:** 8090293			
80915AH10n-2 Sample Result			
Fluorobenzene (Surr)	60	70.-130.	
Trifluorotoluene (Surr)	61	70.-130.	
80915AH11n-3 Sample Result			
Fluorobenzene (Surr)	84	70.-130.	
Trifluorotoluene (Surr)	84	70.-130.	
80915AH12n-4 Sample Result			
Fluorobenzene (Surr)	82	70.-130.	
Trifluorotoluene (Surr)	84	70.-130.	
80915AH15n-5 Sample Result			
Fluorobenzene (Surr)	76	70.-130.	
Trifluorotoluene (Surr)	77	70.-130.	
80915AH19n-6 Sample Result			
Fluorobenzene (Surr)	79	70.-130.	
Trifluorotoluene (Surr)	78	70.-130.	
80915AH1n-7 Sample Result			
Fluorobenzene (Surr)	92	70.-130.	
Trifluorotoluene (Surr)	94	70.-130.	
80915AH20n-8 Sample Result			
Fluorobenzene (Surr)	81	70.-130.	
Trifluorotoluene (Surr)	81	70.-130.	

See Narrative for explanation of notes and abbreviations

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Analyte	%Recovery	Limit	Notes
NW TPH-Gx **Batch:** 8090293			
80915AH21n-9 Sample Result			
Fluorobenzene (Surr)	73	70.-130.	
Trifluorotoluene (Surr)	70	70.-130.	
80915AH22n-10 Sample Result			
Fluorobenzene (Surr)	82	70.-130.	
Trifluorotoluene (Surr)	84	70.-130.	
80915AH25n-11 Sample Result			
Fluorobenzene (Surr)	83	70.-130.	
Trifluorotoluene (Surr)	81	70.-130.	
80915AH28n-12 Sample Result			
Fluorobenzene (Surr)	110	70.-130.	
Trifluorotoluene (Surr)	110	70.-130.	
80915AH2n-13 Sample Result			
Fluorobenzene (Surr)	80	70.-130.	
Trifluorotoluene (Surr)	83	70.-130.	
80915AH30n-14 Sample Result			
Fluorobenzene (Surr)	88	70.-130.	
Trifluorotoluene (Surr)	87	70.-130.	
80915AH31H1-15 Sample Result			
Fluorobenzene (Surr)	100	70.-130.	
Trifluorotoluene (Surr)	100	70.-130.	
80915AH32H1-16 Sample Result			
Fluorobenzene (Surr)	94	70.-130.	
Trifluorotoluene (Surr)	96	70.-130.	
80915AH5n-17 Sample Result			
Fluorobenzene (Surr)	79	70.-130.	

See Narrative for explanation of notes and abbreviations

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Analyte	%Recovery	Limit	Notes
NW TPH-Gx **Batch:** 8090293			
80915AH5n-17 Sample Result			
Trifluorotoluene (Surr)	80	70.-130.	
80915AH8n-18 Sample Result			
Fluorobenzene (Surr)	110	70.-130.	
Trifluorotoluene (Surr)	100	70.-130.	

See Narrative for explanation of notes and abbreviations

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Appendix F: Open Pit Infiltration Test

Alder Geotechnical Services

3910 NE 10th Avenue
Portland, Oregon 97212
(503) 282-7482
Fax (503) 282-7402
aldergeo@teleport.com

October 7, 2008
Project No. 730-1

Ms. Chris-Poole Jones
Delta House
1206 NE Knott Street
Portland, Oregon 97208-4265

RESULTS OF OPEN PIT INFILTRATION TESTS
PROPOSED DELTA HOUSE
5940 N. ALBINA AVENUE
PORTLAND, OREGON

Dear Ms. Jones:

I completed three infiltration tests on your site October 3. The purpose of this testing was to determine whether the native soils underlying the site have water infiltration capacities of 2 inches per hour or greater. The City of Portland *2008 Stormwater Management Manual* (SWMM) requires infiltration rates of at least 2 inches per hour for projects that utilize the "simplified approach design methodology" discussed in Chapter 2 of the SWMM. This letter describes my testing procedures. As discussed below, the measured infiltration rates ranged from 17 to 514 inches per hour.

Figure 1 shows the locations of the three open pit infiltration tests. The bottom of Test Pit 1 exposed coarse- to fine-grained sand with some silt and rounded gravels. The bottom of Test Pit 2 exposed well-graded, coarse- to fine-grained sands containing some rounded gravels. The bottom of Test Pit 2 exposed coarse- to fine-grained silty sands.

Each pit was approximately 2 feet square and 32 to 36 inches deep. After cleaning loose soils from the bottom of the pits, 8- and 12-inch diameter pipes were pushed 3 to 6 inches into the bottom of the test pits. Approximately 8 to 10 inches of water was then poured into the pipes and allowed to drain out several times before starting the tests. During testing each pipe was refilled with 8 to 10 inches of water and the time was recorded for the water surface to drop 6 to 8 inches. The test results are presented on the attached Form 1 data sheets.

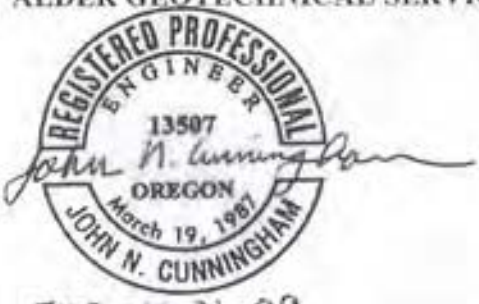
The following infiltration rates were measured:

- Infiltration Test 1 — 36 inches per hour
- Infiltration Test 2 — 514 inches per hour
- Infiltration Test 3 — 17 inches per hour

In my opinion, the site soils located deeper than 32 inches below the ground surface have infiltration rates greater than 2 inches per hour. The simplified design methodology in the SWMM may be used to size stormwater management facilities for the project.

I hope this information meets your needs at this time. Please contact me if you have questions.

ALDER GEOTECHNICAL SERVICES, LLC

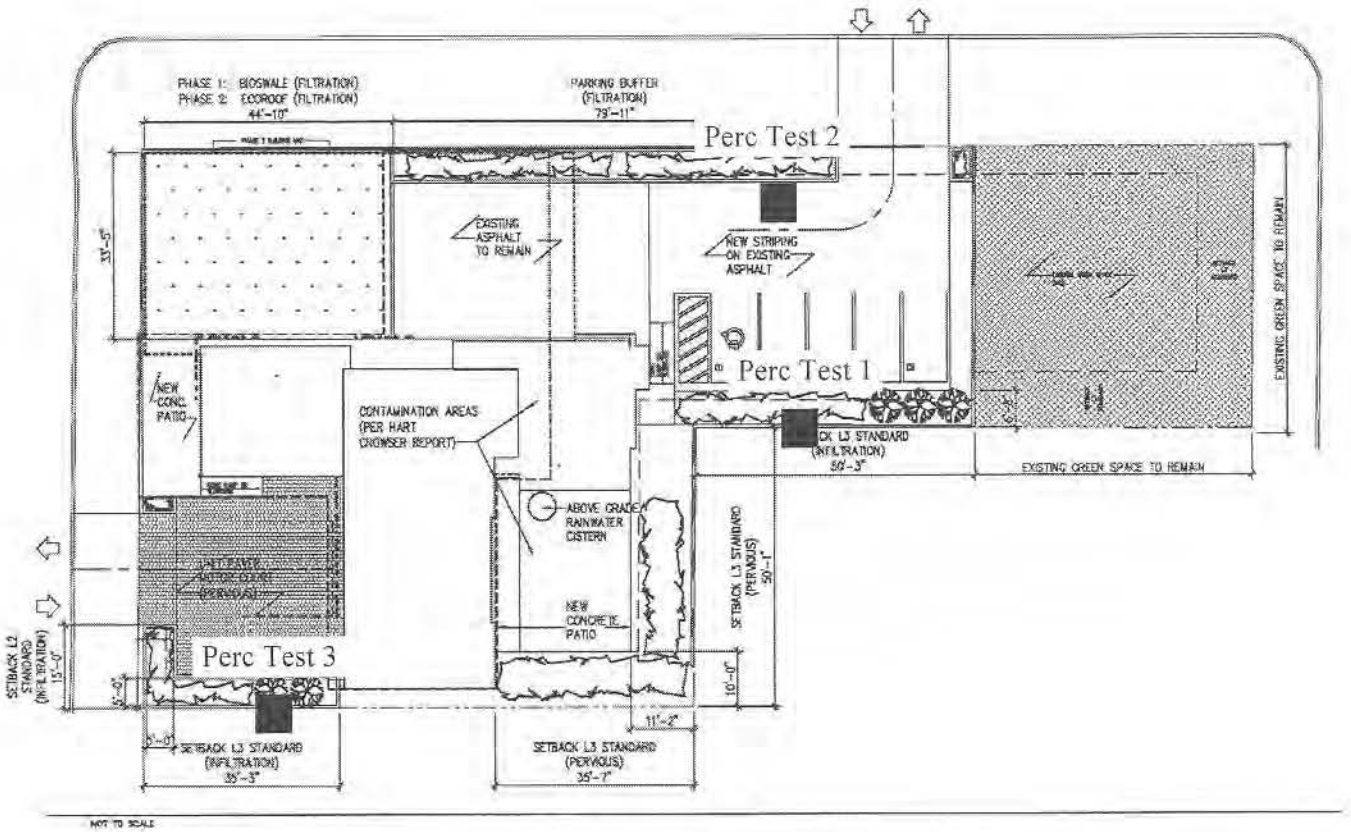


EXP. 12-31-09

John Cunningham, P.E., G.E.
Oregon Registered Geotechnical Engineer No. 13,507

(1) Addressee
(1) Sienna Architecture

Attachments: Figure 1, SWMM Form 1 (4 pages total)



Alder Geotechnical Services, LLC

Job # 730-1 Delta House Figure 1
Oct. 2008 Portland, OR Percolation Test Locations

Form 1 - SIMPLIFIED APPROACH

Simplified Approach Infiltration Testing Instructions (Open Pit Test):

1. A simple open pit infiltration test should be conducted where the facility is proposed, or within the direct vicinity.
2. Excavate a test hole to the depth of the bottom of the proposed facility (up to 4 feet). The test hole can be excavated with small excavation equipment or by hand using a shovel, auger, or post-hole digger.
3. If you encounter a layer that is hard enough to prevent further excavation, or if you come across noticeable moisture/water in the soil, stop and measure this depth from the surface and record S5 below. Proceed with the test at this depth.
4. Fill the hole with water to a height of about 12 inches from the bottom of the hole (or to one half the maximum depth of the proposed facility), and record the exact time. Check the water level at regular intervals (every 1 minute for fast-draining soils to every 10 minutes for slower-draining soils) for a minimum of one hour or until all of the water has infiltrated. Record the distance the water has dropped from the top edge of the hole.
5. Repeat this process two more times, for a total of three rounds of testing. These tests should be performed as close together as possible to accurately portray the soil's ability to infiltrate at different levels of saturation. The third test should provide the best measure of the saturated infiltration rate.

PERCOLATION TEST # 1

For each test pit required, submit all three testing results.

S5 Infiltration Test Results: *For each test include date, time, initial and final water height, duration of test, and infiltration rate in inches per hour.*

Depth of Evacuation: 32 inch deep test pit; tested using 12" dia. pipe

Test 1:	Test 2:	Test 3:
Date: 10-3-2008	Date: 10-3-2008	Date: 10-3-2008
Time: 2:18pm	Time: 2:26pm	Time: 2:39pm
Initial water depth: 8"	Initial water depth: 8"	Initial water depth: 8"
Final water depth: 0"	Final water depth: 0"	Final water depth: 0"
Duration of test: 5M:19S	Duration of test: 10M:53S	Duration of test: 13M:21S
Infiltration rate: 83"/hr	Infiltration rate: 44"/hr	*Infiltration rate: 36"/hr

* The pit infiltration rate is the result of the third test.

$$\text{Pit Infiltration Rate} = \frac{\text{Initial Water Depth - Final Water Depth (inches)}}{\text{Duration of test (hours)}}$$

If the pit infiltration rate is greater than or equal to 2 inches per hour then onsite infiltration is required. Applicants may choose either a surface infiltration facility with overflow to a drywell or soakage trench or a surface infiltration facility with an overflow to an approved discharge point. If the tested infiltration rate is below 2 inches per hour, then a flow-through or partial infiltration facility is required with overflow to an approved discharge point.

Projects that infiltrate roof runoff with private soakage trenches or drywells are not required to provide pollution reduction prior to infiltration. This exemption does not apply to projects that discharge stormwater offsite. Single-family residential (up to three units) roofs and footing drains are excluded from UIC registration. Refer to Section 1.4 for specific pollution reduction requirements for UICs.

Form 1 - SIMPLIFIED APPROACH

Simplified Approach Infiltration Testing Instructions (Open Pit Test):

1. A simple open pit infiltration test should be conducted where the facility is proposed, or within the direct vicinity.
2. Excavate a test hole to the depth of the bottom of the proposed facility (up to 4 feet). The test hole can be excavated with small excavation equipment or by hand using a shovel, auger, or post-hole digger.
3. If you encounter a layer that is hard enough to prevent further excavation, or if you come across noticeable moisture/water in the soil, stop and measure this depth from the surface and record S5 below. Proceed with the test at this depth.
4. Fill the hole with water to a height of about 12 inches from the bottom of the hole (or to one half the maximum depth of the proposed facility), and record the exact time. Check the water level at regular intervals (every 1 minute for fast-draining soils to every 10 minutes for slower-draining soils) for a minimum of one hour or until all of the water has infiltrated. Record the distance the water has dropped from the top edge of the hole.
5. Repeat this process two more times, for a total of three rounds of testing. These tests should be performed as close together as possible to accurately portray the soil's ability to infiltrate at different levels of saturation. The third test should provide the best measure of the saturated infiltration rate.

PERCOLATION TEST # 2

For each test pit required, submit all three testing results.

S5 Infiltration Test Results: *For each test include date, time, initial and final water height, duration of test, and infiltration rate in inches per hour.*

Depth of Evacuation: 36 inch deep test pit; tested using 12" dia. pipe

Test 1:	Test 2 :	Test 3 :
Date: 10-3-2008	Date: 10-3-2008	Date: 10-3-2008
Time: 2:59pm	Time: 3:03pm	Time: 3:05pm
Initial water depth: 8"	Initial water depth: 8"	Initial water depth: 8"
Final water depth: 0"	Final water depth: 0"	Final water depth: 0"
Duration of test: 0M:36S	Duration of test: 0M:52S	Duration of test: 0M:56S
Infiltration rate: 800"/hr	Infiltration rate: 553"/hr	*Infiltration rate: 514"/hr

* The pit infiltration rate is the result of the third test.

$$\text{Pit Infiltration Rate} = \frac{\text{Initial Water Depth - Final Water Depth (inches)}}{\text{Duration of test (hours)}}$$

If the pit infiltration rate is greater than or equal to 2 inches per hour then onsite infiltration is required. Applicants may choose either a surface infiltration facility with overflow to a drywell or soakage trench or a surface infiltration facility with an overflow to an approved discharge point. If the tested infiltration rate is below 2 inches per hour, then a flow-through or partial infiltration facility is required with overflow to an approved discharge point.

Projects that infiltrate roof runoff with private soakage trenches or drywells are not required to provide pollution reduction prior to infiltration. This exemption does not apply to projects that discharge stormwater offsite. Single-family residential (up to three units) roofs and footing drains are excluded from UIC registration. Refer to Section 1.4 for specific pollution reduction requirements for UICs.

Form 1 - SIMPLIFIED APPROACH

Simplified Approach Infiltration Testing Instructions (Open Pit Test):

1. A simple open pit infiltration test should be conducted where the facility is proposed, or within the direct vicinity.
2. Excavate a test hole to the depth of the bottom of the proposed facility (up to 4 feet). The test hole can be excavated with small excavation equipment or by hand using a shovel, auger, or post-hole digger.
3. If you encounter a layer that is hard enough to prevent further excavation, or if you come across noticeable moisture/water in the soil, stop and measure this depth from the surface and record S5 below. Proceed with the test at this depth.
4. Fill the hole with water to a height of about 12 inches from the bottom of the hole (or to one half the maximum depth of the proposed facility), and record the exact time. Check the water level at regular intervals (every 1 minute for fast-draining soils to every 10 minutes for slower-draining soils) for a minimum of one hour or until all of the water has infiltrated. Record the distance the water has dropped from the top edge of the hole.
5. Repeat this process two more times, for a total of three rounds of testing. These tests should be performed as close together as possible to accurately portray the soil's ability to infiltrate at different levels of saturation. The third test should provide the best measure of the saturated infiltration rate.

PERCOLATION TEST # 3

For each test pit required, submit all three testing results.

S5 Infiltration Test Results: *For each test include date, time, initial and final water height, duration of test, and infiltration rate in inches per hour.*

Depth of Evacuation: 32 inch deep test pit; tested using 8" dia. pipe

Test 1:	Test 2 :	Test 3 :
Date: 10-3-2008	Date: 10-3-2008	Date: 10-3-2008
Time: 2:08pm	Time: 2:30pm	Time: 2:51pm
Initial water depth: 10"	Initial water depth: 10"	Initial water depth: 10"
Final water depth: 4"	Final water depth: 4"	Final water depth: 4"
Duration of test: 20M:40S	Duration of test: 20M:24S	Duration of test: 21M:00S
Infiltration rate: 18"/hr	Infiltration rate: 18"/hr	*Infiltration rate: 17"/hr

* The pit infiltration rate is the result of the third test.

$$\text{Pit Infiltration Rate} = \frac{\text{Initial Water Depth - Final Water Depth (inches)}}{\text{Duration of test (hours)}}$$

If the pit infiltration rate is greater than or equal to 2 inches per hour then onsite infiltration is required. Applicants may choose either a surface infiltration facility with overflow to a drywell or soakage trench or a surface infiltration facility with an overflow to an approved discharge point. If the tested infiltration rate is below 2 inches per hour, then a flow-through or partial infiltration facility is required with overflow to an approved discharge point.

Projects that infiltrate roof runoff with private soakage trenches or drywells are not required to provide pollution reduction prior to infiltration. This exemption does not apply to projects that discharge stormwater offsite. Single-family residential (up to three units) roofs and footing drains are excluded from UIC registration. Refer to Section 1.4 for specific pollution reduction requirements for UICs.

Appendix G: Response to Stormwater Calculations (Sienna Architecture)

sienna
architecture company

411
southwest
sixth
avenue
portland
oregon
97204.1602

503.227.5616 | fax 503.227.3590 | siennaarchitecture.com

m e m o r a n d u m

project name:	Delta House	**project no.:**	27003
from:	Summer Gorder	**date:**	11.06.08
no of pages:		**via:**	fax
to:	Nan Stark	**fax no:**	

re: Land Use Review Comment Response

Comment:

1. Revised Stormwater Calculations. Stormwater calculations for this proposal were based on the Simplified design approach. In its review of this proposal, BDS Site Development states that this approach cannot be used for sites greater than 10,000 square feet. Instead, the Presumptive design approach or, if approved by BES, the Performance design approach must be used for stormwater calculations.

   Please provide revised calculations for the stormwater facility that include the following:
   - Design Assumptions
   - Stormwater narrative demonstrating compliance with City's Stormwater Destination/Disposal Hierarchy (pgs 1-18 and 1-19 of the 2004 Stormwater Management Manual)
   - Configuration and size of any stormwater facility (eg, pond, swale, etc.)

   Response:
   - *The stormwater design is based on the Simplified Approach, per the 2008 Stormwater Management Manual's description in Chapter 2: Facility Design page 2-15 that this method is "available for projects with less than 10,000 square feet total new or redeveloped impervious area, including but not limited to roofs, patios, parking areas, and driveways." The ultimate build-out of Phase I and Phase II being submitted in this application will result in 7,477 SF, which is less than 10,000 SF.*
   - *The development meets Category 1 of the Stormwater Hierarchy described in section 1.3.5 as "Vegetated infiltration facility with no overflow." The site is designed with Total Infiltration facilities, since the soils drain beyond the requirement of 2 inches per hour as indicated in Chapter 2: Facility Design page 2-25 (see infiltration tests conducted by Alder Geotechnical Services attached to Form 1). According to this section of the SWMM, no offsite discharge point is required.*
   - *Total Phase I onsite infiltration is achieved by 802 SF of vegetated swales which can manage 8,911 SF, exceeding the maximum 8,578 SF of impervious surface. Phase II will include an Eco-roof, and will result in total impervious area of 7,477SF. The 717 SF of vegetated swales proposed can manage more than this remaining impervious area. Please refer to the calculations on Form 1 and the additional "Impervious Area Calculations" sheet provided.*

Comment:

2. Revised Site Utility Plan. In its review of this proposal, BDS Site Development states that the submitted storm water plan does not include catchment data or facility sizing calculations. Please provide a revised site utility plan that includes the following:
   - Sanitary sewer services for each lot
   - Stormwater disposal method for each lot
   - Stormwater management and disposal method for street improvements, if applicable

- Stormwater narrative demonstrating compliance with City's Stormwater Destination/Disposal Hierarchy (pgs 1-18 and 1-19 of the 2004 Stormwater Management Manual)

Response:

- *The Utility Plan attached shows the single Sanitary connection line to the combination gravity main in N. Albina, that the City plumbing records show on permit file #78948 (also referenced in the Pre-application Conference Response Letter dated April 2, 2008). This connection was also approved in the EA 08-112436 comments. Consequently, since there is a single connection on the site no pipes cross. Please refer to sheet A002 enclosed.*
- *Stormwater is completely managed with on-site infiltration.*
- *No street improvements apply.*

Comment:

3. Confirmation from DEQ and Additional Site Plan. To approve on-site infiltration of stormwater, BES requests that you provide confirmation from DEQ that the site has no remaining contamination concerns. In addition, please provide a site plan that shows the current proposal overlaid with a map that shows areas of contamination. This will show that the on-site infiltration areas for the proposed development do not extend into areas of contamination.

Response: *Please refer to test results in the "Additional Site Assessment Report," dated 15 October 2008 from Worley Parsons Komex.*

Comment:

4. Additional Parking Information. In its review of this proposal, Portland Transportation states that additional information is necessary to determine if there is adequate parking for large events (events with more than 30 people). Please provide additional written information that includes the following:
    - Opportunities for shared parking, such as at the PCC campus or at other nearby sites. Shuttle service or other options to reduce automobile parking demand should also be explored further.
    - An explanation of the basis for mode split percentages (walk/bike/transit). If you are basing the mode splits on actual data from another location, then it should be noted. In addition, the characteristics of the other location should be described and compared to this location (ie proximity of bus service).

Response:

- *Please refer to the Memorandum of Understanding from PCC Cascade.*
- *Please refer to the Transportation and Parking document provided by the client, Chris Poole-Jones enclosed. As indicated in this Transportation and Parking document, it was "created by survey, community input; observation and parking use of the church across the street using the Delta site (not authorized by the Delta organization)."*

Comment:

5. Conditional Use Narrative. Please clarify whether you are now proposing both Phase I and II, or Phase I only. You've provided drawings that include Phase II, but the large-scale elevations are only for Phase I, and in general it looks like the proposal is for only Phase I. If you are proposing this review for both phases, then you will need to discuss in your narrative the increased floor area between Phase I and II, and how many more activities and events are anticipated to occur, and related information about who will be using the space and when, as you have outlined in your TDM plan.

    As stated in the pre-application conference summary, Conditional Use reviews expire after 3 years, so any development or programming proposed but not implemented within that time will be subject to a new review.

If you think that both Phase I and II might be implemented within 3 years, then you should propose both phases in your application. The CU approval applies to all projects for which permits have been issued; the work must be started within the 3 years but does not have to be completed within that time.

Response: *Phase I and a concept design of Phase II is being submitted for explanation of the adjustment requested to the max set-back off of Ainsworth street. Please refer to the narrative enclosed for further detail about the activities and anticipated users of the space provided by Chris Poole-Jones.*

Comment:

6. Site Plan. Please provide a reduced 8-1/2" x 11" version of the site plan that enlarges the site area and eliminates the large amount of space devoted to the streets and adjacent blocks. The reduced site plan will be mailed with the public notice, and it's helpful if it can be easily read and understood by the neighboring property owners who will receive it.

Response: *An 8-1/2" x 11" site plan has been included.*

Comment:

7. Adjustment narrative. It would be helpful to add to your narrative regarding the maximum setback to address Adjustment approval criteria A through F. It is very rare (if ever) that applicants address criteria G, H and I because they have to show that there are no other properties in the city where the development you propose would be possible. Criteria A through F more appropriately address your situation, so I would advise that you use those criteria and submit the additional narrative.

Response: *Please see attached, the adjustment narrative revised per BDS comment.*

cc:

IMPERVIOUS AREA CALCULATIONS

TOTAL SITE AREA = 15,000 SF

PHASE 1:

PERVIOUS AREA

PERVIOUS PAVERS	=	1,000 SF
EXISTING GREEN SPACE	=	2.520 SF
LANDSCAPED	=	600 SF
GRASSY AREA	=	1,500 SF
VEGETATED SWALES	=	802 SF
TOTAL	=	6,422 SF

IMPERVIOUS AREA = 15,000 – 6,522 = 8,578 SF

STORMWATER MANAGEMENT FAICLITY	IMPERVIOUS AREA MANAGED		SIZING FACTOR	FACILITY SURFACE AREA
PHASE 1:				
VEGETATED SWALE #1	3,000 SF	X	0.09	270 SF
VEGETATED SWALE #2	4,178 SF	X	0.09	376 SF
VEGETATED SWALE #3	1,733 SF	X	0.09	156 SF
PHASE 1 TOTALS	8,911 SF			802 SF

IMPERVIOUS AREA MANAGED = 8,911 SF GREATER THAN IMPERVIOUS AREA = 8,578 SF

PHASE 2:

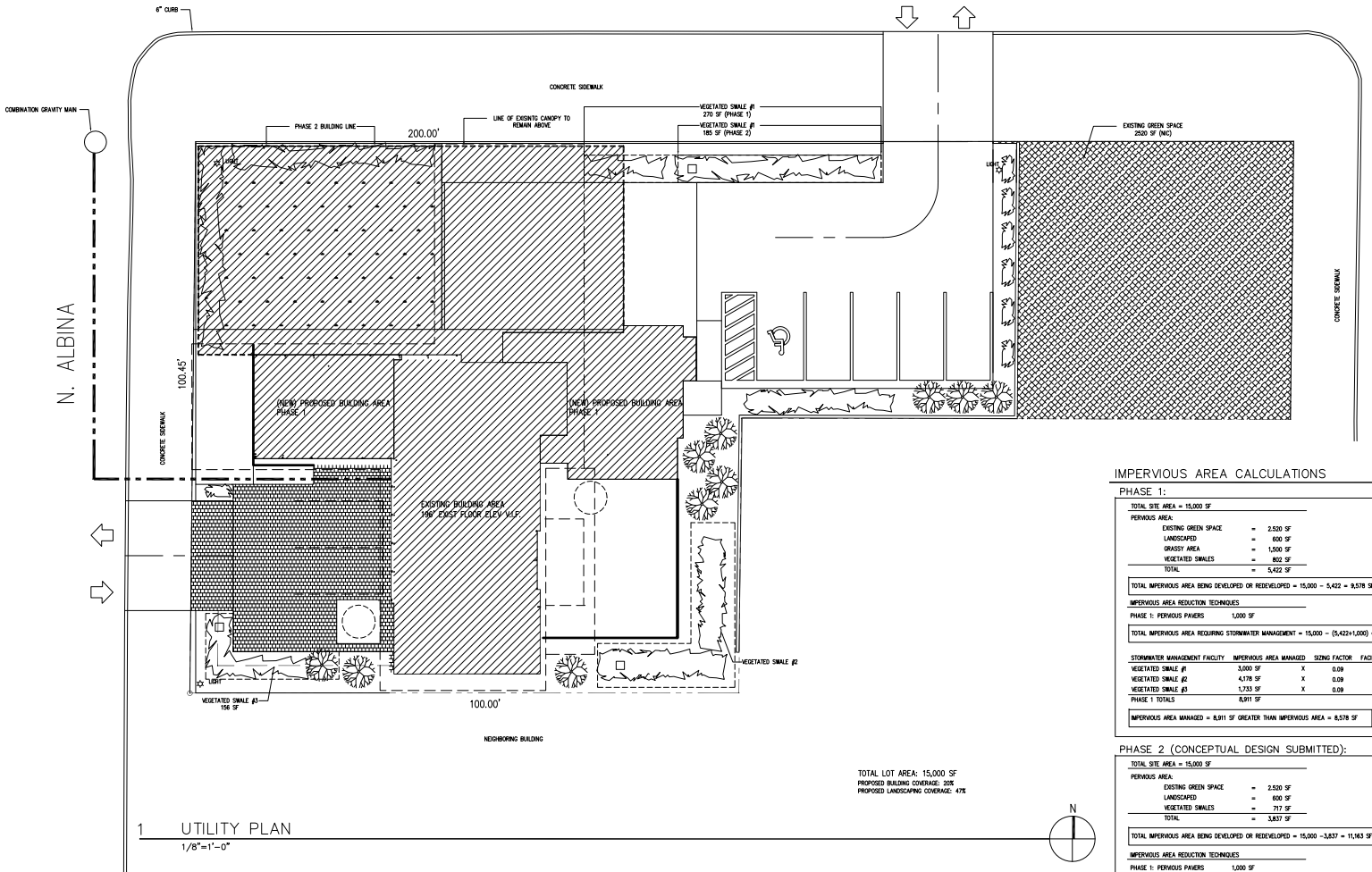
PERVIOUS AREA

PERVIOUS PAVERS	=	1,000 SF
EXISTING GREEN SPACE	=	2.520 SF
LANDSCAPED	=	600 SF
ECO–ROOF	=	2,686 SF
VEGETATED SWALES	=	717 SF
TOTAL	=	7,523 SF

IMPERVIOUS AREA = 15,000 – 7,523 = 7,477 SF

STORMWATER MANAGEMENT FAICLITY	IMPERVIOUS AREA MANAGED		SIZING FACTOR	FACILITY SURFACE AREA
PHASE 2:				
VEGETATED SWALE #1	2,055 SF	X	0.09	185 SF
VEGETATED SWALE #2	4,178 SF	X	0.09	376 SF
VEGETATED SWALE #3	1,733 SF	X	0.09	156 SF
PHASE 2 TOTALS	7,966 SF			717 SF

IMPERVIOUS AREA MANAGED = 7,966 SF GREATER THAN IMPERVIOUS AREA = 7,477 SF



1 UTILITY PLAN

1/8"=1'-0"

TOTAL LOT AREA: 15,000 SF
PROPOSED BUILDING COVERAGE: 35%
PROPOSED LANDSCAPING COVERAGE: 47%

N

IMPERVIOUS AREA CALCULATIONS

PHASE 1:

TOTAL SITE AREA = 15,000 SF

PERVIOUS AREA:

EXISTING GREEN SPACE	=	2,520 SF
LANDSCAPED	=	600 SF
GRASSY AREA	=	1,500 SF
VEGETATED SWALES	=	802 SF
TOTAL	=	5,422 SF

TOTAL IMPERVIOUS AREA BEING DEVELOPED OR REDEVELOPED = 15,000 - 5,422 = 9,578 SF

IMPERVIOUS AREA REDUCTION TECHNIQUES

PHASE 1: PERVIOUS PAVERS 1,000 SF

TOTAL IMPERVIOUS AREA REQUIRING STORMWATER MANAGEMENT = 15,000 - (5,422+1,000) = 8,578 SF

STORMWATER MANAGEMENT FACILITY	IMPERVIOUS AREA MANAGED		SIZING FACTOR	FACILITY SURFACE AREA
VEGETATED SWALE #1	3,000 SF	X	0.09	270 SF
VEGETATED SWALE #2	4,178 SF	X	0.09	376 SF
VEGETATED SWALE #3	1,733 SF	X	0.09	156 SF
PHASE 1 TOTALS	8,911 SF			802 SF

IMPERVIOUS AREA MANAGED = 8,911 SF GREATER THAN IMPERVIOUS AREA = 8,578 SF

PHASE 2 (CONCEPTUAL DESIGN SUBMITTED):

TOTAL SITE AREA = 15,000 SF

PERVIOUS AREA:

EXISTING GREEN SPACE	=	2,520 SF
LANDSCAPED	=	600 SF
VEGETATED SWALES	=	717 SF
TOTAL	=	3,837 SF

TOTAL IMPERVIOUS AREA BEING DEVELOPED OR REDEVELOPED = 15,000 - 3,837 = 11,163 SF

IMPERVIOUS AREA REDUCTION TECHNIQUES

PHASE 1: PERVIOUS PAVERS 1,000 SF
PHASE 2: ECO-ROOF 2,686 SF
TOTAL IMPERVIOUS AREA REDUCTION 3,686 SF

TOTAL IMPERVIOUS AREA REQUIRING STORMWATER MANAGEMENT = 15,000 - (3,837+3,686) = 7,477 SF

STORMWATER MANAGEMENT FACILITY	IMPERVIOUS AREA MANAGED		SIZING FACTOR	FACILITY SURFACE AREA
VEGETATED SWALE #1	2,055 SF	X	0.09	185 SF
VEGETATED SWALE #2	4,178 SF	X	0.09	376 SF
VEGETATED SWALE #3	1,733 SF	X	0.09	156 SF
PHASE 2 TOTALS	7,966 SF			717 SF

IMPERVIOUS AREA MANAGED = 7,966 SF GREATER THAN IMPERVIOUS AREA = 7,477 SF

architecture company
sienna
411 sw sixth
portland, oregon
97204.1602
503.227.5616 v
503.227.3590 f

june key delta house

5940 N ALBINA AVE
PORTLAND, OR 97217
DELTA SIGMA THETA SORORITY INC
1540 NE AINSWORTH ST
PORTLAND, OR 97211
project no: 27003

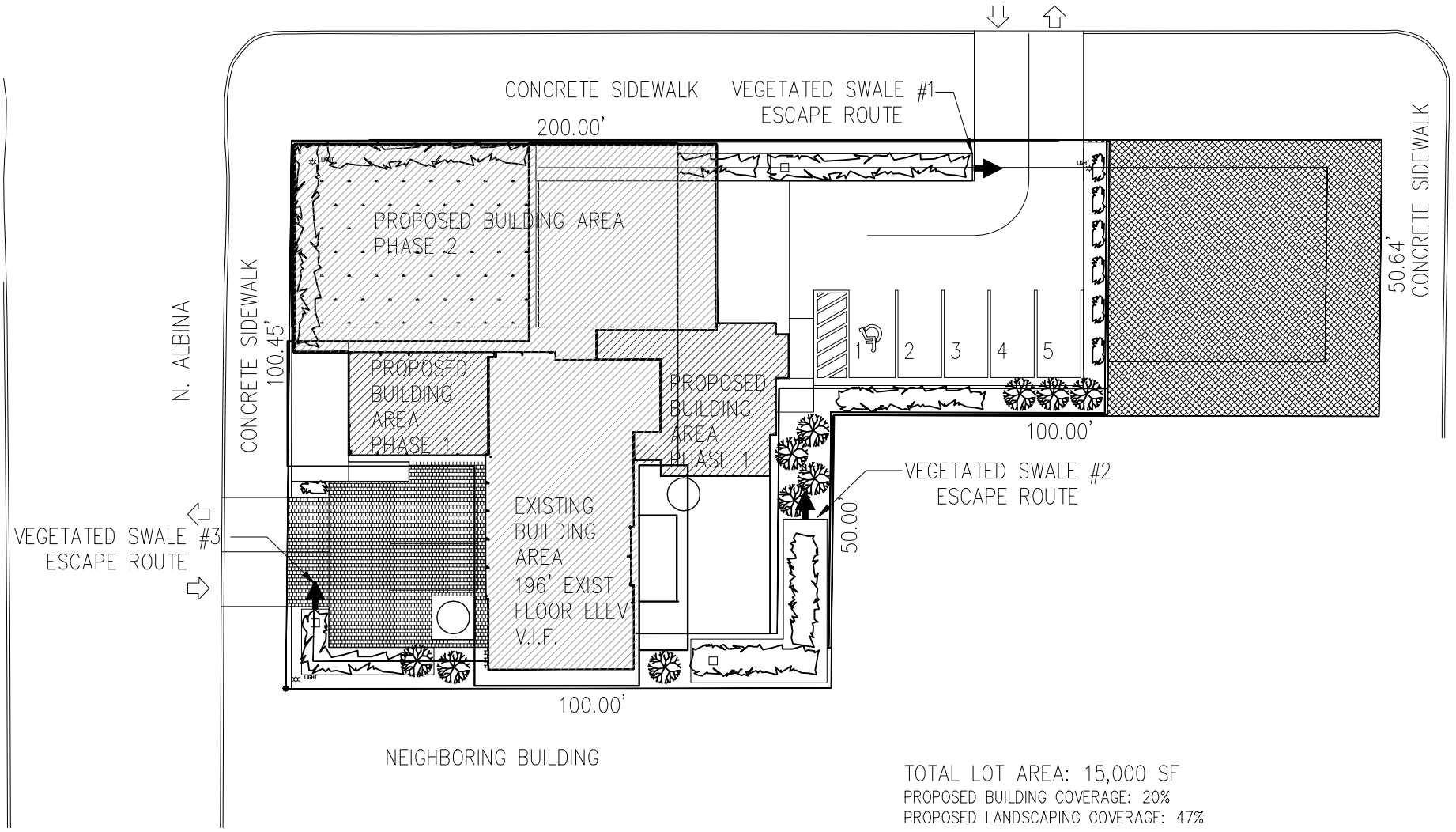
03 75% DESIGN DEVELOPMENT 10.21.08
02 ELECTRICAL DEVELOPMENT 04.22.08
01 50% DESIGN DEVELOPMENT 03.07.08

Drawn By Checked By Date

Sheet Title
UTILITY PLAN

Sheet Scale
1/16"=1'-0"

Sheet No.
A002



1 ESCAPE ROUTE DIAGRAM

Appendix H: City of Portland BES Land Use Response

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
1120 SW Fifth Avenue, Room 1000, Portland, Oregon 97204-1912 ▪ Sam Adams, Commissioner ▪ Dean Marriott, Director

LAND USE RESPONSE

Date: 5 January 2009

To: Nan Stark, BDS Land Use Services 503-823-7828

From: Elisabeth Reese Cadigan, BES System Development 503-823-2327
Sebrina Deal, BES Source Control

Subject: **LU 08-152641 CU**

Location: 5940 N ALBINA AVE **Quarter Section:** 2429

R No: R893903990

The following conditions of approval and informational comments are based on the land use review information provided to the Bureau of Environmental Services (BES). The applicant may contact me with any questions or concerns.

Proposal Summary: Application for Type III Conditional Use Review to allow a new Community Service Use in a residential zone (renovation/expansion of existing building to a community center). Changes include increasing floor area from 1,507 square feet to 2,383 square feet to accommodate a meeting space with 120-person capacity, two restrooms, accessory office space, kitchen, and exterior surface parking. Type II Adjustment Review for building setback within pedestrian district and for landscaping within setbacks.

BES Response Summary: *BES has no recommended conditions of approval. At the time of building permit review, the stormwater management plan must take into account the specific stormwater information detailed below and meet BES and BDS Site Development's approval.*

Sanitary Services

1. There is a City-owned 14-inch VSP combination gravity main in N. Albina Avenue (BES as-built 2-1472). There is a City-owned 8-inch VSP combination gravity main in N. Ainsworth St. (BES as-built 0418). Please note that these two mains do not connect at the intersection of N. Albina and N. Ainsworth. The main in N. Ainsworth that is to the east of the intersection, begins approximately 155 feet east from the intersection of N. Albina and N. Ainsworth. The main in N. Ainsworth to the west of the intersection extends from the intersection of N. Albina and N. Ainsworth to the west of the intersection. The main in N. Albina extends from the intersection to the south, along the frontage of the property.

2. City plumbing records show one permit on file, #78948 (circa 1962), for a sanitary service connection to the combination gravity main. The former development connected via a lateral to the combination gravity main in N. Albina Avenue. The plans show that the proposed development will utilize this existing connection, which is conceptually feasible. Connection to the public sanitary sewer in the public right-of-way must follow BES's "Rules of Connection" and meet the standards of the City of Portland's Sewer Design Manual.

Stormwater Management & Water Resources

1. *Stormwater Management Manual:* The stormwater runoff generated from the proposed development must meet the requirements of the City of Portland's Stormwater Management Manual (SWMM) that

Ph: 503-823-7740 Fax: 503-823-6995 TDD: 503-823-3520 ▪ www.cleanriverspdx.org ▪ An Equal Opportunity Employer ▪ Printed on recycled paper.

is current at the time of building plan review. The current version (2008) of the SWMM can be found online at www.portlandonline.com/bes. Follow the links to *Publications*, then *Stormwater Management Manual*.

2. *General Summary of SWMM Requirements:* The 2008 SWMM requires all development projects to comply with Infiltration and Discharge requirements, summarized in the Stormwater Hierarchy (Exhibit 1-2). Projects that develop or redevelop more than 500 square feet of impervious surface are required to comply with the Flow Control and Pollution Reduction requirements. Generally, the Stormwater Hierarchy requires vegetated facilities to manage stormwater runoff from development sites. Where *complete* on-site infiltration via a vegetated surface facility (Category 1) is not feasible, surface infiltration facilities must be used to the maximum degree feasible with overflow to a subsurface infiltration facility (Category 2). Categories 3 and 4 allow off-site discharge of stormwater, after vegetated facilities have been used to meet Flow Control and Pollution Reduction requirements. The Site Development Section of BDS must approve infiltration on private property. BES must approve infiltration in the public right-of-way and off-site stormwater discharge points.
3. *Existing Infrastructure:* There is no public storm-only sewer available to this project.
4. *Project Specific Stormwater Comments:* BES has reviewed the Stormwater Management Plan/Simplified Approach submittal and associated calculations prepared by Sienna Architecture and the infiltration test information submitted by Alder Geotechnical Services. BES conceptually approves of the proposed stormwater management plan with the following caveats:
    a. All stormwater management and infiltration on private property must meet the approval of BDS Site Development at the time of building plan review. All off-site stormwater discharges must meet with BES approval at the time of building plan review.
    b. All infiltration facilities have setback requirements and must meet with Site Development approval at the time of building plan review.
    c. The Stormwater Management Plan indicates on page 4 that overflow will be directed to the public combined sewer. However, since infiltration is feasible at this location, overflow must be directed infiltration facilities (such as drywells, as suggested by Site Development).
    d. Escape routes must be overland. No hard connections to the public sewer will be allowed for escape routes.
5. *Site Contamination and Infiltration:* The previous pre-application conference (08-112436) comments required additional information to be submitted to the BES Source Control. The additional information was required to address the concerns regarding the contamination that was onsite and clean-up acitivites that had occurred. All the information that was requested, including a comprehensive site map delineating contamination hot spots was received and reviewed. Additional information was submitted with this landuse outlining analytical data that was recently run on existing soils in the areas of the concern as outlined on the comprehensive maps. The results are satisfactory to the BES to allow infiltration in the proposed areas in this Land Use.
6. *DEQ UIC Requirements:* The Oregon Department of Environmental Quality (DEQ) regulates underground injection control (UIC) facilities (e.g. drywells, soakage trenches) to protect groundwater. If such a facility is used, it may require DEQ registration. The applicant is responsible for registering UICs with DEQ, as appropriate. To learn more about DEQ's UIC regulations, please visit their website (www.deq.state.or.us/wq/uic/uic.htm) or contact the DEQ UIC program at 503-229-5945. The applicant may also refer to the SWMM for general UIC information.
7. *Pervious Pavement:* BDS Site Development has conceptually approved of the use of permeable pavers at this site. **Please note that runoff from adjacent impervious areas MAY NOT be directed to pervious pavement.** Refer to pages 2-40 through 2-44 in the 2008 SWMM for more information and requirements related to pervious pavement and pavers.

8. *City of Portland Ecoroof Incentive Program:* The City of Portland, through BES, offers financial grants to select projects that install new ecoroofs. For the current funding cycle, grants are available to projects in various stages of completion, including those currently under construction, provided all other grant requirements are met. For more information, contact Alice Meyers in BES at 503-823-7914. In addition, information including the grant application, evaluation criteria, and the review process is available on the BES website. Navigate to www.portlandonline.com/bes/ecoroof and select the *Ecoroof Grant Program* link.
9. *Public Right-of-Way Comments:* Stormwater runoff from any sidewalk improvements where a curb already exists must meet the requirements of the Stormwater Management Manual and Sewer Design Manual, as approved by BES and BDS. Details about required improvements can be discussed at the PDOT Pre-Design Meeting. See the response from PDOT for more information.

Conditions of Approval

BES has no recommended conditions of approval.

Future Building Permit Application Requirements

1. Design requirements from Chapter 4 of the SWMM (Source Controls) that may be pertinent to this project are briefly described as follows with the corresponding Chapter 4 section noted. BES recommends the applicant review Chapter 4 to help recognize other requirements that may apply to this project at the building permit review stage.
    a. This area is served by a combined public sewer system. During construction, groundwater or precipitation water that is removed from the construction area and discharged to a City sewer requires pre-authorization/approval through the BES Batch Discharge Program. Fees are assessed for temporary construction discharges to the public sewer system - see the BES website for current rates and information about dewatering as it relates to construction projects.
    b. Solid waste (including grease bins/drums/boxes) and recycling (plastic, paper, glass, etc.) areas require a structural cover with a paved surface beneath the receptacles, a bermed or graded isolated area beneath the cover to protect from stormwater run-on, and a drain to the sanitary sewer within the isolated covered area.
    c. Loading docks (material transfer areas) must be isolated from stormwater run-on. The first 3 feet of the dock face must be isolated through grading, berms or drains, and that area must discharge to the sanitary sewer.
2. Additional erosion control measures are required. Stockpiles of soil must have a barrier on all four sides, and covered to protect from stormwater contact. Contaminated soil piles must also have an impervious layer underneath the stockpile to inhibit contaminates from leaching back into the soil.
3. If during construction, any contamination is found, i.e. oily smells, or stained soils, the DEQ must be notified. Please contact Kevin Dana at 503-229-5369.

Appendix I: City of Portland BDS Land Use Response

City of Portland, Oregon
Bureau of Development Services
Site Development

1900 SW 4th Avenue, Suite 5000
Portland, Oregon 97201
503-823-6892
Fax 503-823-5433
TTY 503-823-6868
www.portlandonline.com/bds

Land Use Review Response
Site Development Section, BDS

To: Nan Stark, LUR Division
From: Mary King, Site Development (823-7539)

Location/Legal: LOT 4-6 BLOCK 15, WEST PIEDMONT
Land Use Review: LU 08-152641
Proposal: Application for Type III Conditional Use Review to allow a new Community Service Use in a residential zone (renovation/expansion of existing building to a community center). Changes include increasing floor area from 1,507 square feet to 2,383 square feet to accommodate a meeting space with 120-person capacity, two restrooms, accessory office space, kitchen, and exterior surface parking. Type II Adjustment Review for building setback within pedestrian district and for landscaping within setbacks.
Quarter Sec. Map: 2429
Date: December 31, 2008

Stormwater treatment and infiltration.
The proposed Conditional Use must be found to comply with the stormwater infiltration and discharge hierarchy. The hierarchy is found on page 1-10 of the **2008 Stormwater Management Manual** and requires that stormwater must be infiltrated on site to the maximum extent feasible before discharging any flows off site.

Records indicate that this site has a history of soil contamination from previous use as a gasoline service station. However, Sebrina Nelson-Deal of BES has reviewed the Additional Site Assessment Report prepared by Worley, Parsons, Komex and confirmed that on-site infiltration of stormwater will be allowed at this location in the proposed areas designated by the applicant.

Based on the results of open pit infiltration tests performed by Alder Geotechnical Services, Site Development finds that the service criterion for stormwater can be met utilizing on-site infiltration at this location.

Site Development has reviewed the Simplified Approach stormwater report dated November 6, 2008. The information provided is sufficient for the purposes of this Conditional Use review, but additional information will be required at the time of building permit review. Use of the Simplified Approach requires that overflow from the treatment swales must be directed to an appropriate discharge location. Similarly, overflow from any proposed eco-roofs must also be directed to an appropriate discharge location. Drywells sized per the Stormwater Management Manual would be acceptable. The applicant is advised that drywells or soakage trenches may be required to be registered as Underground Injection Control facilities with the Oregon Department of Environmental Quality, in addition to City requirements. Please refer to the attached UIC Fact Sheet.

Swales 2 and 3 are within 5 feet of the property lines and, therefore, they would need to be lined. The applicant is advised that the need to use impermeable liners or water-tight flow-through planter boxes may be incompatible with landscape requirements in areas where trees and/or high screen shrubs are required.

Site Development has no objection to the proposed use of permeable pavers on this site.

Questions regarding these requirements may be directed to George Helm, (503) 823-7201.

Engineering requirements.
To evaluate whether the foundation design of the proposed structure complies with the Oregon Structural Specialty Code, a geotechnical report may be required at the time of building permit review.

Questions regarding this requirement may be directed to Jason Butler-Brown, (503) 823-4936.

Erosion control.
Erosion control requirements found in Title 10 apply to both site preparation work and development. Full compliance with the erosion control requirements of Title 10, as well as maintenance of the erosion control elements, such as silt fences on private property and bio bags in the public right-of-way, is the responsibility of the property owner, the developer of the land division and the builders of structures on the individual lots. Please refer to the City of Portland *Erosion and Sediment Control Manual* for additional information regarding erosion and sediment control requirements. An erosion control plan will be required at the time of building permit review.

UIC FACT SHEET

Requirements for Owners, Operators and Contractors of Drywells, Sumps, Trench drains…

January 2008

This fact sheet was prepared by the City of Portland to provide information about Oregon Department of Environmental Quality (DEQ) requirements for the construction and operation of drywells, sumps, trench drains and other types of underground injection controls (UICs) to protect water quality. Complete requirements and information are on the DEQ website at www.deq.state.or.us/wq/uic/uic.htm.

Owners or operators of new and existing UICs, with the exception of single-family residential roof and footing drains, are required to register and provide site inventory data to the DEQ.

Sumps, Drywells and other facilities defined as UICs

The DEQ defines a UIC as any system, structure, or activity that is intended to discharge fluids to the subsurface. This includes, but is not limited to, drywells, sumps, trench drains, and soakage trenches. UICs are co-regulated with plumbing codes. See the DEQ website for other facilities that may be considered a UIC.

Registration and Rule Authorization Requirements

Existing and proposed development or redevelopment utilizing UICs for site drainage must register and apply for rule authorization with the DEQ. New UICs must be authorized prior to construction. Application forms are available for download at www.deq.state.or.us/wq/uic/forms.htm.

The DEQ recommends that registration and rule authorization applications along with the associated fee be submitted 60-90 days prior to construction.

Decommissioning Process (UIC Closure)

Closure of a UIC requires submittal of a completed pre-closure application to DEQ before closure of the UIC. The pre-closure application requires information about the UIC, and may require the development of a sampling plan, and collection and laboratory analyses of any sediment and standing water from within the UIC to ensure site remediation or cleanup are not necessary.

DEQ Fees

There are three categories of UIC fees based on environmental risk and associated onsite activities.

- **Simple: $100 per UIC Registration or Closure (one-time fee)**
  Includes commercial or apartment building roof drains that do NOT mix roof runoff with other fluids or runoff from other sources, such as parking lots or streets.
- **Moderate: $125 per UIC Registration (one-time fee)**
  Includes stormwater runoff from commercial or industrial facilities with less than 50 devices, areas without hazardous materials, traffic areas of less than 1,000 vehicle trips per day, and no contaminated soils or groundwater.
- **Complex: $300 per UIC Registration plus $100 annually per UIC**
  Includes complex systems, facilities or sites with a higher risk for environmental degradation, including traffic areas with more than 1,000 vehicle trips per day, heavy industrial, or sites with hazardous materials or petroleum products.

Send applications with fees to:
Oregon DEQ, Business Office, 811 SW 6th Avenue, Portland, OR 97204

For more information, call the DEQ at 503-229-5945 or 503-229-5886.