Construction Contingency Plan
Soil and Groundwater Management

Rufus 2.0 Development
Block 18
Seattle, Washington

for
Acorn Development LLC

January 10, 2018

GeoEngineers
Earth Science + Technology

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Block 18
Seattle, Washington

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January 10, 2018

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

This report presents the Construction Contingency Plan and soil and groundwater handling recommendations for the redevelopment construction activities of Block 18 in the Denny Triangle Neighborhood in downtown Seattle, Washington.

Block 18 is comprised of two adjoining tax parcels (066000-0130 and -0150) and is bounded by 7th Avenue to the north, Blanchard Street to the east, an alley to the south and Bell Street to the west. These directions are considered project specific and correspond to references in the temporary shoring wall design, and are shown on Figure 2. The Rufus 2.0 Development includes the phased development of commercial high-rise structures on Blocks 14, 19, 20, 21, and 18. Block 14 has been completed, Block 19 is near completion, Block 20 is in construction, and construction for Block 21 is planned to begin in the fall of 2018. Block 18 will consist of the development of a high-rise structure with a parking garage including five below-grade levels (P1 through P5). Environmental explorations have been completed to evaluate soil and groundwater conditions prior to excavation and redevelopment activities. The soil and groundwater chemical analytical results form the basis for this Construction Contingency Plan and are being used to coordinate the management of contaminated, impacted and "non-regulated" soil (as defined and described in Sections 3.0 and 4.0 of this document).

Block 18 is referred to herein as the "Subject Property." The Subject Property is shown relative to surrounding physical features on the Vicinity Map, Figure 1. The Block 18 layout and exploration locations are shown on the Soil Chemical Analytical Results figure (Figure 2).

2.0 BACKGROUND

Several environmental studies were completed on Block 18 to evaluate potential sources of contamination and to characterize soil and groundwater beneath the subject property. Historic uses of the property are summarized in our Phase I Environmental Site Assessment (ESA) report dated June 7, 2012, and updated by Aspect Consulting on December 19, 2016. The 2017 Phase II ESA activities are summarized in our Phase II ESA report dated November 13, 2017. (Reports provided upon request.) The Phase I ESA did not identify any recognized environmental conditions (RECs) associated with the property. However, historical property research did identify the likely presence of imported soil from an unknown source. Potential contaminants of concern associated with unknown fill soil include:

- Gasoline-, diesel-, and heavy oil-range total petroleum hydrocarbons (TPH);
- Polycyclic aromatic hydrocarbons (PAHs), including carcinogenic PAHs (cPAHs);
- Volatile organic compounds (VOCs); and,
- Metals.

2.1. Soil Chemical Analytical Results

During the Phase II ESA study, cPAHs were identified in fill soil at concentrations greater than the Model Toxics Control Act (MTCA) Method A cleanup level (CUL) in an isolated location in the southeast corner of the site, at 2.5 feet below ground surface (bgs). Additionally, fill soil with detections of contaminants of concern (including TPH and/or petroleum-related VOCs) at concentrations less than

MTCA CULs was identified in the northeast and western portions of the site to depths up to ten feet bgs. Potential contaminants of concern (TPH, PAHs, VOCs, and metals) did not exceed MTCA CULs in the soil samples analyzed from native soil, and detected metals concentrations were similar to published values for natural background metals concentrations in Puget Sound soils. Soil chemical analytical results from the Phase II study are shown graphically on Figure 2 and summarized in Tables 1 and 2.

Based on the results of the Phase I and II ESA studies, fill and native soil on Block 18 was classified based on the soil categories described in section 3.0 below, as represented on the Soil Management Categories figure (Figure 3).

2.2. Groundwater Chemical Analytical Results

One boring (MW18-1) from the 2017 Phase II ESA study was completed as a groundwater monitoring well, screened from 85 to 95 feet bgs (approximately elevation 12 to 22 feet) to evaluate the potential for contaminants in the regional groundwater aquifer beneath the Site. Contaminants of concern including TPH, PAHs, VOCs, and metals were not detected above MTCA CULs, with one exception.

Total arsenic was detected at a concentration greater than the MTCA Method A CUL from the deep monitoring well (MW18-1) on May 23, 2017. Follow-up groundwater sampling from the same well on June 27, 2017 indicated total and dissolved arsenic concentrations were less than the MTCA Method A CUL. Elevated total arsenic in sample MW18-1-170523 was likely due to the presence of suspended solids (silt and sand) in the collected sample and not representative of arsenic concentrations in groundwater. Groundwater chemical analytical results from the Phase II study are summarized in Table 3.

Based on the results of the follow-up groundwater sampling, groundwater will meet the specifications for discharge to the King County combined storm-sanitary sewer without pre-treatment for hazardous chemicals. Discharge into the combined storm-sanitary sewer will need to meet King County discharge requirements for physical parameters.

2.3. Additional Soil Characterization

Additional soil characterization is planned prior to the Block 18 construction activities. Up to 14 proposed test pit excavations are distributed across the site (locations identified on Figure 3) to further delineate the horizontal and vertical extents of the soil management categories. Test pits will be completed to the fill/native soil contact depth, approximately 5 to 10 feet below ground surface. Soil management categories may be revised based on the chemical analytical results and communication with the project team.

3.0 SOIL CATEGORIES AND DEFINITIONS

3.1. Contaminated Soil

For the purposes of soil handling for the Rufus 2.0 Block 18 construction activities, soils are considered “Contaminated” and not acceptable for unrestricted end-use if one or more of the following characteristics are present:

- Contaminant concentrations for any analyte that exceeds state cleanup levels (MTCA).
- Metals are detected greater than natural background levels for the Puget Sound region (Ecology, 1994). In the cases of barium, selenium and silver where no natural background level has

been established for the Puget Sound, soil is considered "contaminated" if the detected concentrations are greater than the MTCA Method A or B Cleanup Level for Unrestricted Land Use.

- Physical evidence of contamination (sheen, odor, staining) is observed.

One isolated area of contaminated soil was identified during the Phase II ESA explorations in boring B18-2, identified in blue shading on Figure 3.

3.2. Impacted Soil

Soils are considered "Impacted" and should be transported to a controlled and permitted landfill, or owner-approved fill location if:

- Contaminant concentrations for any analyte that exceeds laboratory detection limits but are less than state cleanup levels (MTCA).
- Metals are detected greater than natural background levels for the Puget Sound region (Ecology, 1994). In the cases of barium, selenium and silver where no natural background level has been established for the Puget Sound, soil is considered "contaminated" if the detected concentrations are greater than the MTCA Method A or B Cleanup Level for Unrestricted Land Use.
- Physical evidence of contamination (sheen, odor, staining) is observed.

Impacted soil was identified during the Phase II ESA explorations in fill soil at borings B18-3, B18-6, and MW18-1, identified with yellow shading on Figure 3.

3.3. Non-Regulated Soil

Soil is considered "Non-regulated" and acceptable for unrestricted end-use if the following characteristics are true:

- Contaminants are not detected for any analyte other than metals.
- Metals are detected less than the natural background levels for the Puget Sound region (Ecology, 1994). In the cases of barium, selenium and silver where no natural background level has been established for the Puget Sound, soil is considered "non-regulated" if the detected concentrations are less than the MTCA Method A or B Cleanup Level for Unrestricted Land Use.
- Physical evidence of contamination (sheen, odor, staining, etc.) is not observed.

Based on the results of the Phase II ESA testing, fill soil in the northeast and western portions of the Site and all native soil on the Site was classified as non-regulated soil, identified with green shading on Figure 3.

Definitions of contaminated soil and natural background concentrations are provided in Washington Administrative Code (WAC) 173-350-100 for solid waste purposes.

4.0 SOIL EXCAVATION AND HANDLING RECOMMENDATIONS

4.1. Blue Category – Contaminated Soil

Contaminants of concern (cPAHs) were detected at concentrations **greater** than the MTCA cleanup levels in the blue category (shown on Figure 3). Special handling and end use considerations are needed for soil to be excavated within the blue category. The special handling and disposal should include the following:

- **Soil Excavation and Segregation**: a representative of GeoEngineers will be on site during the excavation of soil in the blue category to field screen soil and obtain confirmation soil samples. Field screening methods are described in Appendix A. As the soil in the blue category is excavated, the contractor should segregate this soil from soil excavated from the remaining categories to prevent cross-contamination of the contaminated soil in the blue category and the impacted and non-regulated soil (that is not contaminated) excavated from the yellow and green categories.
- **Loading/Transportation and/or Temporary Stockpiling of Contaminated Soil**: Contaminated soil can either be loaded directly into trucks and transported for off-site permitted disposal, or can be temporarily stockpiled on plastic sheeting (Visqueen) on the Subject Property pending end use/disposal. The Contractor must develop and maintain a procedure to track contaminated soil loads transported offsite for permitted disposal.
- **Disposal/Recycling Facilities**: excavated soil can be transported to the selected disposal facility after approval is granted by the facility. Potential disposal/recycling facilities include the following:
    - Waste Management's Columbia Ridge Landfill in Arlington, Oregon. A transfer station for this landfill is located in Seattle, Washington.

  GeoEngineers has assisted by providing the soil profile application to Seneca for each of the disposal facilities.

- **Confirmation Soil Sampling**: Confirmation soil samples will be obtained in the blue area following the removal of contaminated soil. The Contractor will temporarily halt excavation at confirmation sample locations pending receipt of chemical analytical results. Confirmation soil samples will be submitted for chemical analysis for contaminants of concern with turnaround ranges of 24-hour to approximately 7 business days, depending on the project's needs.

4.2. Yellow Category – Impacted Soil

Contaminants of potential concern (heavy oil-range petroleum hydrocarbons, and petroleum-related VOCs) were detected at concentrations **greater than** laboratory detection limits but **less than** the MTCA Method A or B cleanup levels in soil samples obtained from the fill soil in the yellow category (shown on Figure 3). Contaminants of potential concern were not detected or were detected at concentrations that represent background conditions in native soil (green category). Special handling and end use considerations are needed for Impacted soil to be excavated within the yellow category. The special handling and disposal should include the following:

- **Soil Excavation and Segregation**: as the soil in the yellow category is excavated, the contractor should segregate this soil from soil excavated from the blue category to prevent co-mingling of the impacted soil in the yellow category and the contaminated soil excavated from the blue category. Attention to soil

segregation vertically is also important, as it relates to the fill/native soil contact. GeoEngineers will be on site to assist in soil segregation activities.

- **Loading/Transporting and/or Temporary Stockpiling of Impacted Soil**: impacted soil can either be loaded directly into trucks for off-site permitted disposal, or can be temporarily stockpiled on asphalt or plastic sheeting (Visqueen) on the Subject Property pending end use/disposal. Any stockpiles that remain on-site must be covered with plastic sheets. The Contractor must develop and maintain a procedure to track impacted soil loads transported offsite for permitted disposal.
- **Disposal/Recycling Facilities**: excavated impacted soil can be transported to the selected disposal facility after approval is granted by the facility. Potential disposal/recycling facilities include the following:
    - Cadman's treatment and disposal facility in Everett, Washington.
    - Waste Management's Columbia Ridge Landfill in Arlington, Oregon. A transfer station for this landfill is located in Seattle, Washington.

  GeoEngineers is available to discuss the pros and cons of each of these disposal facilities, and has assisted by providing soil profile applications to Seneca for each of the disposal facilities.

- **Off-Site Reuse Alternative to Disposal/Recycling**: excavated Impacted soil can be transported to a receiving facility that is prequalified by the owner (Acorn Development LLC) and has been provided with the chemical analytical results and agrees (in writing) to accept the fill soil as-is with an acknowledgement that the soil may contain contaminants at low concentrations, less than MTCA cleanup levels.
- **Confirmation Soil Sampling**: No confirmation soil sampling from the excavation of the yellow category is required unless unexpected contamination is identified.

4.3. Green Category – Non-Regulated Soil

Contaminants of potential concern were **not detected** in soil samples obtained in the green category or were detected at concentrations that represent background conditions. There are no special handling or end-use requirements for this soil.

5.0 DISCOVERY OF UNEXPECTED POTENTIALLY CONTAMINATED/IMPACTED SOIL OR USTS

GeoEngineers will be on site performing periodic field screening during excavation of the yellow (impacted soil) category. Therefore, it is the contractor's responsibility to identify potentially contaminated/impacted soil as described below. Excavated soil from any location should be considered to be petroleum-contaminated/impacted if it exhibits one or more of the following physical characteristics:

- Staining;
- Petroleum hydrocarbon-like odors;
- A moderate or heavy sheen when placed in contact with water; and/or,
- Significant concentrations of organic vapors detected using headspace field screening methods.

If soil exhibits one or more of the above characteristics or if an undocumented underground storage tank (UST) is discovered, the Contractor should notify GeoEngineers immediately for characterization prior to removal and/or disposal. A "Potentially Contaminant Impacted Soil Notification Form" is presented in Appendix B. Upon discovery of potentially contaminated/impacted soil, the Contractor should refer to this guide for contact information of project contacts to notify as well as information regarding the location, type and actions taken to address the potentially contaminated soil or UST.

6.0 CONSTRUCTION DEWATERING EFFLUENT HANDLING

Static groundwater is present beneath the Subject Property at approximately 84 to 89 feet below the ground surface and discontinuous zones of shallow perched water are likely present in isolated locations beneath Block 18.

It is important for the contractor to prepare a groundwater handling plan with appropriate containment, testing and treatment methodologies. The contractor also is responsible for obtaining necessary discharge authorizations from local agencies. GeoEngineers can assist in providing information related to groundwater sampling and testing completed on the subject properties and/or support the contractor in the sampling and testing of groundwater for the presence of hazardous chemicals in order to comply with discharge permits.

7.0 DISCOVERY OF UNEXPECTED CONTAMINATED/IMPACTED GROUNDWATER

GeoEngineers will not be on site to evaluate groundwater conditions during excavation activities. Therefore, it is the Contractor's responsibility to identify potentially contaminated/impacted groundwater as described below:

- Petroleum hydrocarbon-like odors;
- A moderate or heavy sheen; and/or,
- Turbidity that may result in a discharge exceedance.

8.0 CONTACT INFORMATION

If unexpected potentially contaminated soil is discovered during construction activities, the contractor should notify GeoEngineers and Seneca Group as soon as possible. The table below presents those contacts as well as other relevant project contacts who may be contacted as back up.

RELEVANT PROJECT CONTACTS

Name	Title	Cell Phone	Office Phone	Email
Seneca Real Estate Group				
Todd Leber	Project Manager	206.550.5222	206.802.0353	toddl@senecagroup.com
GeoEngineers				
Tony Orme	Environmental Associate	425.922.2223	425.861.6076	torme@geoengineers.com
Matt Smith	Geotechnical Principal	206.963.0862	425.861.6072	msmith@geoengineers.com
Chris Brown	Environmental Project Manager	206.427.7706	206.239.3251	cbrown@geoengineers.com
Lindsay Flangas	Geotechnical Project Manager	206.251.6441	425.861.6058	lflangas@geoengineers.com
Sellen Construction Company				
Brian Duke	Project Superintendent	206.571.2628	--	Brian.duke@sellen.com

9.0 LIMITATIONS

We have prepared this report for the exclusive use of the Acorn Development LLC and their authorized agents. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

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Please refer to Appendix C, titled "Report Limitations and Guidelines for Use," for additional information pertaining to use of this report.

TABLES

GeoEngineers

Table 1

Soil Field Screening and Chemical Analytical Data (Petroleum Hydrocarbons and Metals)

Project Rufus 2.0

Block 18, Denny Triangle, Seattle, Washington

Sample Date	Exploration Location[1]	Sample ID	Depth (feet bgs)	Location of Sample Relative to Fill/Native Soil	Field Screening		Petroleum Hydrocarbons (mg/kg)			RCRA 8 Metals[4] (mg/kg)							
					Sheen	Headspace (ppm)	Gasoline Range[2]	Diesel Range[3]	Heavy Oil Range[3]	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
Hollow-Stem Auger Borings Completed May 9 to May 10, 2017																	
05/09/17	B18-1	B18-1-2.5	2.5	Fill	NS	<1	<4.98	<22.9	<57.3	**6.5**	**99.6**	<0.182	**53.9**	**3.68**	**1.95**	<0.0909	<0.293
05/09/17	B18-1	B18-1-7.5	7.5	Native	NS	<1	<5.63	<21.0	<52.4	**2.79**	**25.7**	<0.171	**21.3**	**1.23**	**0.713**	<0.0856	<0.26
05/09/17	B18-2	B18-2-2.5	2.5	Fill	NS	<1	<7.66	<23.6	**125**	**5.3**	**135**	<0.204	**70.8**	**6.29**	**2.06**	<0.102	<0.286
05/09/17	B18-2	B18-2-5.0	5	Native	NS	<1	<5.70	<22.6	<56.4	**5.42**	**141**	<0.188	**68.7**	**5.30**	**1.86**	<0.0942	<0.325
05/09/17	B18-2	B18-2-10.0	10	Native	NS	<1	<5.84	<23.6	<58.9	**5.48**	**124**	<0.2	**67.3**	**4.68**	**2.25**	<0.0999	<0.312
05/08/17	B18-3	B18-3-5.0	5	Fill	NS	<1	<5.0	<22.9	**104**	**4.57**	**103**	<0.183	**55.2**	**5.03**	**1.77**	<0.0921	<0.278
05/08/17	B18-3	B18-3-15.0	15	Native	NS	<1	<11.1	<20.5	<51.3	**1.48**	**48.2**	<0.164	**32.3**	**1.66**	**0.966**	<0.0818	<0.241
05/10/17	MW18-1	MW18-1-2.5	2.5	Fill	NS	<1	<6.28	<19.9	**138**	**1.94**	**39.9**	<0.168	**32.7**	**1.86**	**0.98**	<0.084	<0.226
05/10/17	MW18-1	MW18-1-7.5	7.5	Native	NS	<1	<5.99	<20.9	<52.2	**3.19**	**45.1**	<0.155	**30.4**	**1.93**	**1.12**	<0.0777	<0.259
Direct-Push Borings Completed May 16, 2017																	
05/16/17	B18-4	B18-4-5.0	5	Fill	NS	<1	<7.95	<24.0	<60.1	**4.98**	**93.1**	<0.195	**61**	**4.19**	**1.67**	<0.0973	<0.302
05/16/17	B18-4	B18-4-15.0	15	Native	NS	<1	<4.51	<20.5	<51.3	**2.58**	**51.5**	<0.169	**38.1**	**1.94**	**1.05**	<0.0847	<0.253
05/16/17	B18-5	B18-5-2.5	2.5	Native	NS	<1	<4.91	<19	<47.6	**2.69**	**38.6**	<0.173	**34.6**	**2.07**	**1.08**	<0.0863	<0.264
05/16/17	B18-5	B18-5-10.0	10	Native	NS	<1	<6.22	<20.7	<51.8	**1.82**	**31.5**	<0.161	**35.9**	**1.54**	**1**	<0.0806	<0.260
05/16/17	B18-6	B18-6-5.0	5	Fill	NS	<1	<4.23	<19.5	<48.8	**2.18**	**30.2**	<0.170	**28.8**	**1.61**	**1.06**	<0.0851	<0.267
05/16/17	B18-6	B18-6-10.0	10	Fill	NS	<1	<4.91	<19.5	**127**	**3.3**	**52.6**	<0.174	**88.3**[7]	**2.43**	**1.37**	<0.0870	<0251
05/16/17	B18-7	B18-7-2.5	2.5	Fill	NS	<1	<4.65	<19.5	<48.8	**1.75**	**26.4**	<0.155	**26.9**	**1.49**	**0.827**	<0.0775	<0.256
05/16/17	B18-8	B18-8-2.5	2.5	Fill	NS	<1	<7.96	<19.4	<48.4	**2.39**	**31.2**	<0.172	**28**	**1.55**	**1.02**	<0.0858	<0.268
05/16/17	B18-8	B18-8-10.0	10	Native	SS	<1	<5.26	<19.9	<49.8	**2.73**	**49.4**	<0.182	**59.9**	**2.13**	**1.2**	<0.0908	<0.261
05/16/17	B18-8	B18-8-15.0	15	Native	NS	<1	<6.21	<20.1	<50.4	**2.36**	**34.4**	<0.154	**33.4**	**1.7**	**1.01**	<0.0772	<0.263
05/16/17	B18-9	B18-9-5.0	5	Native	NS	<1	<7.93	<23.8	<59.5	**5.03**	**136**	<0.203	**88.5**[8]	**5.91**	**2.21**	0.102	0.0324
05/16/17	B18-9	B18-9-10.0	10	Native	NS	<1	<5.43	<25.0	<62.5	**5.02**	**121**	<0.189	**85.6**[9]	**5.6**	**2.11**	<0.0943	<0.0315
MTCA Method A or B Cleanup Level for Unrestricted Land Use							30/100[5]	2,000		20	16,000	2	2,000[6]	250	400	400	2
Puget Sound Natural Background Concentration										7	0.6	1	48	24	ne	ne	0.07

Notes:

[1]Approximate exploration locations shown on the attached figures. Chemical analytical testing by Fremont Analytical in Seattle, Washington.

[2]Gasoline-range hydrocarbons analyzed by petroleum hydrocarbon identification using Northwest Method NWTPH-Gx.

[3]Diesel- and heavy oil-range hydrocarbons analyzed by Northwest Method NWTPH-Dx.

[4]Total metals analyzed by EPA Method 6020/7471.

[5]When benzene is present, the gasoline range cleanup level is 30 mg/kg. When benzene is not present the gasoline range cleanup level is 100 mg/kg.

[6]MTCA Method A cleanup level for Chromium III (Trivalent Chromium).

[7]The chromium detected in this sample was also submitted for Chromium Speciation using EPA Method 7196. Hexavalent Chromium (Chromium VI) was not detected above laboratory reporting limits (0.542 mg/kg).

[8]The chromium detected in this sample was also submitted for Chromium Speciation using EPA Method 7196. Hexavalent Chromium (Chromium VI) was not detected above laboratory reporting limits (0.651 mg/kg).

[9]The chromium detected in this sample was also submitted for Chromium Speciation using EPA Method 7196. Hexavalent Chromium (Chromium VI) was not detected above laboratory reporting limits (0.614 mg/kg).

mg/kg = milligrams per kilogram

bgs = below ground surface

ne = not established

ns = no sheen, ss = slight sheen

-- = not tested

Bolding indicates analyte was detected. Shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 2

Soil Chemical Analytical Data (VOCs and PAHs)

Project Rufus 2.0

Block 18, Denny Triangle, Seattle, Washington

Sample Date	Exploration Location[1]	Sample ID	Depth (feet bgs)	Location of Sample Relative to Fill/Native Soil	Non-Carcinogenic PAHs[2] (µg/kg)						Total cPAHs[3] (µg/kg)	VOCs[4] (mg/kg)				
					Acenaphthene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo (g,h,i) perylene	TEQ	Methylene Chloride	Total Xylenes	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	Other VOCs
Hollow-Stem Auger Borings Completed May 9 to May 10, 2017																
05/09/17	B18-1	B18-1-2.5	2.5	Fill	<46.9	<46.9	<46.9	<46.9	<46.9	<46.9	ND	<0.0199	<0.0199	<0.0199	<0.0199	ND
05/09/17	B18-1	B18-1-7.5	7.5	Native	<43.9	<43.9	<43.9	<43.9	<43.9	<43.9	ND	<0.0225	<0.0225	<0.0225	<0.0225	ND
05/09/17	B18-2	B18-2-2.5	2.5	Fill	**218**	**343**	**273**	**139**	**137**	**71.7**	**189.92**	<0.0306	**0.1548**	**0.0784**	**0.118**	ND
05/09/17	B18-2	B18-2-5.0	5	Native	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	ND	<0.0228	<0.0228	<0.0228	<0.0228	ND
05/09/17	B18-2	B18-2-10.0	10	Native	<49.6	<49.6	<49.6	<49.6	<49.6	<49.6	ND	<0.0234	<0.0234	<0.0234	<0.0234	ND
05/08/17	B18-3	B18-3-5.0	5	Fill	<43.9	<43.9	<43.9	<43.9	<43.9	<43.9	ND	<0.02	<0.02	<0.02	<0.02	ND
05/08/17	B18-3	B18-3-15.0	15	Native	<41.8	<41.8	<41.8	<41.8	<41.8	<41.8	ND	<0.0446	<0.0446	<0.0446	<0.0446	ND
05/10/17	MW18-1	MW18-1-2.5	2.5	Fill	<41.8	<41.8	<421	<41.8	<41.8	<41.8	ND	**0.0419**[6]	<0.0251	<0.0251	<0.0251	ND
05/10/17	MW18-1	MW18-1-7.5	7.5	Native	<41.8	<41.8	<41.8	<41.8	<41.8	<41.8	ND	<0.0239	<0.0239	<0.0239	<0.0239	ND
Direct-Push Borings Completed May 16, 2017																
05/16/17	B18-4	B18-4-5.0	5	Fill	<43.9	<43.9	<43.9	<43.9	<43.9	<43.9	ND	<0.0318	<0.0318	<0.0318	<0.0318	ND
05/16/17	B18-4	B18-4-15.0	15	Native	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	ND	<0.0180	<0.0180	<0.0180	<0.0180	ND
05/16/17	B18-5	B18-5-2.5	2.5	Native	<42.6	<42.6	<42.6	<42.6	<42.6	<42.6	ND	<0.0197	<0.0197	<0.0197	<0.0197	ND
05/16/17	B18-5	B18-5-10.0	10	Native	<42.6	<42.6	<42.6	<42.6	<42.6	<42.6	ND	<0.0249	<0.0249	<0.0249	<0.0249	ND
05/16/17	B18-6	B18-6-5.0	5	Fill	<38.9	<38.9	<38.9	<38.9	<38.9	<38.9	ND	<.0169	<.0169	<.0169	<.0169	ND
05/16/17	B18-6	B18-6-10.0	10	Fill	<39.1	<39.1	<39.1	<39.1	<39.1	<39.1	ND	<.0196	<.0196	<.0196	<.0196	ND
05/16/17	B18-7	B18-7-2.5	2.5	Fill	<35.0	<35.0	<35.0	<35.0	<35.0	<35.0	ND	<0.0186	<0.0186	<0.0186	<0.0186	ND
05/16/17	B18-8	B18-8-2.5	2.5	Fill	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	ND	<0.0318	<0.0318	<0.0318	<0.0318	ND
05/16/17	B18-8	B18-8-10.0	10	Native	<42.7	<42.7	<42.7	<42.7	<42.7	<42.7	ND	<0.0210	<0.0210	<0.0210	<0.0210	ND
05/16/17	B18-8	B18-8-15.0	15	Native	<40.5	<40.5	<40.5	<40.5	<40.5	<40.5	ND	<0.0250	<0.0250	<0.0250	<0.0250	ND
05/16/17	B18-9	B18-9-5.0	5	Native	<48.3	<48.3	<48.3	<48.3	<48.3	<48.3	ND	<0.0317	<0.0317	<0.0317	<0.0317	ND
05/16/17	B18-9	B18-9-10.0	10	Native	<48.8	<48.8	<48.8	<48.8	<48.8	<48.8	ND	<0.0217	<0.0217	<0.0217	<0.0217	ND
MTCA Method A or B Cleanup Level for Unrestricted Land Use					ne	3,200,000	2,400,000	ne	2,400,000	ne	100	0.02	9[5]	800	ne	Varies

Notes:

[1]Approximate exploration locations shown on the attached figures. Chemical analytical testing by Fremont Analytical in Seattle, Washington.

[2]Polycyclic aromatic hydrocarbons (PAHs) analyzed by EPA Method 8270D/SIM. See the laboratory report for the full list of compounds analyzed.

[3]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) analyzed by EPA Method 8270D/SIM. Total cPAHs calculated using the toxicity equivalency (TEQ) methodology specified in WAC 173-340-780(8). cPAHs that were not detected were assigned half the value of the detection limit for these calculations except when none were detected.

[4]Volatile organic compounds (VOCs) were analyzed by EPA Method 8260C. For VOCs, only detected compounds are presented in the table. See the laboratory report for the full list of compounds analyzed and detection limits.

[5]MTCA method A cleanup level for the sum of m,p- and o-xylenes (Total Xylenes).

[6]Methylene chloride is a common laboratory solvent and was likely introduced during sample preparation.

µg/kg = micrograms per kilogram

bgs = below ground surface

mg/kg = milligrams per kilogram

-- = Not Tested

ne = not established

ND = not detected above laboratory reporting limits

Bolding indicates analyte was detected. Shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 3

Groundwater Chemical Analytical Data

Project Rufus 2.0

Block 18, Denny Triangle, Seattle, Washington

Sample Date	Exploration Location[1]	Screened Interval (feet bgs)	Sample ID	Depth to Water (feet bgs)	Petroleum Hydrocarbons (mg/L)			Total RCRA 8 Metals[4] (mg/L)								Dissolved Metals[4] (µg/L)	VOCs[5] (µg/L)	PAHs[6] (µg/L)
					Gasoline Range[2]	Diesel Range[3]	Heavy Oil Range[3]	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury	Arsenic		
05/23/17	MW18-1	85-95	MW18-1-170523	88.9	<50.0	<49.9	<99.8	**22.5**	**2210**	**1.46**	**33.3**	**8.08**	**19.5**	<0.2	<0.1	--	ND	ND
06/27/17			MW18-1-06272017	--	--	--	--	**1.27**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**1.05**	--	--
MTCA Method A or B Cleanup Level					800/1,000[7]	500	500	5	3,200	5	50	15	80	80	2	5	varies	varies

Notes:

[1]Approximate exploration locations shown on the attached figures. Chemical analytical testing by Fremont Analytical in Seattle, Washington.

[2]Gasoline-range hydrocarbons analyzed by petroleum hydrocarbon identification using Northwest Method NWTPH-Gx.

[3]Diesel- and heavy oil-range hydrocarbons analyzed by Northwest Method NWTPH-Dx.

[4]Total and dissolved metals analyzed by EPA 200.8/245.1.

[5]Volatile organic compounds (VOCs) were analyzed by EPA Method 8260C. For VOCs, only detected compounds are presented in the table. See the laboratory report for the full list of compounds analyzed and detection limits.

[6]Polycyclic aromatic hydrocarbons (PAHs) analyzed by EPA Method 8270D/SIM. For PAHs, only detected compounds are presented in the table. See the laboratory report for the full list of compounds analyzed and detection limits.

[7]When benzene is present, the gasoline range cleanup level is 800 µg/L. When benzene is not present the gasoline range cleanup level is 1000 µg/L.

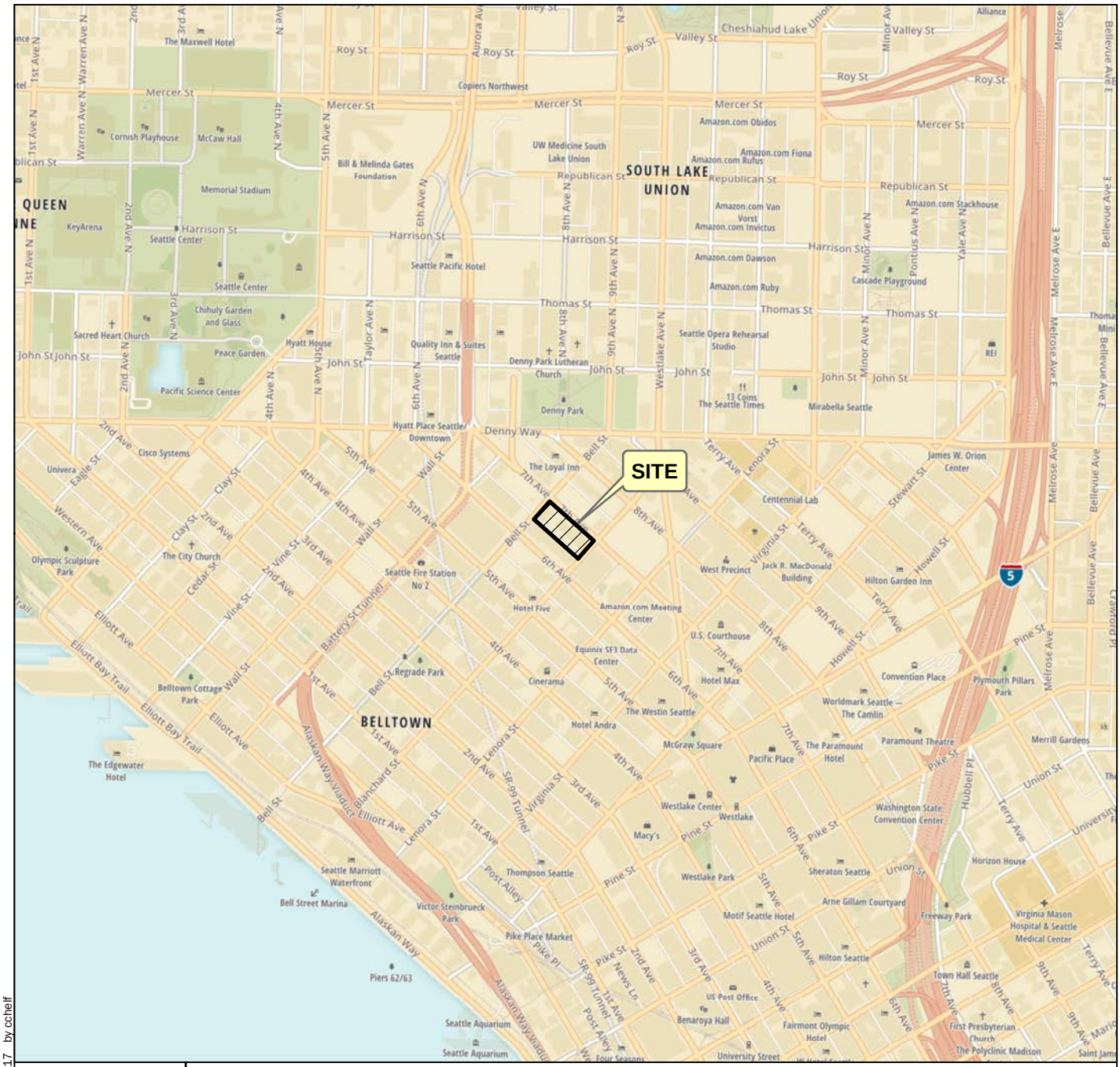
bgs = below ground surface

µg/L = micrograms per liter

Bolding indicates analyte was detected. Shading indicates analyte was detected at a concentraion greater than the MTCA cleanup level.

FIGURES

GeoEngineers



Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2016

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Vicinity Map

Rufus 2.0 Development - Block 18
Seattle, Washington

GeoEngineers

Figure 1

P:\20\20434001\GIS\2043400131_F01_VicinityMap.mxd Date Exported: 05/09/17 by cchelf

Legend

- Site Boundary
- MW18-1 — Boring with Monitoring Well by GeoEngineers, 2017 (Current Study)
- B18-1 — Boring by GeoEngineers, 2017 (Current Study)
- B-3 — Boring with Monitoring Well by Aspect, 2016
- B-1 — Boring by Aspect, 2015
- MW19-1 — Boring with Monitoring Well by GeoEngineers, 2012 and 2013
- B19-1 — Boring by GeoEngineers, 2012
- B-1 — Boring by Shannon and Wilson, 1964

Soil Chemical Analytical Results

- Contaminants of concern detected at concentrations greater than the corresponding MTCA cleanup levels
- Contaminants of concern detected at concentrations less than the corresponding MTCA cleanup levels
- Contaminants of concern were not detected, or were detected at concentrations similar to natural background concentrations (metals only).

(2.5) Sample obtained from Fill Soil

(7.5) Sample obtained from Native Soil

Depth bgs
Sample Result

bgs = Below Ground Surface

NT = Not Tested

Note: Sample collected at 10 feet bgs at B18-6 is characterized as fill soil.

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base map was taken from BRH, Dated 12/21/2016

Projection: WA State Plane, North Zone, NAD83, US Foot

Actual

Project

50 0 50
Feet

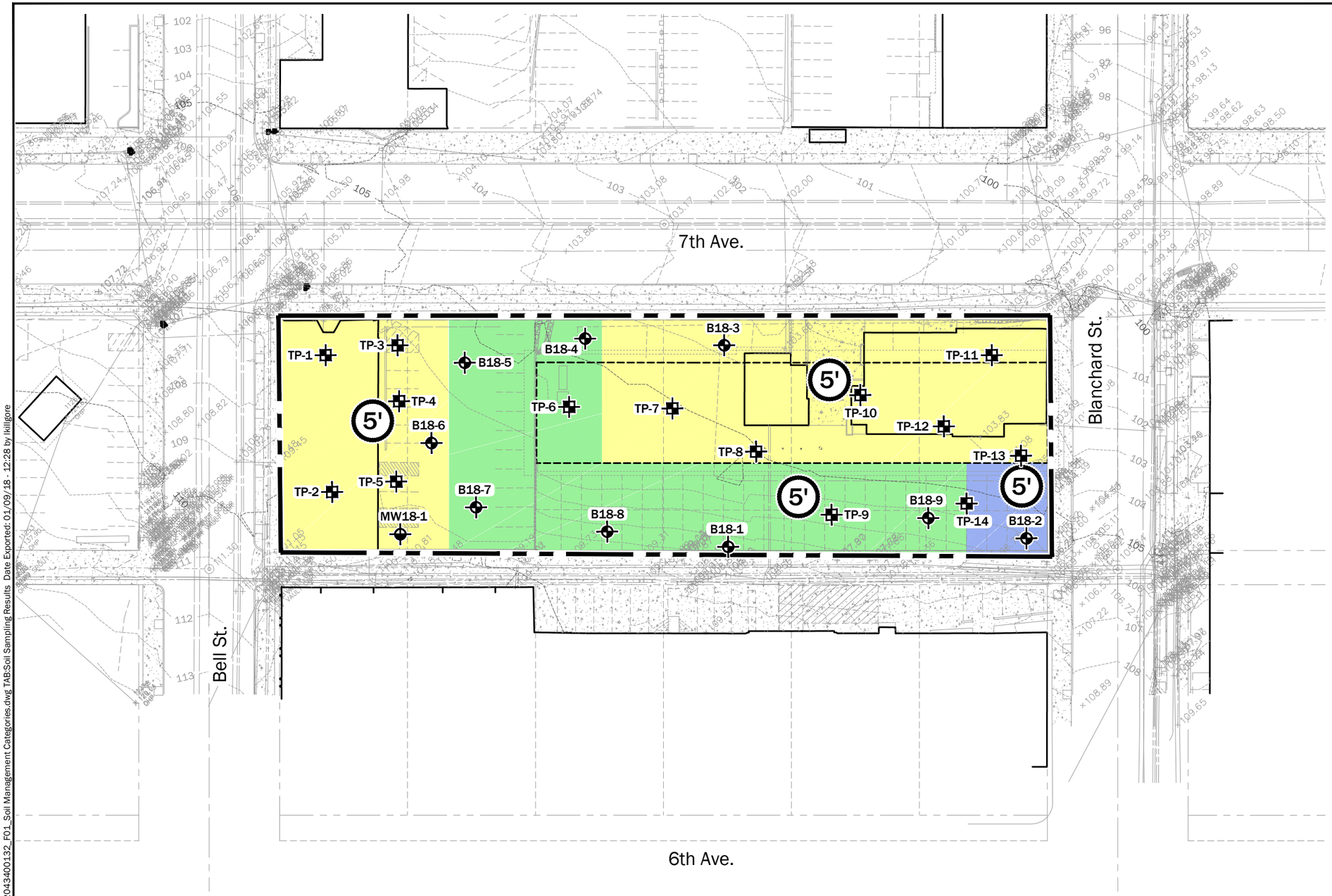
Soil Chemical Analytical Results

Rufus 2.0 Development - Block 18
Seattle, Washington

GeoEngineers

Figure 2

P:\20\20434001\CAD\32\Environmental\20434001132_F02-F03_Site Plan and Cross-Section.dwg TAB:Soil Sampling Results Date Exported: 08/25/17 - 12:53 by tmichaud



Legend

- Site Boundary
- MW18-1 — Boring with Monitoring Well by GeoEngineers, 2017
- B18-1 — Boring by GeoEngineers, 2017
- MW19-1 — Boring with Monitoring Well by GeoEngineers, 2012 and 2013
- B19-1 — Boring by GeoEngineers, 2012
- TP-1 — Proposed Test Pit Location (following building demolition)

Soil Management Categories

Contaminated: Approximate location of soil with contaminants of concern detected at concentrations greater than the MCTA cleanup levels, based on the best available information at the time the Phase II ESA and Construction Contingency Plan reports were completed.

Impacted: Approximate location of fill soil with contaminants of concern detected at concentrations less than the MCTA cleanup levels, based on the best available information at the time the Phase II ESA and Construction Contingency Plan reports were completed.

Non-Regulated: Approximate location of soil with contaminants of concern not detected, based on the best available information at the time the Phase II ESA and Construction Contingency Plan reports were completed.

5' — Average fill thickness (feet) estimated to calculated soil disposal costs. Actual fill thickness varies from approximately 2.5 to 10 feet by location.

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base map was taken from BRH, Dated 12/21/2016

Projection: WA State Plane, North Zone, NAD83, US Foot

Actual / Project

50 0 50
Feet

Soil Management Categories and Proposed Exploration Locations

Rufus 2.0 Development - Block 18
Seattle, Washington

GeoEngineers

Figure 3

P:\20\20434001\CAD\32\Environmental\20434001132_F01_Soil Management Categories.dwg TAB:Soil Sampling Results Date Exported: 01/09/18 - 12:28 by lkillgore

APPENDICES

GeoEngineers

APPENDIX A
Field Procedures

APPENDIX A
FIELD PROCEDURES

Field Screening of Soil Samples

Soil samples obtained from the explorations will be evaluated for evidence of possible contamination using field screening techniques. Field screening results can be used as a general guideline to delineate areas of possible petroleum- or volatile organic compound (VOC)-related contamination in soils. In addition, screening results are often used as a basis for selecting soil samples for chemical analysis. The screening methods employed included: (1) visual examination, (2) water sheen testing, and (3) headspace vapor testing using a photoionization detector (PID).

Visual screening consists of observing the soil for stains indicative of petroleum-related contamination. Visual screening is generally more effective when contamination is related to heavy petroleum hydrocarbons such as motor oil, or when hydrocarbon concentrations are high. Sheen screening is a more sensitive screening method that can be effective in detecting petroleum-based products.

Water sheen testing involves placing soil in water and observing the water surface for signs of sheen. Sheens are classified as follows:

No Sheen (NS)	No visible sheen on water surface.
Slight Sheen (SS)	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly.
Moderate Sheen (MS)	Light to heavy sheen, may have some color/iridescence; spread is irregular to flowing; few remaining areas of no sheen on water surface.
Heavy Sheen (HS)	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen.

Headspace vapor screening involves placing a soil sample in a plastic bag. Air is captured in the bag, and the bag is shaken to expose the soil to the air trapped in the bag. The probe of the PID is inserted into the bag. The PID measures the concentration of photoionizable gases and vapors in the sample bag headspace. The PID is designed to quantify photoionizable gases and vapors up to 2,000 parts per million (ppm), and is calibrated with isobutylene. A lower threshold of significance of 1 ppm is used in application.

Field screening results are site- and exploration- specific. The results may vary with temperature, moisture content, soil lithology, organic content and type of contaminant. The presence or absence of sheen does not necessarily confirm the presence or absence of contaminants in a sample.

APPENDIX B
Potentially Contaminant Impacted Soil Notification Form

RUFUS 2.0 REDEVELOPMENT
POTENTIALLY CONTAMINANT IMPACTED SOIL NOTIFICATION FORM

Prepared for:	**GENERAL INFORMATION**	
Acorn Development LLC c/o Seneca Group 1191 Second Avenue, Suite 1500 Seattle, Washington 98101	DATE OF DISCOVERY:	TIME OF DISCOVERY:
	PERSON DISCOVERING CONDITION:	PHONE NUMBER:
Prepared by: GeoEngineers 600 Stewart Street, Suite 1700 Seattle, Washington 98101 206.728.2674	PERSON FILLING OUT FORM:	PHONE NUMBER:
	APPROXIMATE LOCATION OF SOIL ON THE SITE:	

SOIL CHARACTERISTICS

PHYSICAL CHARACTERISTICS:

Odor:
- ☐ Yes (Describe_____)
- ☐ No

Staining:
- ☐ Yes (Describe_____)
- ☐ No

Other: _____

_____

SOIL DISTURBED:
- ☐ Soil in-place
- ☐ Soil stockpiled

FREE LIQUIDS:
- ☐ Yes (Content_____%)
- ☐ No

ACTIONS TAKEN: _____

_____

_____

_____

_____

ESTIMATED VOLUME OF CONTAMINATED SOIL:

NOTIFICATION CONTACT INFORMATION

SENECA	**GEOENGINEERS**	**Sellen Construction**
Todd Leber	Chris Brown	Brian Duke
C: 206.550.5222	D: 206.239.3251	C: 206.571.2628
toddl@senecagroup.com	C: 206.427.7706	Brian.duke@sellen.com
	cbrown@geoengineers.com	

ADDITIONAL INFORMATION

This record serves to document information, actions, and notifications regarding the discovery of and response to the presence of suspected and known contamination on the project.

APPENDIX C
Report Limitations and Guidelines for Use

APPENDIX C
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This Appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering, geology and environmental science) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Environmental Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for the exclusive use of Acorn Development LLC their authorized agents and regulatory agencies. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment or remedial action study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except Acorn Development LLC should rely on this plan without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

This Environmental Report Is Based on a Unique Set of Project-Specific Factors

This report applies to Block 18 in the Denny Triangle neighborhood of Seattle, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

If important changes are made after the date of this remedial action plan, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.

Reliance Conditions for Third Parties

No third party may rely on the product of our services unless GeoEngineers agrees in advance, and in writing to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Environmental Regulations Are Always Evolving

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Uncertainty May Remain after Completion of Remedial Activities

Remediation activity completed in a portion of a site cannot wholly eliminate uncertainty regarding the potential for contamination in connection with a property. Our interpretation of subsurface conditions in this study is based on field observations and chemical analytical data from widely spaced sampling locations. It is always possible that contamination exists in areas that were not explored, sampled or analyzed.

Subsurface Conditions Can Change

This environmental report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying this report to determine if it is still applicable.

Soil and Groundwater End Use

The cleanup levels referenced in this report are site- and situation-specific. The cleanup levels may not be applicable for other sites or for other on-site uses of the affected media (soil and/or groundwater). Note that hazardous substances may be present in some of the site soil and/or groundwater at detectable concentrations that are less than the referenced cleanup levels. GeoEngineers should be contacted prior to the export of soil or groundwater from the subject site or reuse of the affected media on site to evaluate the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject site to another location or its reuse on site in instances that we were not aware of or could not control.

Most Environmental Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical, Geologic and Geoenvironmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants and no conclusions or inferences should be drawn regarding Biological Pollutants, as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If the client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.

Have we delivered World Class Client Service?
Please let us know by visiting **www.geoengineers.com/feedback**.

GeoEngineers