GeoDesign Inc

CONTAMINATED MEDIA MANAGEMENT PLAN

N Roshak Property
13794 and 13580 SW Roy Rogers Road
Tigard, Oregon

For
Oregon Department of Environmental Quality
November 7, 2018

GeoDesign Project: Polygon-166-01

GeoDesign INC

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Oregon Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232

Attention: Kevin Dana

Contaminated Media Management Plan
N Roshak Property
13794 and 13580 SW Roy Rogers Road
Tigard, Oregon
GeoDesign Project: Polygon-166-01

GeoDesign, Inc. is pleased to submit this CMMP for the planned N Roshak Property site located at 13794 and 13580 SW Roy Rogers Road in Tigard, Oregon. This CMMP addresses the management of known and potentially contaminated media that could be encountered during future site redevelopment and includes protocols for the proper identification, response actions, communications, removal, temporary stockpiling, transportation, and disposal of contaminated soil.

Sincerely,

GeoDesign, Inc.

Jason O'Donnell, R.G.
Principal Geologist

cc: Pam Verdadero, Polygon Northwest Company (via email only)

KRS:JSO:kt
Attachments
One copy submitted
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ACRONYMS AND ABBREVIATIONS

AST	aboveground storage tank
BGS	below ground surface
CFR	Code of Federal Regulations
CFSL	Clean Fill Screening Level
CMMP	Contaminated Media Management Plan
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DEQ	Oregon Department of Environmental Quality
ECSI	Environmental Cleanup Site Information
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
HCP	Hazard Communication Plan
HSP	Health and Safety Plan
ICPMS	inductively coupled plasma mass spectrometry
I.D.	identification
LUCS	Land Use Compatibility Study
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MRL	method reporting limit
NA	not applicable
NC	not calculated
NE	not established
OAR	Oregon Administrative Rule
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PPE	personal protective equipment
RBC	risk-based concentration
RBDM	*Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites*
RCRA	Resource Conservation and Recovery Act
SSO	site safety officer
SWLA	Solid Waste Letter of Authorization
SWPE	Solid Waste Permit Exemption
TMB	trimethylbenzene
UST	underground storage tank
VCP	Voluntary Cleanup Program
VOC	volatile organic compound

1.0 INTRODUCTION

This CMMP has been prepared by GeoDesign, Inc. on behalf of Polygon Northwest Company (Polygon) for the planned N Roshak Property development located at 13794 and 13850 SW Roy Rogers Road in Tigard, Oregon (project site). The project site includes Tax Lots 3300 and 3301 of Washington County Tax Map 2S16; consists of 38.52 acres; and is currently occupied by two rural residences, associated outbuildings, a large irrigation pond, a small pond, a creek, and agricultural land.

The project site is shown relative to surrounding physical features on Figure 1. The project site and surrounding properties are shown on Figures 2 and 3. Acronyms and abbreviations used herein are defined above, immediately following the Table of Contents.

A site-specific HSP and directions to the Legacy Meridian Park Medical Center are presented in Appendix A. The attached HSP was created solely for use by GeoDesign employees. However, contractors may adopt the HSP with proper modifications, as needed, to address the type of work they will be completing at the project site.

1.1 OBJECTIVE

The objective of this CMMP is to assist contractors or on-site workers in field identification and management of potentially contaminated media (soil and sediment) that may be encountered during future earthwork-related construction activities. This CMMP includes field protocol for identification, response actions, communications, removal, temporary storage or stockpiling, transportation, and treatment and/or disposal of contaminated media.

2.0 PLANNED DEVELOPMENT

The planned development includes construction of commercial, mixed-use (commercial/apartments), apartment, and residential structures and associated utilities and roadways. The planned development also includes the creation of parks and/or open spaces, including a public park and improved habitat for the ponds located in the northwest portion of the project site. The layout of the proposed commercial/residential development is shown on the Area Site Plans, presented in Appendix B.

3.0 BACKGROUND

GeoDesign conducted a Phase I ESA of Tax Lots 3300 and 3301 of the project site in July 2018. The Phase I ESA indicated that the project site has historically been used for cropland, and the agricultural practice of crop production often includes the application of pesticides and/or herbicides. In addition, the following features of environmental concern were observed during the Phase I ESA site reconnaissance:

- A berm of undocumented fill was observed at the northwest boundary of the large irrigation pond in the central portion of the project site.
- Drums and containers of petroleum products along with surface soil staining were observed in a vehicle maintenance building.
- Three fueling ASTs were historically located west of the storage building.

Based on the historical agricultural use of the project site and features of environmental concern observed during the site reconnaissance, a limited surface soil and sediment evaluation was recommended. The limited surface soil and sediment evaluation included sampling soil or sediment from the following areas:

- Agricultural production areas
- The undocumented fill berm
- Creek channel and small and large irrigation ponds
- The vehicle maintenance building
- The former AST area

Sampling and analysis for residual agricultural impacts was conducted in general accordance with DEQ's *Guidance for Evaluating Residual Pesticides on Lands Formerly Used for Agricultural Production*. The approximate locations of the composite sampling areas (COMP-1 through COMP-12) and the discrete sample locations collected within each composite area are shown on Figure 3. The soil and sediment sample analytical results are summarized in Tables 1 through 6. A summary of the chemical analytical results, by area, is presented below.

Agricultural Production Areas

The agricultural production area was divided into eight approximately equal composite sampling areas (COMP-2 through COMP-9). Soil samples were collected and composited from two depth zones (0 to 0.5 foot BGS and 1.0 foot to 1.5 feet BGS). Select composite soil samples were submitted for analysis of organochlorine pesticides and agricultural-use metals. Dieldrin, 4,4'-DDE, and/or 4,4'-DDT were detected in both depth zones in five of the eight composite sampling areas (COMP-4 and COMP-6 through COMP-9) at concentrations exceeding DEQ *Soil Ingestion, Dermal Contact, and Inhalation* RBCs for residential receptors and/or CFSLs. Dieldrin, 4,4'-DDE, and/or 4,4'-DDT were detected in only the 0 to 0.5 foot BGS zone in one of the composite sampling areas (COMP-3) at concentrations exceeding DEQ CFSLs. Composite sampling areas COMP-2 and COMP-5 appear to meet DEQ clean fill requirements, although a slight exceedance of 4,4'-DDT was detected in surface soil in composite sampling area COMP-5. The concentration of 4,4'-DDT detected in the surface soil in composite sampling area COMP-5 was 0.0221 mg/kg, compared to the DEQ CFSL of 0.021 mg/kg.

Undocumented Fill Berm

Two composite soil samples (COMP-11 and COMP-12) were collected from the berm of undocumented fill and analyzed for petroleum hydrocarbons, PAHs, VOCs, and/or PCBs. Oil-range hydrocarbons were detected in one of the composite soil samples collected from the undocumented fill berm [COMP-12(0.0-2.5)] at a concentration of 89.4 mg/kg. Naphthalene was detected in both composite soil samples [COMP-11(0-3.0) and COMP-12(0-2.5)] at concentrations

greater than the DEQ CFSL but less than the DEQ *Soil Ingestion, Dermal Contact, and Inhalation* RBC for residential receptors. 2-methylnaphthalene was detected in composite soil sample COMP-11(0-3.0) at a concentration less than the DEQ CFSL.

Creek Channel and Irrigation Pond Sediment

Composite sediment samples (SEDCOMP-1 through SEDCOMP-7) were collected from the creek channel and the small and large irrigation ponds and analyzed for organochlorine pesticides and agricultural-use metals. Organochlorine pesticides were either not detected at concentrations greater than laboratory MRLs or were detected at concentrations less than applicable DEQ RBCs and/or CFSLs. Arsenic and lead were individually detected in sediment at one location at concentrations exceeding DEQ CFSLs. However, the average site-wide concentrations were less than the DEQ CFSL.

Vehicle Maintenance Building

One composite soil sample [COMP-1(0.0-0.5)] and four discrete soil samples [SS-1(0-0.5), SS-2(1.5-2), SS-3(0.5-1), and SS-4(0-0.5)] were collected from the vehicle maintenance building and submitted for analysis of petroleum hydrocarbons, metals, PAHs, and/or PCBs. Gasoline-range hydrocarbons were detected in the composite soil sample at a concentration greater than the DEQ *Vapor Intrusion into Buildings* RBC for residential receptors of 94 mg/kg. Diesel-range hydrocarbons were detected in the composite soil sample at a concentration greater than the DEQ *Soil Ingestion, Dermal Contact, and Inhalation* RBCs for residential and construction worker receptors. Diesel-range hydrocarbons were detected in one discrete soil sample at a concentration greater than the DEQ *Soil Ingestion, Dermal Contact, and Inhalation* RBC for residential receptors. Cadmium was detected in the composite soil sample at a concentration greater than the DEQ CFSL. Naphthalene and 1-methylnaphthalene were detected in the composite soil sample at concentrations greater than their respective DEQ CFSLs. Except for naphthalene, VOCs and PCBs were not detected at concentrations greater than laboratory MRLs or were detected at concentrations less than applicable DEQ RBCs and/or CFSLs.

Former AST Area

Three diesel ASTs (approximately 200- to 500-gallon capacity each) were historically located east of the well house on Tax Lot 3300 but were recently removed. Surface staining was not observed in the vicinity of the former AST locations. One composite soil sample [COMP-10(0-0.5)] was collected from the former AST area and analyzed for petroleum hydrocarbons, metals, PAHs, VOCs, and PCBs. Diesel-range hydrocarbons were detected at a concentration greater than the DEQ *Soil Ingestion, Dermal Contact, and Inhalation* RBC for residential receptors. Oil-range hydrocarbons were detected at a concentration of 195 mg/kg. Cadmium, lead, and naphthalene were detected in the composite soil sample at concentrations greater than the DEQ CFSLs. VOCs and PCBs were either not detected at concentrations greater than laboratory MRLs or were detected at concentrations less than applicable DEQ RBCs and/or CFSLs.

4.0 REGULATORY INTERACTION

On July 24, 2018 Polygon submitted a Notice of Intent to Participate in DEQ's VCP. The project site was entered into the DEQ ECSI database (ECSI Site No. 6156) on March 20, 2017. On August 27, 2018 Polygon submitted a request for an SWPE to reuse soil impacted with pesticides

and/or naphthalene on site that will be generated during future earthwork activities without obtaining an SWLA permit. On October 2, 2018 Tim Spencer of DEQ responded to the SWPE request via electronic mail and, based on their review of the SWPE submittal, determined that a SWLA will be necessary for on-site disposal of the contaminated soil generated during the earthwork stage of site development (described in Section 8.0). DEQ's decision to require a SWLA included the following:

- The large volume of pesticide-impacted soil that requires encapsulation on site (56,900 cubic yards)
- The persistence and toxicity of the pesticide compounds involved (DDT, DDE, and dieldrin)
- The close proximity of one of the disposal cells (Cell A) to a small creek channel

On October 2, 2018 Kyle Sattler of GeoDesign further discussed the requirement for the SWLA with Mr. Spencer. Mr. Spencer noted that in addition to an SWLA permit application, a LUCS would be required. However, Mr. Spencer noted DEQ will not require an additional fee for the SWLA application, that no other supporting information will be necessary, and that future processing of the application can be expedited since DEQ has already reviewed the background information necessary for the project. Polygon may submit the SWLA permit application and LUCS to DEQ for processing before the end of the year (and prior to earthwork activities anticipated to begin in January 2020). If Polygon submits the SWLA permit application and LUCS to DEQ prior to the end of the year, we understand DEQ will only file the information and not issue the permit until Polygon requests they do so, so as to not initiate the six-month permit validation timeline (which can be extended an additional six months one time, if necessary).

5.0 SUBSURFACE CONDITIONS

5.1 SOIL

Based on geotechnical explorations performed by GeoDesign, subsurface conditions at the project site generally consist of uncontrolled fill in the vicinity of the large pond (at depths up to 18 feet BGS). The uncontrolled fill predominantly consists of silt and clay. Native soil at the project site generally consists of fine-grained alluvium overlying residual basalt. The fine-grained alluvium generally consists of low to medium plasticity clay and silt with varying amounts of sand. The consistency of the alluvium ranges from medium stiff to stiff and extends to depths between 7.0 and 20.5 feet BGS. The fine-grained alluvium is underlain by residual basalt, which is generally decomposed and transitions to weathered with depth. The residual basalt ranges from stiff to hard or dense to very dense. Although not encountered in our explorations, based on our experience in the vicinity, basalt cobbles and boulders are likely present within the residual basalt.

5.2 SEDIMENT

Sediment consisting of fine-grained alluvium (clay and silt with varying amounts of sand) is present along the drainage and small pond that cross the northwest corner of the project site and along the banks of the large pond.

5.3 GROUNDWATER

Groundwater was encountered in three geotechnical explorations at the project site at depths between 4 and 17 feet BGS. The groundwater encountered in the exploration at a depth of 4 feet BGS was likely groundwater seepage from the large irrigation pond. Based on interviews, a review of well logs, and topographic maps for the area, the shallow groundwater encountered during the geotechnical investigation is likely perched. Regional groundwater is expected to be present at a depth of approximately 90 feet BGS. Shallow perched groundwater in the area is anticipated to flow to the northwest towards the unnamed tributary of the Tualatin River that flows to the southwest in the northwest portion of project site. The depth to groundwater may fluctuate in response to seasonal changes, changes in surface topography, and other factors not observed during our explorations.

6.0 CONTAMINANT INFORMATION

6.1 SOIL

Based on the results of the recent sampling activities, soil beneath the project site contains relatively low concentrations of organochlorine pesticides, metals, petroleum hydrocarbons, PAHs, VOCs, and PCBs. The maximum detected concentrations of these analytes in recently collected soil samples are as follows:

Organochlorine Pesticides

- 4,4'-DDD: 0.0114 mg/kg
- 4,4'-DDE: 0.393 mg/kg
- 4,4'-DDT: 0.556 mg/kg
- Alpha-Chlordane: 0.0619 mg/kg
- Beta-BHC: 0.00528 mg/kg
- Chlordane: 0.482 mg/kg
- Delta-BHC: 0.0110 mg/kg
- Dieldrin: 0.162 mg/kg
- Gamma-Chlordane: 0.0387 mg/kg
- Heptachlor Epoxide: 0.00950 mg/kg

Metals

- Arsenic: 8.26 mg/kg
- Barium: 225 mg/kg
- Beryllium: 0.725 mg/kg
- Cadmium: 2.92 mg/kg
- Chromium: 25.9 mg/kg
- Cobalt: 21.7 mg/kg
- Copper: 47.0 mg/kg
- Lead: 63.9 mg/kg
- Mercury: 0.107 mg/kg
- Nickel: 16.0 mg/kg
- Silver: 0.568 mg/kg
- Vanadium: 79.7 mg/kg
- Zinc: 78.0 mg/kg

Petroleum Hydrocarbons

- Gasoline-range hydrocarbons: 166 mg/kg
- Diesel-range hydrocarbons: 5,510 mg/kg
- Oil-range hydrocarbons: 3,320 mg/kg

PAHs

- Benzo(b)fluoranthene: 0.0139 mg/kg
- Benzo(g,h,i)perylene: 0.0279 mg/kg
- Indeno(1,2,3-cd)pyrene: 0.0123 mg/kg
- 1-Methylnaphthalene: 3.60 mg/kg
- 2-Methylnaphthalene: 7.69 mg/kg
- Naphthalene: 1.44 mg/kg
- Phenanthrene: 1.64 mg/kg
- Pyrene: 1.06 mg/kg

VOCs

- n-Butylbenzene: 0.301 mg/kg
- sec-Butylbenzene: 0.189 mg/kg
- Naphthalene: 1.01 mg/kg
- n-Propylbenzene: 0.0824 mg/kg
- 1,2,4-TMB: 1.69 mg/kg
- 1,3,5-TMB: 0.399 mg/kg
- Total Xylenes: 0.0627 mg/kg

PCBs

- Aroclor 1260: 0.0718 mg/kg

6.2 SEDIMENT

Based on the results of the recent investigation, sediment in the unnamed stream that traverses the project site contains low concentrations of organochlorine pesticides and metals. The maximum detected concentrations of these analytes in recently collected sediment samples are as follows:

Organochlorine Pesticides

- 4,4'-DDE: 0.00533 mg/kg
- Dieldrin: 0.00280 mg/kg

Metals

- Arsenic: 10.6 mg/kg
- Barium: 221 mg/kg
- Beryllium: 0.645 mg/kg
- Cadmium: 0.282 mg/kg
- Chromium: 19.3 mg/kg
- Cobalt: 27.8 mg/kg
- Copper: 23.4 mg/kg
- Lead: 45.1 mg/kg

- Nickel: 16.3 mg/kg
- Vanadium: 81.9 mg/kg
- Zinc: 247 mg/kg

7.0 WORKER SAFETY

None of the detected analyte concentrations exceeded the DEQ *Soil Ingestion, Dermal Contact, and Inhalation* RBC for the construction workers receptor, with the exception of diesel-range hydrocarbons detected in surface soil (from 0.0 to 0.5 foot BGS) in sample COMP-1 collected in the vehicle maintenance building. None of the detected analyte concentrations exceeded the DEQ *Soil Ingestion, Dermal Contact, and Inhalation* RBC for the excavation workers receptor.

Prior to beginning earthwork activities, the owner, operator, or contractor must prepare and implement a site-specific HCP. The HCP fulfills "worker right to know" requirements (29 CFR 1926.59). If completed by the contractor, a copy of the HCP must be submitted to the owner prior to the start of work on the project. During work on the project, the HCP must be posted at the project site. The contractor is responsible for notifying subcontractors of pertinent environmental conditions. Subcontractors may either adopt the contractor's HCP or must prepare their own HCP. This document should be used in conjunction with, not in place of, the HCP and the project specifications. Each contractor and subcontractor is responsible for the safety of its employees, including compliance with applicable OSHA regulations and compliance with all specifications in the technical specifications manual for the project.

In addition to implementation of an HCP, the owner, operator, or contractor should prepare and implement a site-specific HSP in accordance with OSHA requirements to ensure adequate protection for their workers while on site. A site-specific HSP and directions to the Legacy Meridian Park Medical Center are presented in Appendix A. The attached HSP was created solely for use by GeoDesign employees. However, the owner, the operator, or the contractor may adopt the HSP with proper modifications, as needed, to address the type of work they will be completing at the project site.

8.0 MEDIA MANAGEMENT

The project site owner, operator, contractors, on-site workers, or any others involved with subsurface excavation activities should be familiar with this CMMP and the potential locations of contaminated media prior to beginning earthwork activities. A summary of methods used to properly identify, characterize, handle, and dispose of contaminated media that may be encountered during future site earthwork activities is presented in the following sections.

8.1 SOIL MANAGEMENT

Agricultural-Use Areas

Agricultural-related impacts at the project site are limited, and it is both cost-prohibitive and unsustainable to export the volume of marginally impacted soil for disposal at a RCRA Subtitle D landfill such as Waste Management's Hillsboro facility. Therefore, Polygon identified an alternative to reuse soil containing contaminants at concentrations greater than DEQ CFSLs on site in a manner that is protective of the future residential use of the property. Specifically,

surface soil between 0 to 0.5 foot BGS removed from composite sampling area COMP-3 and surface and shallow subsurface soil between 0 and 1.5 feet BGS removed from composite sampling areas COMP-4 and COMP-6 through COMP-9 will be interred in two separate disposal cells located on the west half of the project site. One disposal cell (Cell A) will be located beneath the future commercial building and associated parking lot (near the west-central portion of the project site), and the other disposal cell (Cell B) will be located beneath the parking lot at the southwest corner of the project site. The locations of disposal cells are shown on Drawing A presented in Appendix C. An estimated 30,585 cubic yards of soil will be excavated during construction of disposal Cell A, and an estimated 26,884 cubic yards of soil will be excavated during construction of disposal Cell B. The lateral extent and vertical profile of disposal Cell A are shown on Drawings B and C presented in Appendix C. The lateral extent and vertical profile of disposal Cell B are shown on Drawings D, E, and F presented in Appendix C. Soil generated during disposal Cell A construction will be re-used on site without restriction. Soil generated during construction of disposal Cell B from below 1.5 feet BGS will be re-used on site without restriction. A total of approximately 56,900 cubic yards of pesticide-impacted soil excavated during site preparation and grading activities will be interred in the disposal cells. The disposal cells will be capped beneath a minimum of 3 feet of clean soil/fill.

Soil between 0 and 0.5 foot BGS generated from composite sampling areas COMP-2 and COMP-5 and soil between 1.0 foot and 1.5 feet BGS generated from composite sampling area COMP-3 does not present unacceptable risk to human health or the environment. Therefore, soil generated from these areas can be re-used without restriction on site as fill material.

Creek Channel and Irrigation Ponds

Composite sediment samples were collected from the creek channel and the small and large irrigation ponds and analyzed for organochlorine pesticides and agricultural-use metals. Organochlorine pesticides were either not detected at concentrations greater than laboratory MRLs or were detected at concentrations less than applicable DEQ RBCs and/or CFSLs. Arsenic and lead were individually detected in sediment at one location at concentrations exceeding DEQ CFSLs. However, the average site-wide concentrations were less than the DEQ CFSL. Consequently, the sediment within the composite sediment sampling areas (SEDCOMP-1 through SEDCOMP-7) can be managed as clean fill.

Undocumented Fill Berm

The detected naphthalene and 2-methylnaphthalene concentrations in the undocumented fill berm do not pose a risk to future residential, urban residential, or occupational receptors. The approximate lateral extent and vertical profile of the undocumented fill berm is shown on Drawing G presented in Appendix C. The estimated volume of the undocumented fill berm is approximately 11,594 cubic yards. Provided the fill does not exhibit physical characteristics of petroleum hydrocarbon impacts during removal, such as odor or staining, the undocumented fill comprising the berm at the project site will be re-used on site during redevelopment and placed beneath buildings, roadways, or parking lots. Since the naphthalene concentrations in the undocumented fill exceed the DEQ CFSL, if transported off site for disposal, it would require disposal at a RCRA Subtitle D landfill such as Waste Management's Hillsboro facility.

Vehicle Maintenance Building

Based on the analytical results discussed in Section 3.0, the upper 1 foot of soil from the vehicle maintenance building (approximately 110 cubic yards) as well as any deeper soil exhibiting physical characteristics of petroleum hydrocarbon impacts during removal, such as odor or staining, will be removed from the project site and disposed of at a RCRA Subtitle D landfill.

Former AST Area

Based on the analytical results discussed in Section 3.0, the upper 0.5 foot of soil from the former AST fueling area (approximately 3.5 cubic yards) and deeper soil exhibiting physical characteristics of petroleum hydrocarbon impacts during removal, such as odor or staining, will be removed from the project site and disposed of at a RCRA Subtitle D landfill.

8.1.1 Soil Handling

Prior to beginning work in areas of potential contamination, the contractor should verify that work will be completed in accordance with a site-specific HSP and this CMMP and continuously observe the soil for field evidence of petroleum-related contamination such as odor, staining, and/or sheen.

In the event that undocumented contaminated soil is encountered by an earthwork contractor or site workers, excavation of contaminated soil should stop, the owner notified, and the work area barricaded or otherwise isolated until it can be verified by the environmental professional that additional work can be completed in accordance with the site-specific HSP and this CMMP.

8.1.2 Soil Disposition

Project site redevelopment activities that will disturb soil and require either on- or off-site disposal include the following:

- Ground improvement
- Foundation construction
- Grading
- Installation of new utilities
- New landscaping

As described earlier, soil generated during redevelopment activities from the vehicle maintenance building and the former AST area do not meet DEQ's definition of clean fill and will be removed from the project site and disposed of at a RCRA Subtitle D landfill. Sediment generated during redevelopment activities from the creek channel and the small and large irrigation ponds meets DEQ's definition of clean fill and can be managed as clean fill. Soil generated during redevelopment activities from portions of the agricultural-use areas (specifically composite sampling areas COMP-2 and COMP-5) meet DEQ's definition of clean fill and can be managed as clean fill.

Soil generated during redevelopment activities from portions of agricultural-use areas COMP-3, COMP-4, and COMP-6 through COMP-9 and the undocumented fill berm will be managed on site as described below.

8.1.2.1 Agricultural-Use Areas

Surface soil between 0 to 0.5 foot BGS that is removed from composite sampling area COMP-3 and surface and shallow subsurface soil that is removed between 0 and 1.5 feet BGS from composite sampling areas COMP-4 and COMP-6 through COMP-9 will be interred in two separate disposal cells located on the west half of the project site. One disposal cell (Cell A) will be located beneath the future commercial building and associated parking lot (near the west-central portion of the project site), and the other disposal cell (Cell B) will be located beneath the parking lot at the southwest corner of the project site. The locations of disposal cells are shown on Drawing A presented in Appendix C. An estimated 30,585 cubic yards of soil will be excavated during construction of disposal Cell A, and an estimated 26,884 cubic yards of soil will be excavated during construction of disposal Cell B. The lateral extent and vertical profile of disposal Cell A are shown on Drawings B and C presented in Appendix C. The lateral extent and vertical profile of disposal Cell B are shown on Drawings D, E, and F presented in Appendix C. Soil generated during disposal Cell A construction will be re-used on site without restriction. Soil generated during construction of disposal Cell B from below 1.5 feet BGS will be re-used on site without restriction. The upper 1.5 feet of soil generated during construction of disposal Cell B should be temporarily stockpiled (as described in Section 8.1.2.4) for later placement with either disposal Cell A or disposal Cell B.

The excavated soil placed in the disposal cells shall be compacted in accordance with the geotechnical recommendations for the project to approximately 3 feet below the planned finish grade, where the contaminated soil surface will be covered with a demarcation layer consisting of geotextile fabric or other suitable material. A total of approximately 56,900 cubic yards of pesticide-impacted soil excavated during site preparation will be interred in the disposal cells. The disposal cells will be capped beneath a minimum of 3 feet of clean soil/fill.

Based on our preliminary calculations, the total volume of both disposal cells will accommodate the volume of pesticide-impacted soil requiring containment and capping. However, if the volume of soil generated from impacted portions of the agricultural-use areas exceeds the capacity of the disposal cells, the owner must be notified and an alternative disposal method will be discussed. Since pesticide concentrations in portions of the agricultural-use areas exceed the DEQ CFSLs and/or RBCs, if transported off site for disposal, the pesticide-impacted soil will require disposal at a RCRA Subtitle D landfill.

8.1.2.2 Undocumented Fill Berm

The detected naphthalene and 2-methylnaphthalene concentrations in the undocumented fill berm do not pose an unacceptable risk to future residential, urban residential, or occupational receptors. The approximate lateral extent and vertical profile of the undocumented fill berm is shown on Drawing G presented in Appendix C. The estimated volume of the undocumented fill berm is approximately 11,594 cubic yards. Provided the fill does not exhibit physical characteristics of petroleum hydrocarbon impacts during removal, such as odor or staining, the undocumented fill comprising the berm at the project site can be re-used on site during redevelopment provided it is placed beneath buildings, roadways, or parking lots. Soil that does exhibit physical characteristics of petroleum contamination, such as staining or odor, must not be re-used on site and should be disposed of off site, as described in the following section.

8.1.2.3 Off-Site Disposal

Previous soil sample analytical results indicate that areas of impacted soil at the project site contain concentrations of contaminants that are suitable for disposal at a RCRA Subtitle D landfill. These areas include the (1) the vehicle maintenance building and (2) the former AST Area. The excavation contractor is responsible for obtaining a permit from the disposal facility prior to hauling the impacted material to their facility. The earthwork contractor will likely need to provide copies of the chemical analytical laboratory reports to the selected disposal facility. Copies of the permit should accompany each load transported to the selected disposal facility. The contractor must exercise care during loading of the potentially contaminated soil to minimize spillage of the soil onto the ground surface. All trucks leaving the project site should be free of loose soil on the exterior of the trucks and may require covers. Contaminated soil loaded into trucks should be covered if weather conditions could cause soil to blow out (dry, warm, or windy conditions) during transport to the disposal facility. The contractor should avoid handling, loading, or transportation of contaminated soil during periods of wet weather if possible. The contractor must use care not to track soil onto city roads and must routinely wash down the roads if soil is being tracked onto them. Trucks should not be allowed to leave the project site if liquids are draining from the load. Transport tracking tickets should be required, which document the haul to the approved disposal facility for each individual truck leaving the project site.

8.1.2.4 Soil Stockpiling

Contaminated soil that cannot be placed directly into the disposal cell or direct-loaded for transport to a RCRA Subtitle D landfill must be temporarily stockpiled on site. Soil that is placed in temporary stockpiles must be well maintained at all times. All stockpiled soil must be placed on impermeable plastic sheeting (minimum 6-mil thick) with a berm around the perimeter of the stockpile. The plastic sheeting and berm prevent the runoff of stockpiled soil contaminants to surrounding areas. The berm may be constructed with hay bales or other equivalent methods. The bottom plastic sheeting should be lapped over the berm materials, and the soil stockpile within the berm should also be covered with plastic sheeting to prevent erosion or leaching of contaminants from the soil stockpile impacting the underlying soil. The upper plastic sheeting covering the soil stockpile should be secured using sand bags or equivalent. The upper plastic sheeting prevents the stockpiled soil from being exposed to precipitation and wind.

8.1.3 Erosion and Dust Control

Exposed soil will become susceptible to erosion by wind and water; therefore, erosion control measures should be planned carefully and in place before beginning earthwork activities. Silt fences, hay bales, and/or granular haul roads may be used as required to reduce sediment transport during construction to acceptable levels. Measures to reduce erosion should be implemented in accordance with OAR 340-41-006, OAR 340-41-455, and any City of Tigard or Washington County regulations regarding erosion control. In general, erosion control measures must limit sediment transport to less than 1 ton per acre per year, as calculated by the Universal Soil Loss equation.

Given that soil at the project site contains pesticides, diesel-range hydrocarbons, and PAHs at concentrations greater than the corresponding DEQ *Soil Ingestion, Dermal Contact, and Inhalation* RBC for the residential receptor, appropriate dust control measures will be employed

to prevent visible fugitive dust from leaving the project site. Soil will be wetted during excavation activities. If necessary, gravel surfaces will be installed over geotextile fabric in storage, vehicle movement, and/or parking areas; mulch will be placed over exposed soil to minimize dust generation; and chemical dust control/wetting agents will be applied.

8.1.4 Contractor Reporting Requirements

The contractor is responsible for keeping a detailed daily record of all soil excavation, stockpiling, export, and disposal activities. This includes the purpose, origin, destination, and volume of soil that is (1) disposed of in internment Cell A or B, (2) re-used on the project site, or (3) transported off site to a RCRA Subtitle D landfill. The contractor is responsible for preparing a daily field report for distribution to representatives of Polygon that identifies the estimated quantity of soil interred, the source of the interred soil, and number of truckloads of soil transported off site and landfill disposal receipts if soil is disposed of at a RCRA Subtitle D landfill.

8.2 SEDIMENT MANAGEMENT

As previously stated, sediment that is excavated from the creek channel and the small and large irrigation ponds within the composite sediment sampling areas (SEDCOMP-1 through | SEDCOMP-7) can be managed as clean fill.

9.0 UNFORESEEN CONDITIONS

In the event that undocumented petroleum contamination or other potentially hazardous conditions are encountered that are not addressed in this CMMP, the earthwork contractor shall cease work and notify the owner. The earthwork contractor will then barricade or otherwise isolate the area and avoid filling the area until authorized to do so by the owner. The earthwork contractor shall not replace any known or suspected contaminated soil in any excavation area without prior approval by the owner.

Although not anticipated, if a UST is encountered during construction, it should be decommissioned by a licensed UST service provider in accordance with current applicable DEQ rules and regulations. If contaminated soil is encountered in the vicinity of a UST during construction, it should be managed in accordance with the protocol established in this CMMP.

10.0 LIMITATIONS

This CMMP has been prepared for DEQ and Polygon Northwest Company. This CMMP is not intended for use by others, and the information contained herein is not applicable to other sites. Reliance by other parties must be approved by GeoDesign in accordance with our standard contractual process for third party reliance. This CMMP is based on interpretations of subsurface conditions based on data from select soil and sediment samples collected from limited portions of the project site. The results of the analyses only indicate the presence or absence of those chemical constituents analyzed in those discrete sample locations. It is always possible that contamination could exist between the widely spaced boring locations. Analytical data from the

laboratory samples should only be considered as indicators of site conditions and not a guarantee of the absence of subsurface impact in areas not sampled.

Our services have been executed in accordance with the generally accepted practices in this area at the time this CMMP was prepared. No warranty or other conditions, express or implied, should be understood.

♦ ♦ ♦

Please call if you have questions regarding this CMMP.

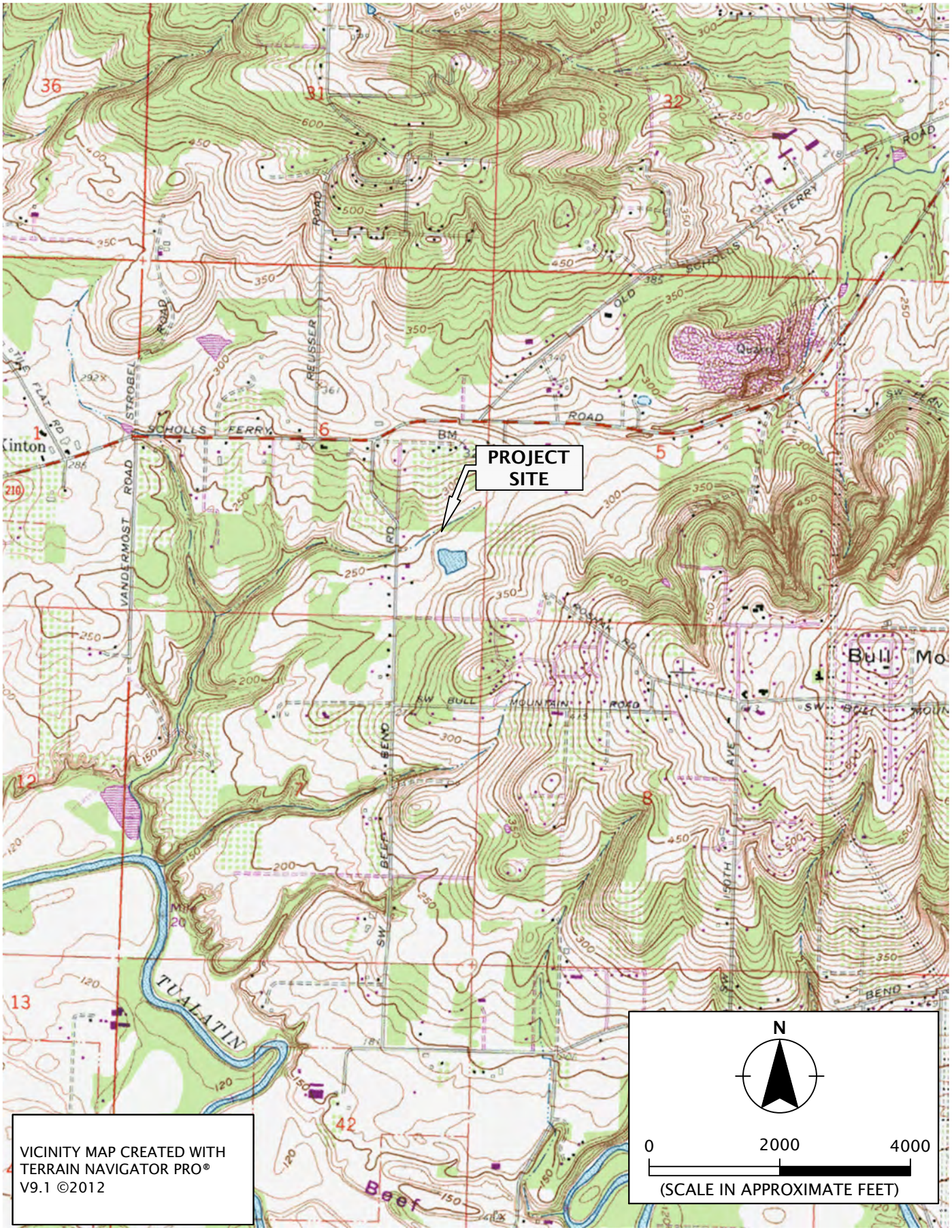
Sincerely,

GeoDesign, Inc.

Kyle R. Sattler, L.G. (Washington)
Senior Project Manager

Jason O'Donnell, R.G.
Principal Geologist

FIGURES



GeoDesign Inc 9450 SW Commerce Circle - Suite 300 Wilsonville OR 97070 503.968.8787 www.geodesigninc.com	POLYGON-166-01	**VICINITY MAP**	
	NOVEMBER 2018	N ROSHAK PROPERTY TIGARD, OR	**FIGURE 1**

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LEGEND:

- PROJECT SITE BOUNDARY
- POLE-MOUNTED TRANSFORMER
- WELL
- TAX LOT

N

0 200 400

(SCALE IN FEET)

SITE PLAN BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®, JUNE 29, 2018

SITE PLAN

N ROSHAK PROPERTY
TIGARD, OR

FIGURE 2

POLYGON-166-01

NOVEMBER 2018

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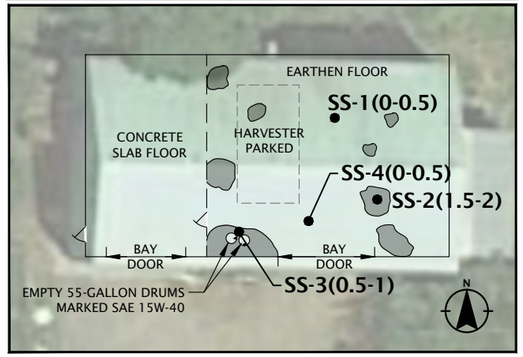
SITE PLAN BASED ON AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH PRO®, JUNE 29, 2018

LEGEND:

- COMPOSITE SOIL SAMPLING AREA
- DISCRETE SOIL SAMPLE LOCATION
- COMPOSITE SEDIMENT SAMPLING AREA
- DISCRETE SEDIMENT SAMPLE LOCATION
- SURFACE STAINING (SEE DETAIL BELOW)

DETAIL - VEHICLE MAINTENANCE BUILDING (COMP-1)



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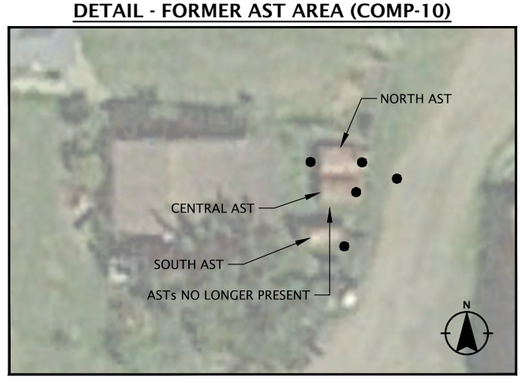
(SCALE IN FEET)

DETAIL - FORMER AST AREA (COMP-10)



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(SCALE IN FEET)

SITE PLAN - SAMPLING LOCATIONS

FIGURE 3

N ROSHAK PROPERTY
TIGARD, OR

POLYGON-166-01

NOVEMBER 2018

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TABLES

TABLE 1
Summary of Soil and Sediment Sample Chemical Analytical Results [1]
Organochlorine Pesticides
N Roshak Property
13974 and 13580 SW Roy Rogers Road
Tigard, Oregon

Sample I.D. (depth in feet BGS)	Sample Date	Organochlorine Pesticides by EPA Method 8081B (mg/kg)																					
		4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-HCH	alpha-Chlordane	beta-BHC	Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Endrin	Endrin Aldehyde	Endrin Ketone	gamma-HCH	gamma-Chlordane	Heptachlor	Heptachlor Epoxide	Methoxychlor	Toxaphene
COMP-2(0.0-0.5)	06/11/18	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.0621 U	<0.00207 U	<0.00207	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00207 U	<0.00621 U	<0.0621 U
COMP-3(0.0-0.5)	06/11/18	<0.00341 U	**0.0478**	**0.0168**	<0.00206 U	<0.00206 U	**0.0058**	<0.00206 U	<0.0619 U	<0.00330 U	**0.0231**	<0.00206 U	<0.00206 U	<0.00355 U	<0.00206 U	<0.00206 U	<0.00206 U	<0.00206 U	0.00248 U	<0.00206 U	<0.00206 U	<0.00619 U	<0.0619 U
COMP-3(1.0-1.5)	06/11/18	<0.00235 U	**0.00306**	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.0706 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00235 U	<0.00706 U	<0.0706 U
COMP-4(0.0-0.5)	06/11/18	**0.00230**	**0.0495**	**0.0305**	<0.00205 U	<0.00205 U	<0.00205 U	<0.00205 U	<0.0614 U	<0.00205 U	**0.0149**	<0.00205 U	<0.00205 U	<0.00205 U	<0.00205 U	<0.00205 U	<0.00205 U	<0.00205 U	<0.00205 U	<0.00205 U	<0.00205 U	<0.00614 U	<0.0614 U
COMP-4(1.0-1.5)	06/11/18	<0.00222 U	**0.0385**	**0.00632**	<0.00211 U	<0.00211 U	**0.0120**	<0.00211 U	<0.0633 U	**0.0110**	**0.0149**	<0.00211 U	<0.00211 U	<0.00211 U	<0.00211 U	<0.00211 U	<0.00211 U	<0.00211 U	**0.00564**	<0.00211 U	<0.00211 U	<0.00633 U	<0.0633 U
COMP-5(0.0-0.5)	06/11/18	<0.00267 U	**0.0167**	**0.0221**	<0.00213 U	<0.00213 U	**0.00286**	<0.00213 U	<0.0640 U	<0.00480 U	**0.00462**	<0.00213 U	<0.00213 U	<0.00213 U	<0.00213 U	<0.00213 U	<0.00213 U	<0.00213 U	<0.00213 U	<0.00213 U	<0.00213 U	<0.00640 U	<0.0640 U
COMP-6(0.0-0.5)	06/11/18	**0.0114**	**0.272**	**0.239**	<0.00200 U	<0.00200 U	<0.00200 U	<0.00200 U	<0.0601 U	<0.00200 U	**0.0542**	<0.00200 U	<0.00200 U	<0.00261 U	<0.00200 U	<0.00200 U	<0.00200 U	<0.00200 U	<0.00200 U	<0.00200 U	<0.00200 U	<0.00601 U	<0.0601 U
COMP-6(1.0-1.5)	06/11/18	<0.00217 U	**0.0760**	**0.0550**	<0.00217 U	<0.00217 U	<0.00217 U	<0.00217 U	<0.0650 U	<0.00217 U	**0.0115**	<0.00217 U	<0.00217 U	<0.00217 U	<0.00217 U	<0.00217 U	<0.00217 U	<0.00217 U	<0.00217 U	<0.00217 U	<0.00217 U	<0.00650 U	<0.0650 U
COMP-7(0.0-0.5)	06/11/18	<0.0200 U	**0.319**	**0.556**	<0.00217 U	<0.00217 U	**0.0619**	<0.00217 U	**0.482**	<0.0283 U	**0.162**	<0.00217 U	<0.00238 U	<0.0165 U	<0.00585 U	<0.00238 U	<0.00552 U	<0.00217 U	**0.0387**	<0.00217 U	**0.00950**	<0.00650 U	<0.0650 U
COMP-7(1.0-1.5)	06/11/18	<0.00212 U	**0.0422**	**0.0474**	<0.00212 U	<0.00212 U	**0.00610**	**0.00528**	<0.0636 U	<0.00212 U	**0.0241**	<0.00212 U	<0.00212 U	<0.00212 U	<0.00212 U	<0.00212 U	<0.00212 U	<0.00212 U	**0.00328**	<0.00212 U	<0.00212 U	<0.00636 U	<0.0636 U
COMP-8(0.0-0.5)	06/11/18	<0.0193 U	**0.306**	**0.379**	<0.00224 U	<0.00224 U	**0.0408**	<0.00224 U	**0.320**	<0.00972 U	**0.0964**	<0.00224 U	<0.00224 U	<0.00917 U	<0.00358 U	<0.00224 U	<0.00492 U	<0.00224 U	**0.0220**	<0.00224 U	**0.00734**	<0.00671 U	<0.0671 U
COMP-8(1.0-1.5)	06/11/18	<0.00202 U	**0.0807**	**0.106**	<0.00202 U	<0.00202 U	**0.00745**	**0.00337**	<0.0606 U	**0.00337**	**0.0227**	<0.00202 U	<0.00202 U	<0.00202 U	<0.00202 U	<0.00202 U	<0.00202 U	<0.00202 U	**0.00409**	<0.00202 U	<0.00202 U	<0.00606 U	<0.0606 U
COMP-9(0.0-0.5)	06/11/18	<0.0123 U	**0.393**	**0.478**	<0.00207 U	<0.00207 U	**0.0402**	<0.00207 U	**0.358**	<0.0110 U	**0.104**	<0.00207 U	<0.00207 U	<0.00745 U	<0.00290 U	<0.00300 U	<0.00217 U	<0.00207 U	**0.0197**	<0.00207 U	**0.00826**	<0.00621 U	<0.0621 U
COMP-9(1.0-1.5)	06/11/18	<0.00198 U	**0.178**	**0.192**	<0.00198 U	<0.00198 U	**0.0172**	<0.00198 U	**0.137**	**0.00921**	**0.0377**	<0.00198 U	<0.00198 U	<0.00198 U	<0.00198 U	<0.00198 U	<0.00198 U	<0.00198 U	**0.00883**	<0.00198 U	**0.00325**	<0.00595 U	<0.0595 U
SEDCOMP-1(0.0-0.5)	06/08/18	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.101 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.00336 U	<0.0101 U	<0.101 U
SEDCOMP-2(0.0-0.5)	06/08/18	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.103 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.00343 U	<0.0103 U	<0.103 U
SEDCOMP-3(0.0-0.5)	06/08/18	<0.00382 U	**0.00533**	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.114 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.00382 U	<0.0114 U	<0.114 U
SEDCOMP-4(0.0-0.5)	06/08/18	<0.00244 U	**0.00320**	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.0732 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00244 U	<0.00732 U	<0.0732 U
SEDCOMP-5(0.0-0.5)	06/08/18	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.0990 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00330 U	<0.00990 U	<0.0990 U
SEDCOMP-6(0.0-0.5)	06/08/18	<0.00274 U	**0.0151**	<0.00274 U	<0.00274 U	<0.00274 U	<0.00274 U	<0.00274 U	<0.0823 U	<0.00274 U	**0.00280**	<0.00274 U	<0.00274 U	<0.00274 U	<0.00274 U	<0.00274 U	<0.00274 U	<0.00274 U	<0.00274 U	<0.00274 U	<0.00274 U	<0.00823 U	<0.0823 U
SEDCOMP-7(0.0-0.5)	06/08/18	<0.00311 U	**0.00359**	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.0934 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00311 U	<0.00934 U	<0.0934 U
DEQ Generic RBCs[2]																							
Soil Ingestion, Dermal Contact, and Inhalation																							
Residential		2.7	1.8	1.9	0.031	0.086	NE	NE	1.7	NE	0.034	380	NE	19	NE	NE	0.49	NE	0.11	0.055	NE	0.49	
Construction Worker		94	66	66	1.1	3.0	NE	NE	62	NE	1.2	1,600	NE	80	NE	NE	17	NE	4.0	2.0	NE	17	
Excavation Worker		2,600	1,800	1,800	30	83	NE	NE	1,700	NE	33	45,000	NE	2,200	NE	NE	470	NE	110	56	NE	470	
Volatilization to Outdoor Air																							
Residential		NV	>Csat	NV	>Csat	NV	NE	NE	>Csat	NE	NV	>Max	NE	NV	NE	NE	NV	NE	18	28	NE	NV	
Vapor Intrusion into Buildings																							
Residential		NV	>Csat	NV	>Csat	NV	NE	NE	>Csat	NE	NV	>Max	NE	NV	NE	NE	NV	NE	18	28	NE	NV	
DEQ CFSLs[3]		0.021	0.021	0.021	0.011	0.07	NE	0.27	1.3	NE	0.0049	20	NE	0.04	NE	NE	0.38	NE	0.1	0.053	310	0.44	

Notes:
1. Chemical analyses performed by Apex Laboratories, LLC of Tigard, Oregon.
2. DEQ Generic RBCs dated May 2018
3. DEQ CFSLs dated July 23, 2014. Where applicable, CFSL is based on updated DEQ RBCs dated May 2018.
>Csat: This soil RBC exceeds the limit of three-phase equilibrium partitioning. Refer to Appendix D of DEQ's RBDM guidance document for the corresponding value of Csat. Soil concentrations in excess of Csat indicate that free product might be present.
>Max: The constituent RBC for this pathway is calculated as greater than 1,000,000 mg/kg or 1,000,000 mg/L. Therefore, this substance is deemed not to pose risks in this scenario.
<MRL U: not detected at concentrations greater than the laboratory MRL (shown)
NV: chemical is considered non-volatile
Bolding indicates analyte detected at or above the laboratory MRL.
Gray shading indicates analyte detection at a concentration greater than DEQ RBCs and CFSLs.
Blue shading indicates analyte detection at a concentration greater than DEQ CFSLs.

TABLE 2
Summary of Surface Soil and Sediment Sample Chemical Analytical Results[1]
Total Metals
N Roshak Property
13974 and 13580 SW Roy Rogers Road
Tigard, Oregon

Sample I.D. (depth in feet BGS)	Sample Date	Total Metals by EPA Method 6020 (ICPMS) (mg/kg)																
		Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
SS-2(1.5-2)	06/08/18	--	3.21	128	--	<0.256	19.0	--	--	10.9	<0.102 U	--	--	<1.28 U	<0.256 U	--	--	--
SS-3(0.5-1)	06/08/18	--	<1.21 U	144	--	0.303	7.99	--	--	7.70	<0.0967 U	--	--	<1.21 U	<0.242 U	--	--	--
COMP-1(0.0-0.5)	06/08/18	--	1.20	149	--	0.706	4.10	--	--	7.58	<0.0921 U	--	--	<1.15 U	<0.230 U	--	--	--
COMP-2(0.0-0.5)	06/11/18	<1.22 U	5.08	172	0.725	0.416	21.6	19.1	15.9	14.6	<0.0972 U	<1.22 U	14.2	<1.22 U	0.568	<0.243 U	77.6	71.4
COMP-3(0.0-0.5)	06/11/18	<1.31 U	5.47	201	0.712	0.365	25.9	21.7	13.9	10.9	<0.104 U	<1.31 U	14.5	<1.31 U	<0.261 U	<0.261 U	79.7	70.4
COMP-4(0.0-0.5)	06/11/18	<1.24 U	5.17	191	0.638	0.370	17.6	19.9	22.7	16.5	<0.0993 U	<1.24 U	12.2	<1.24 U	<0.248 U	<0.248 U	78.9	76.2
COMP-5(0.0-0.5)	06/11/18	<1.27 U	3.21	151	0.549	0.507	18.0	11.3	19.3	14.4	<0.102 U	<1.27 U	10.3	<1.27 U	<0.254 U	<0.254 U	54.0	75.9
COMP-6(0.0-0.5)	06/11/18	<1.18 U	6.08	177	0.541	0.297	19.3	13.1	16.8	10.1	<0.0947 U	<1.18 U	14.3	<1.18 U	<0.237 U	<0.237 U	69.1	69.2
COMP-7(0.0-0.5)	06/11/18	<1.20 U	8.26	165	0.560	0.342	19.6	12.1	47.0	10.9	<0.0961 U	<1.20 U	13.4	<1.20 U	<0.240 U	<0.240 U	66.6	77.0
COMP-8(0.0-0.5)	06/11/18	<1.20 U	6.65	190	0.606	0.360	20.1	13.2	31.0	9.57	<0.0961 U	<1.20 U	14.7	<1.20 U	<0.240 U	<0.240 U	68.8	74.8
COMP-9(0.0-0.5)	06/11/18	<1.24 U	7.08	225	0.648	0.415	21.4	15.4	20.3	9.70	<0.0995 U	<1.24 U	16.0	<1.24 U	<0.249 U	<0.249 U	69.3	78.0
COMP-10(0.0-0.5)	06/11/18	--	3.25	174	--	2.92	17.7	--	--	63.9	0.107	--	--	<1.22 U	<0.243 U	--	--	--
COMP-11(0.0-3.0)	06/11/18	--	6.87	161	--	0.508	25.7	--	--	14.1	<0.0898 U	--	--	<1.12 U	<0.225 U	--	--	--
COMP-12(0.0-2.5)	06/11/18	--	4.48	135	--	0.439	18.2	--	--	14.7	<0.0923 U	--	--	<1.15 U	0.250 U	--	--	--
SEDCOMP-1(0.0-0.5)	06/08/18	<1.75 U	4.20	172	0.469	<0.350 U	18.4	10.9	10.9	7.42	<0.140 U	<1.75 U	11.5	<1.75 U	<0.350 U	<0.350	43.7	72.3
SEDCOMP-2(0.0-0.5)	06/08/18	<1.90 U	4.25	157	0.434	<0.380 U	18.3	14.5	15.7	9.11	<0.152 U	<1.90 U	12.3	<1.90 U	<0.380 U	<0.380 U	52.4	92.4
SEDCOMP-3(0.0-0.5)	06/08/18	<2.08 U	10.6	221	0.645	<0.416 U	25.8	27.8	23.4	11.8	<0.166 U	<2.08 U	16.3	<2.08 U	<0.416 U	<0.416 U	81.9	247
SEDCOMP-4(0.0-0.5)	06/08/18	<1.41 U	3.54	153	0.501	0.282	17.9	14.2	13.6	9.90	<0.113 U	<1.41 U	11.0	<1.41 U	<0.282 U	<0.282 U	60.6	46.3
SEDCOMP-5(0.0-0.5)	06/08/18	<1.87 U	<1.87 U	116	0.493	<0.375 U	9.78	12.3	10.4	45.1	<0.150 U	<1.87 U	5.91	<1.87 U	<0.375 U	<0.375 U	42.5	30.3
SEDCOMP-6(0.0-0.5)	06/08/18	<1.54 U	2.23	135	0.532	<0.307 U	16.7	8.09	12.3	7.96	<0.123 U	<1.54 U	7.52	<1.54 U	<0.307 U	<0.307 U	46.1	41.5
SEDCOMP-7(0.0-0.5)	06/08/18	<1.86 U	2.15	124	0.419	<0.373 U	19.3	9.39	11.4	19.0	<0.149 U	<1.86 U	8.24	<1.86 U	<0.373 U	<0.373 U	47.6	47.9
Average Concentration[2]		NC	***4.65***	NC	NC	***0.549***	NC	NC	***19.0***	***15.5***	NC	NC	NC	NC	NC	NC	NC	***78.0***
DEQ Generic RBCs[3]																		
Soil Ingestion, Dermal Contact, and Inhalation																		
Residential		NE	0.43[4]	15,000	160	78	120,000	NE	3,100	400	23	NE	1,500	NE	390	NE	NE	NE
Construction Worker		NE	15	69,000	700	350	530,000	NE	14,000	800	110	NE	7,000	NE	1,800	NE	NE	NE
Excavation Worker		NE	420	>Max	19,000	9,700	>Max	NE	390,000	800	2,900	NE	190,000	NE	49,000	NE	NE	NE
Volatization to Outdoor Air																		
Residential		NE	NV	NV	NV	NV	NV	NE	NV	NV	NV	NE	NV	NE	NV	NE	NE	NE
Vapor Intrusion into Buildings																		
Residential		NE	NV	NV	NV	NV	NV	NE	NV	NV	NV	NE	NV	NE	NV	NE	NE	NE
DEQ CFSLs[5]		0.56	8.8	790	21	0.63	76	43	34	28	0.23	2.1	47	0.71	4.2	5.2	180	180

TABLE 2
Summary of Surface Soil and Sediment Sample Chemical Analytical Results[1]
Total Metals
N Roshak Property
13974 and 13580 SW Roy Rogers Road
Tigard, Oregon

Notes:
1. Chemical analyses performed by Apex Laboratories, LLC of Tigard, Oregon.
2. Averaged values are calculated by averaging analyte concentrations and one-half the detection limits for non-detects.
3. DEQ Generic RBCs, dated November 1, 2015.
4. While the detected concentrations of arsenic are greater than this RBC, they are within the range of naturally occuring arsenic concentrations in Oregon soil.
5. DEQ CFSLs dated July 23, 2014. Where applicable, CFSL is based on updated DEQ RBCs dated May 2018.

>Max: The constituent RBC for this pathway is calculated as greater than 1,000,000 mg/kg or 1,000,000 mg/L. Therefore, this substance is deemed not to pose risks in this scenario.
<MRL U: not detected at concentrations greater than the laboratory MRL (shown)
NV: chemical is considered non-volatile
Bolding indicates analyte detected at a concentration greater than the analytical laboratory MRL.
Blue shading indicates analyte detection at a concentration greater than DEQ CFSLs.
--: not analyzed

TABLE 3
Summary of Soil Sample Chemical Analytical Results[1]
Petroleum Hydrocarbons
N Roshak Property
13974 and 13580 SW Roy Rogers Road
Tigard, Oregon

Sample I.D. (depth in feet BGS)	Sample Date	Gasoline-Range Hydrocarbons by Method NWTPH-Gx (mg/kg)	Diesel- and Oil-Range Hydrocarbons by Method NWTPH-Dx (mg/kg)	
			Diesel-Range	Oil-Range
SS-1(0-0.5)	06/08/18	<6.13 U	**1,390**	**794**
SS-2(1.5-2)	06/08/18	<6.42 U	**407**	<50.0 U
SS-3(0.5-1)	06/08/18	<6.49 U	**204**	**2,190**
SS-4(0-0.5)	06/08/18	<6.29 U	<25.0 U	**1,690**
COMP-1(0.0-0.5)	06/08/18	**166**	**5,510**	**3,320**
COMP-10(0.0-0.5)	06/12/18	<5.81 U	**1,290**	**195**
COMP-11(0.0-3.0)	06/12/18	<6.02 U	<25.0 U	<50.0 U
COMP-12(0.0-2.5)	06/12/18	<5.98 U	<25.0 U	**89.4**
DEQ Generic RBCs[2]				
Soil Ingestion, Dermal Contact, and Inhalation				
Residential		1,200	1,100	NE
Construction Worker		9,700	4,600	NE
Excavation Worker		>Max	>Max	NE
Volatilization to Outdoor Air				
Residential		5,900	>Max	NE
Vapor Intrusion into Buildings				
Residential		94	>Max	NE
DEQ CFSLs[3]		NE	NE	NE

Notes:

1. Chemical analyses performed by Apex Laboratories, LLC of Tigard, Oregon.
2. DEQ Generic RBCs dated May 2018
3. DEQ CFSLs dated July 23, 2014. Where applicable, CFSL is based on updated DEQ RBCs dated May 2018.

>Max: The constituent RBC for this pathway is calculated as greater than 1,000,000 mg/kg or 1,000,000 mg/L. Therefore, this substance is deemed not to pose risks in this scenario.

<MRL U: not detected at concentrations greater than the laboratory MRL (shown)

Bolding indicates analyte detected at or above the laboratory MRL.

Gray shading indicates analyte detection at a concentration greater than DEQ RBCs.

TABLE 4
Summary of Soil Sample Chemical Analytical Results[1]
VOCs
N Roshak Property
13974 and 13580 SW Roy Rogers Road
Tigard, Oregon

Sample I.D. (depth in feet BGS)	Sample Date	VOCs[2] by EPA Method 5035A/8260C (mg/kg)						
		n-Butylbenzene	sec-Butylbenzene	Naphthalene	n-Propylbenzene	1,2,4-TMB	1,3,5-TMB	Total Xylenes
SS-2(1.5-2)	06/08/18	<0.0642 U	<0.0642 U	<0.128 U	<0.0321 U	<0.0642 U	<0.0642 U	<0.0321 U
SS-3(0.5-1)	06/08/18	<0.0649 U	<0.0649 U	<0.130 U	<0.0324 U	<0.0649 U	<0.0649 U	<0.0324 U
COMP-1(0.0-0.5)	06/08/18	**0.301**	**0.189**	**1.01**	**0.0824**	**1.69**	**0.399**	**0.0627**
COMP-10(0.0-0.5)	06/12/18	<0.0581 U	<0.0581 U	<0.116 U	<0.0291 U	<0.0581 U	<0.0581 U	<0.872 U
COMP-11(0.0-3.0)	06/12/18	<0.0602 U	<0.0602 U	<0.120 U	<0.0301 U	<0.0602 U	<0.0602 U	<0.0903 U
COMP-12(0.0-2.5)	06/12/18	<0.0598 U	<0.0598 U	<0.120 U	<0.0299 U	<0.0598 U	<0.0598 U	<0.0897 U
DEQ Generic RBCs[3]								
Soil Ingestion, Dermal Contact, and Inhalation								
Residential		NE	NE	5.3	NE	430	430	1,400
Construction Worker		NE	NE	580	NE	2,900	2,900	20,000
Excavation Worker		NE	NE	16,000	NE	81,000	81,000	560,000
Volatilization to Outdoor Air								
Residential		NE	NE	6.4	NE	>Csat	>Csat	<Csat
Vapor Intrusion into Buildings								
Residential		NE	NE	6.4	NE	140	98	160
DEQ CFSLs[4]		NE	NE	0.087	NE	16	92	25

Notes:
1. Chemical analyses performed by Apex Laboratories, LLC of Tigard, Oregon.
2. Only VOCs detected during this investigation are listed.
3. DEQ Generic RBCs dated May 2018
4. DEQ CFSLs dated July 23, 2014. Where applicable, CFSL is based on updated DEQ RBCs dated May 2018.

>Csat: This soil RBC exceeds the limit of three-phase equilibrium partitioning. Refer to Appendix D of DEQ's RBDM guidance document for the corresponding value of Csat. Soil concentrations in excess of Csat indicate that free product might be present.
<MRL U: not detected at concentrations greater than the laboratory MRL (shown)
Bolding indicates analyte detected at or above the laboratory MRL.
Blue shading indicates analyte detection at a concentration greater than DEQ CFSLs.

TABLE 5
Summary of Soil Sample Chemical Analytical Results[1]
PAHs
N Roshak Property
13974 and 13580 SW Roy Rogers Road
Tigard, Oregon

Sample I.D. (depth in feet BGS)	Sample Date	PAHs by EPA Method 8270D SIM (mg/kg)																	
		Acenapthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene
SS-2(1.5-2)	06/08/18	<0.0144 U	<0.0111 U	<0.0111 U	<0.0111 U	<0.0111 U	<0.0111 U	<0.0111 U	<0.0111 U	<0.0111 U	<0.0111 U	<0.0122 U	<0.0111 U	<0.0133 U	<0.0111 U	**0.119**	**0.175**	**0.0328**	**0.0527**	**0.0312**
SS-3(0.5-1)	06/08/18	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0116 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.130 U	**0.0545**	**0.0827**
COMP-1(0.0-0.5)	06/08/18	<0.332 U	<0.125 U	<0.125 U	<0.0104 U	<0.0104 U	<0.0104 U	<0.0104 U	<0.0104 U	<0.0467 U	<0.0104 U	<0.291 U	0.0698 U	<0.312 U	<0.0104 U	**3.60**	**7.69**	**1.44**	**1.64**	**1.06**
COMP-10(0.0-0.5)	06/12/18	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	**0.0139**	<0.0113 U	**0.0279**	<0.0420 U	<0.0113 U	<0.0113 U	<0.0125 U	<0.0113 U	**0.0123**	**0.0136**	**0.0253**	**0.183**	**0.0326**	**0.125**
COMP-11(0.0-3.0)	06/12/18	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	<0.0107 U	**0.0157**	**0.205**	**0.0135**	<0.0107 U
COMP-12(0.0-2.5)	06/12/18	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	<0.0113 U	**0.211**	<0.0113 U	<0.0113 U
DEQ Generic RBCs[2]																				
Soil Ingestion, Dermal Contact, and Inhalation																				
Residential		4,700	NE	23,000	1.1	0.11	1.1	11	NE	110	0.11	NE	2,400	3,100	1.1	NE	NE	5.3	NE	1,800
Construction Worker		21,000	NE	110,000	170	17	170	1,700	NE	17,000	17	NE	10,000	14,000	170	NE	NE	580	NE	7,500
Excavation Worker		590,000	NE	>Max	4,800	490	4,900	49,000	NE	490,000	490	NE	280,000	390,000	4,900	NE	NE	16,000	NE	210,000
Volatilization to Outdoor Air																				
Residential		>Max	NE	>Max	>Csat	NV	NV	NV	NE	NV	NV	NE	NV	>Max	NV	NE	NE	6.4	NE	>Csat
Vapor Intrusion into Buildings																				
Residential		>Max	NE	>Max	>Csat	NV	NV	NV	NE	NV	NV	NE	NV	>Max	NV	NE	NE	6.4	NE	>Csat
DEQ CFSLs[3]		29	NE	29	1.1	0.11	1.1	11	NE	110	0.11	0.002	29	29	1.1	0.738	310	0.087	NE	1,700

Notes:
1. Chemical analyses performed by Apex Laboratories, LLC of Tigard, Oregon.
2. DEQ Generic RBCs dated May 2018
3. DEQ CFSLs dated July 23, 2014. Where applicable, CFSL is based on updated DEQ RBCs dated May 2018.
>Csat: This soil RBC exceeds the limit of three-phase equilibrium partitioning. Refer to Appendix D of DEQ's RBDM guidance document for the corresponding value of Csat. Soil concentrations in excess of Csat indicate that free product might be present.
>Max: The constituent RBC for this pathway is calculated as greater than 1,000,000 mg/kg or 1,000,000 mg/L. Therefore, this substance is deemed not to pose risks in this scenario.
<MRL U: not detected at concentrations greater than the laboratory MRL (shown)
NV: chemical is considered non-volatile
Bolding indicates analyte detected at or above the laboratory MRL.
Blue shading indicates analyte detection at a concentration greater than DEQ CFSLs.

TABLE 6
Summary of Soil Sample Chemical Analytical Results [1]
PCBs
N Roshak Property
13974 and 13580 SW Roy Rogers Road
Tigard, Oregon

Sample I.D. (depth in feet BGS)	Sample Date	PCBs by EPA Method 8082A (mg/kg)						
		Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
SS-2(1.5-2)	06/08/18	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U	<0.0106 U
SS-3(0.5-1)	06/08/18	<0.0109 U	<0.0109 U	<0.0109 U	<0.0109 U	<0.0109 U	<0.0218 U	<0.0109 U
COMP-1(0.0-0.5)	06/08/18	<0.0285 U	<0.00984 U	<0.0187 U	<0.0364 U	<0.0610 U	<0.112 U	<0.0669 U
COMP-10(0.0-0.5)	06/12/18	<0.0111 U	<0.0111 U	<0.0111 U	<0.0111 U	<0.0111 U	<0.126 U	**0.0718**
COMP-11(0.0-3.0)	06/12/18	<0.0105 U	<0.0105 U	<0.0105 U	<0.0105 U	<0.0105 U	<0.0105 U	<0.0105 U
COMP-12(0.0-2.5)	06/12/18	<0.0105 U	<0.0105 U	<0.0105 U	<0.0105 U	<0.0105 U	<0.0105 U	<0.0105 U
DEQ Generic RBCs [2]								
Soil Ingestion, Dermal Contact, and Inhalation								
Residential		0.23						
Construction Worker		8.4						
Excavation Worker		230						
Volatilization to Outdoor Air								
Residential		>Csat						
Vapor Intrusion into Buildings								
Residential		>Csat						
DEQ CFSLs [3]		0.2						

TABLE 6
Summary of Soil Sample Chemical Analytical Results [1]
PCBs
N Roshak Property
13974 and 13580 SW Roy Rogers Road
Tigard, Oregon

Notes:

1. Chemical analyses performed by Apex Laboratories, LLC of Tigard, Oregon.
2. DEQ Generic RBCs dated May 2018
3. DEQ CFSLs dated July 23, 2014. Where applicable, CFSL is based on updated DEQ RBCs dated May 2018.

>Csat: This soil RBC exceeds the limit of three-phase equilibrium partitioning. Refer to Appendix D of DEQ's RBDM guidance document for the corresponding value of Csat. Soil concentrations in excess of Csat indicate that free product might be present.

<MRL U: not detected at concentrations greater than the laboratory MRL (shown)

Bolding indicates analyte detected at or above the laboratory MRL.

APPENDIX A

APPENDIX A

SITE-SPECIFIC HEALTH AND SAFETY PLAN

INTRODUCTION

Each contractor conducting work at the project site is individually responsible for the health and safety of their employees. This includes the implementation of any training requirements, HSPs, monitoring, and any other specific requirements for the type of work being completed by the contractor. This HSP should be available to employees who will be working at the project site can be used to assist the contractor in preparation of their employee hazard communication and health and safety programs for the project site. This HSP is intended solely for the use of GeoDesign employees while providing on-site observation, monitoring, and sampling; is provided in this document for reference only; and is not a replacement for each contractor's specific HSP. Contractors may adopt this HSP with the proper modifications to address the type of work they will be completing at the project site.

This HSP establishes the policies and procedure that will help minimize risk to on-site workers, visitors, and the public. The procedures and guidelines contained herein are based on the current available information at the time of this HSPs preparation. Specific requirements will be revised when new information is received, or conditions change.

SITE BACKGROUND

A summary the environmental history and background of the project site is presented in Section 3.0 of the CMMP.

PROJECT SITE LOCATION

Address: 13794 and 13580 SW Roy Rogers Road; Tigard, Oregon

Description: The project site consists of 38.52 acres and is currently occupied by two rural residences, associated outbuildings, a large irrigation pond, a small pond, a creek, and agricultural land.

Contracting Company or Agency: To be determined

SCOPE OF WORK (GEODESIGN)

Objectives: Observe soil conditions, excavation activities, and/or construction; provide field screening of soil disturbed during development activities, if necessary; collect confirmation soil samples from limits of excavation and/or soil stockpiles, as appropriate; and document site activities

Duration of Work: To be determined

ON-SITE ORGANIZATION AND COORDINATION

The following personnel are designated to carry out the stated job functions on site. (Note: One person may carry out more than one job function.)

Project Manager:	Kyle Sattler
SSO:	To be determined
Site Supervisor:	To be determined
Field Personnel:	To be determined
Subcontractor(s):	NA
Client Contact:	Pam Verdadero

The Project Manager has overall responsibility for all activities on site, including implementation of the site safety plan. The Project Manager may delegate this function to the SSO.

The SSO is responsible for helping to ensure that work crews comply with all site safety and health requirements.

All other site personnel are responsible for understanding and complying with all site safety and health requirements.

PROJECT SITE CONTROL

The project site will be a secured construction site. Excavations deeper than 4 feet BGS should be properly shored and fenced to prevent excavation collapse and falls into the excavation.

EMPLOYEE TRAINING

All site personnel working in contaminated portions of the project site and that might come in contact with contaminated media will have received 24 or 40 hours of OSHA training on safe work practices for hazardous waste sites. In addition, personnel are required to receive eight hours of OSHA refresher training annually. Managers and supervisors are required to receive eight hours of OSHA training for safe management of hazardous waste site operations. All training will comply with 29 CFR 1910.120. Site-specific training will be held at the beginning of the project. Daily site safety meetings will be held on site and a record kept.

MEDICAL SURVEILLANCE

Pre-employment and periodic medical examinations are required for personnel working at hazardous waste sites. The medical examination must be completed within the prior 12-month period. A statement deeming the worker fit-for-duty is required from a licensed physician. Medical records are accessible by workers.

HAZARD/RISK ASSESSMENT

This section discusses chemical, physical, and environmental hazards to workers at the project site. The table below lists major hazards associated with these tasks and methods to mitigate the hazards. The table below discusses physical hazards identified with this project site, including those associated with fire, use of heavy equipment, slip/trip/fall, lifting, tool and equipment, and heat stress.

Daily tailgate safety meetings will be held at the start of each workday to discuss potential chemical, physical, and environmental hazards and preventative safety measures. Attendance will be mandatory for all employees. Task hazard analyses have been developed for each major field activity/work phase and are presented in the table below. The following sections describe the specific hazards anticipated in more detail and the control measures to be implemented to minimize or eliminate each hazard. This information will be used to augment daily safety meetings intended to heighten safety and hazard awareness on the job.

HAZARDS ASSOCIATED WITH TASKS

The main hazards associated with site construction are struck-by, and inhalation, contact, and/or ingestion of contaminants. Other potential hazards associated with site activity are analyzed as detailed in the table below.

Hazard Sources and Mitigation During Field Activities and Hazard Project Tasks Mitigation Methods

Hazard	Project Tasks	Mitigation Methods
Slip/trip/fall	All tasks	Maintain good housekeeping. Limit work area with boundary marking tape and signs. Slip/trip/fall hazards will be addressed through an ongoing proactive housekeeping program that eliminates elements in the work area that have potential for causing loss of footing.
Struck-by	All tasks	Maintain a safe distance from any heavy equipment. Workers should not stand within the swing radius or reach of heavy equipment.
Explosion/fire	All tasks	Smoking is not permitted in the work zones. Any free-phase petroleum or gasoline will be stored in appropriate containers. Signs indicating flammable liquids should be posted where appropriate. Appropriate fire extinguishers will be available to site personnel during field activities. Open-flame ignition sources will be restricted from the work area (smoking, etc.)

Hazard Sources and Mitigation During Field Activities and Hazard Project Tasks Mitigation Methods (continued)

Hazard	Project Tasks	Mitigation Methods
Inhalation, contact and ingestion of organic vapors	Excavation, sampling and monitoring	Level D PPE is typically adequate. If conditions require upgrading to air-purifying respirations (Level C PPE), an addendum to this HSP will be submitted for review and approval. Remain upwind of contaminated material whenever possible. Wear disposable gloves and safety glasses with side shields when handling soil and sampling waters. Avoid smoking at all times during the mass excavation activities. Chewing tobacco and eating should also be avoided during excavation work to prevent ingestion of site contaminants.
Contact with contaminated soil and groundwater	Excavation, sampling and monitoring	Level D PPE is typically adequate. Wear appropriate coveralls, gloves, and protective eyewear. No eating, smoking, or drinking on site.
Weather extremes	All tasks	Use dress consistent with weather conditions. Implement worker rotation and rest period schedules. Adjust work day to avoid exposure.

HAZARD ANALYSIS

Chemical(s)	Not anticipated
Heavy Equipment	Yes
Confined Space	Not anticipated
Flammability	NA
Reactivity	NA
Heat	Occasional warm periods
Cold	Occasional cold periods
Flammability	
Reactivity	NA
Drums	NA
Terrain	Potential excavation with steep sidewalls
Oxygen Deficient	NA
Electrical	NA
Corrosivity	NA
Noise	Construction equipment noise will be present during the entire work period
Altitude	NA
Radiation	NA
Wildlife	NA
Ergonomic	NA

Drilling	NA
Excavation	Mass excavation for project site development
Biological Agent	NA
Explosives	NA
Vehicles	Cars, freight trucks, construction vehicles

PERSONAL PROTECTIVE EQUIPMENT

Based on the evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

Location	Job Function	Levels of Protection
Exclusion Zone	**All Tasks**	**D**
		A B C D Other
		A B C D Other
		A B C D Other
Contamination Reduction Zone	**All Tasks**	**D**
		A B C D Other
		A B C D Other

Specific protective equipment for each level of protection is as follows:

Level A

Level B

Other

Level C

Level D Hard hat, safety vest, steel toed boots, eye protection, and ear protection if construction equipment is operating.

DOWNGRADING CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL NOT BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER.

DECONTAMINATION PROCEDURE

Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The standard level **NA** decontamination protocol shall be used with the following decontamination stations:

(1) (2)
(3) (4)
(5) (6)

(7)_____ (8)_____
(9)_____ (10)_____

The decontamination station will be located immediately adjacent to the Exclusion Zone. The decontamination solution will be **NA**.

Emergency decontamination will include the following stations: **Soap and Water – Rinse Water – Eye-Wash Station**

Equipment decontamination will be as follows: **Trisodium phosphate and water**

EMERGENCIES

Closest Hospital	**Legacy Meridian Park Medical Center**	
Address	**19300 SW 65th Avenue, Tualatin**	Phone **503-692-1212**
Distance	**10.6 miles – see attached map**	
Ambulance		Phone **911**
Police		Phone **911**
Fire		Phone **911**
GeoDesign, Inc.	Office Phone: **503-968-8787**	

Emergency Equipment is available on-site at the following locations:

First Aid Kit	**In Vehicle**
Eye Wash	**In Vehicle**
Fire Extinguisher	**On Site**
Other	

The following standard emergency procedures will be used by on-site personnel. The SSO shall be notified of any on-site emergencies and will be responsible for helping ensure that the appropriate procedures are followed.

Personnel Injury in the Exclusion Zone: Upon notification of an injury in the Exclusion Zone, the designated emergency signal of three horn blasts shall be sounded. All site personnel will assemble at the decontamination line. The rescue team will enter the Exclusion Zone (if required) to remove the injured person to the hotline. The SSO will evaluate the nature of the injury, and the impacted person should be decontaminated to the extent possible prior to movement to the Support Zone. Appropriate first aid and arrangement for an ambulance will be made with the designated medical facility (if required). No persons will re-enter the Exclusion Zone until the cause of the injury or symptoms is determined.

Personnel Injury in the Support Zone: Upon notification of an injury in the Support Zone, the SSO will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue with the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, the

designated emergency signal of three horn blasts will be sounded and all site personnel shall move to the decontamination line for further instructions. Activities on site will stop until the added risk is removed or minimized.

Fire/Explosion: Upon notification of a fire or explosion on site, the designated emergency signal of three horn blasts will be sounded and all site personnel will assemble at the decontamination line. The fire department will be alerted and all personnel will move to a safe distance from the involved area.

PPE Failure: If any site worker experiences a failure or alteration of PPE that affects the protection factor, that person and his buddy will immediately leave the Exclusion Zone. Re-entry will not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure: If any other equipment on site fails to operate properly, the Site Supervisor will be notified and then determine the effect of the failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of project objectives, all personnel will leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

Emergency Escape Routes: The following routes are designated for use in situations where egress from the Exclusion Zone cannot occur through the decontamination line: (describe alternate routes to leave the area in emergencies)

To be determined upon arrival on site

In all situations, when an on-site emergency results in evacuation of the Exclusion Zone, personnel will not re-enter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been re-assessed.
3. The Site Safety Plan has been reviewed.
4. Site personnel have been briefed on any changes to the Site Safety Plan.

ATTACHMENT 1
HAZARD ANALYSIS

HAZARD	PREVENTION	TREATMENT
Traffic to and from site	Defensive driving	Call 911 and insurance company
Hot weather	Wear sunscreen, drink water	Re-hydrate
Slips, trips, falls, cuts	Caution	Antibiotic ointment
Construction equipment	Eye contact with operator, personal protection equipment, caution	Call 911
Soil sampling	Use protective PPE	Call 911 or on-site assistance

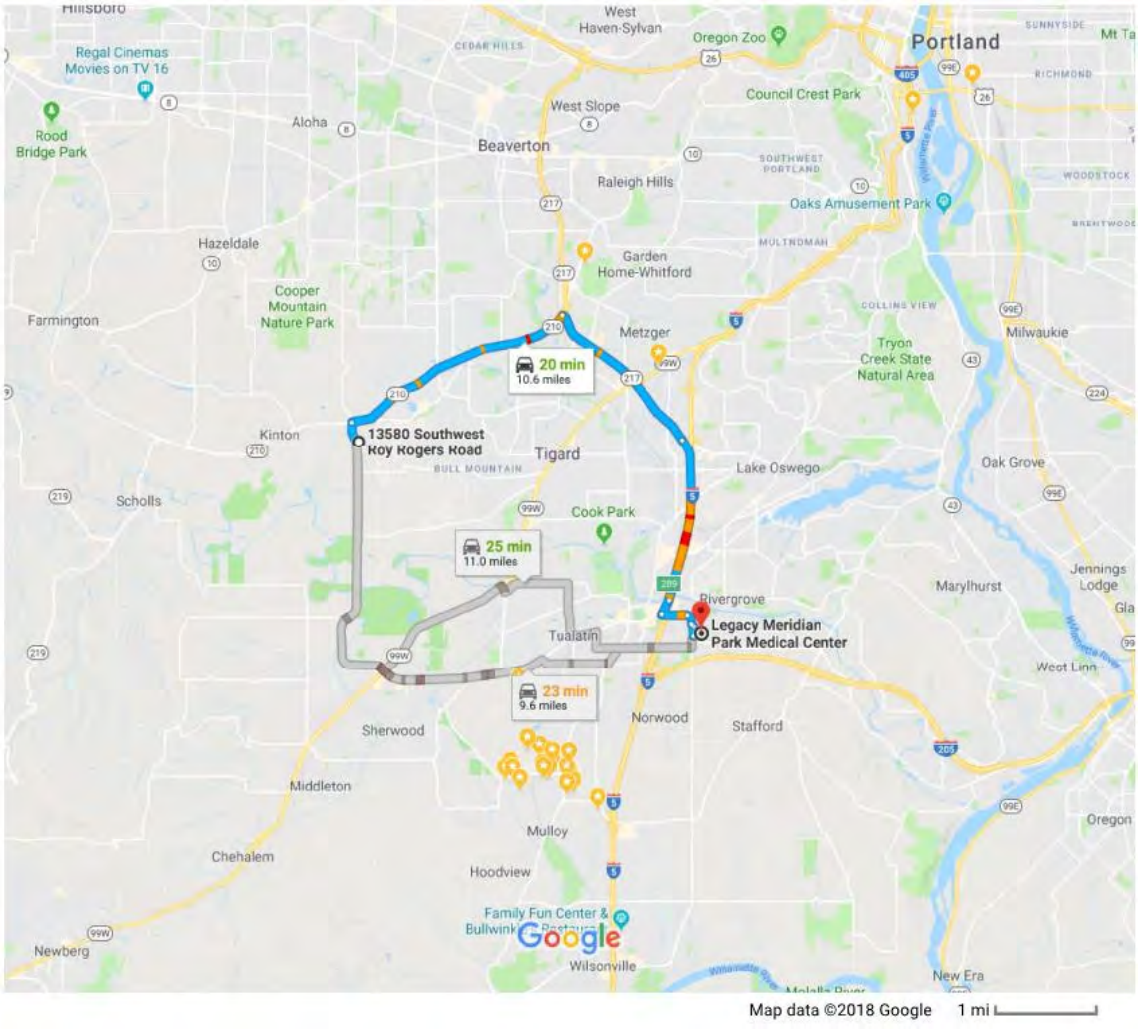
If additional physical hazards are identified during site work, document the conditions and contact the Project Manager.

ATTACHMENT 2
SITE SAFETY PLAN ACKNOWLEDGMENT

All site personnel have read the above plan and are familiar with its provisions.

Name	Company	Date
Site Safety Officer		
Project Manager		
Site Personnel		

Map to Hospital
Legacy Meridian Park Medical Center
19300 SW 65th Avenue
Tualatin, OR 97062

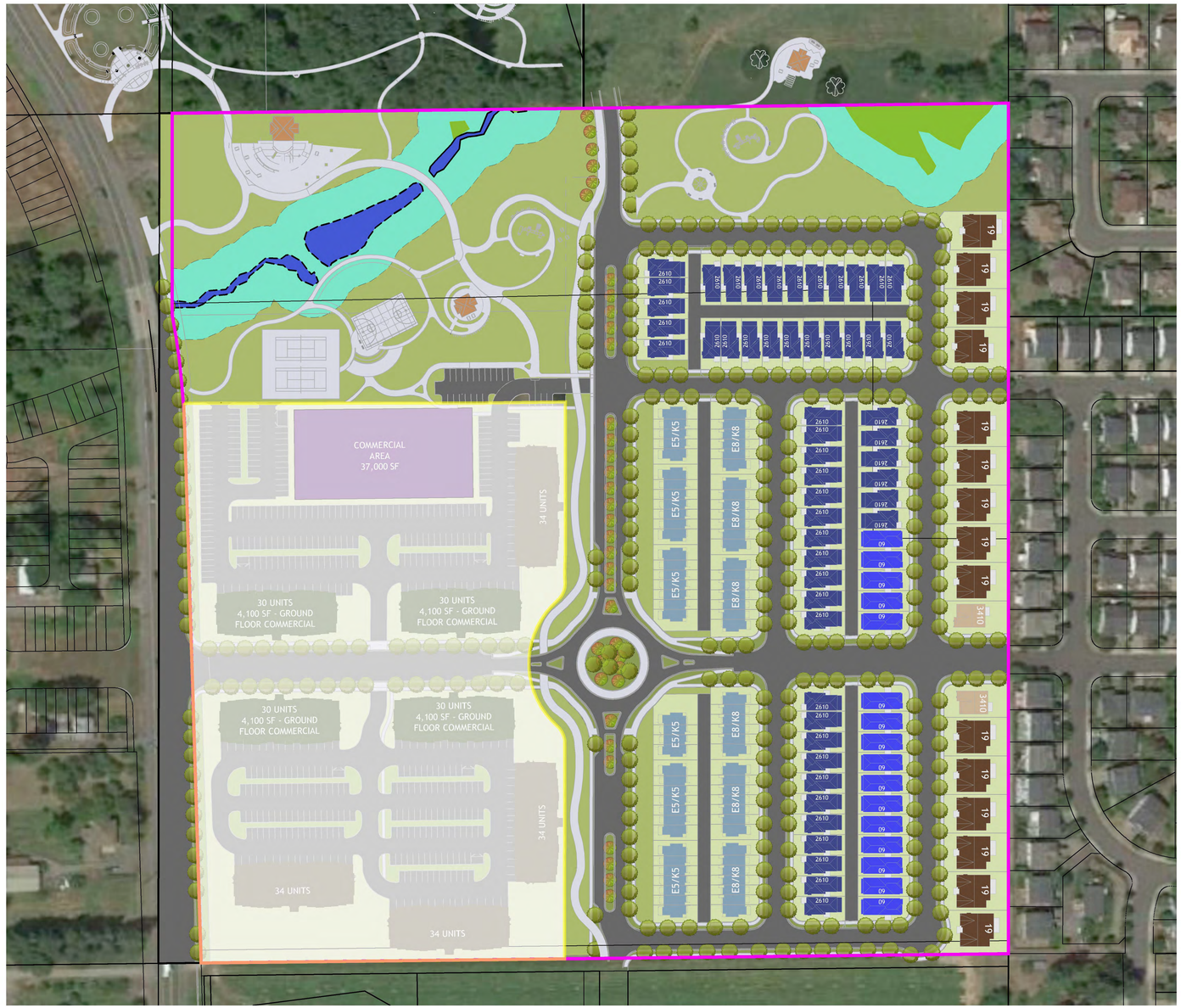


APPENDIX B

North Roshak

Residential Area Site Plan

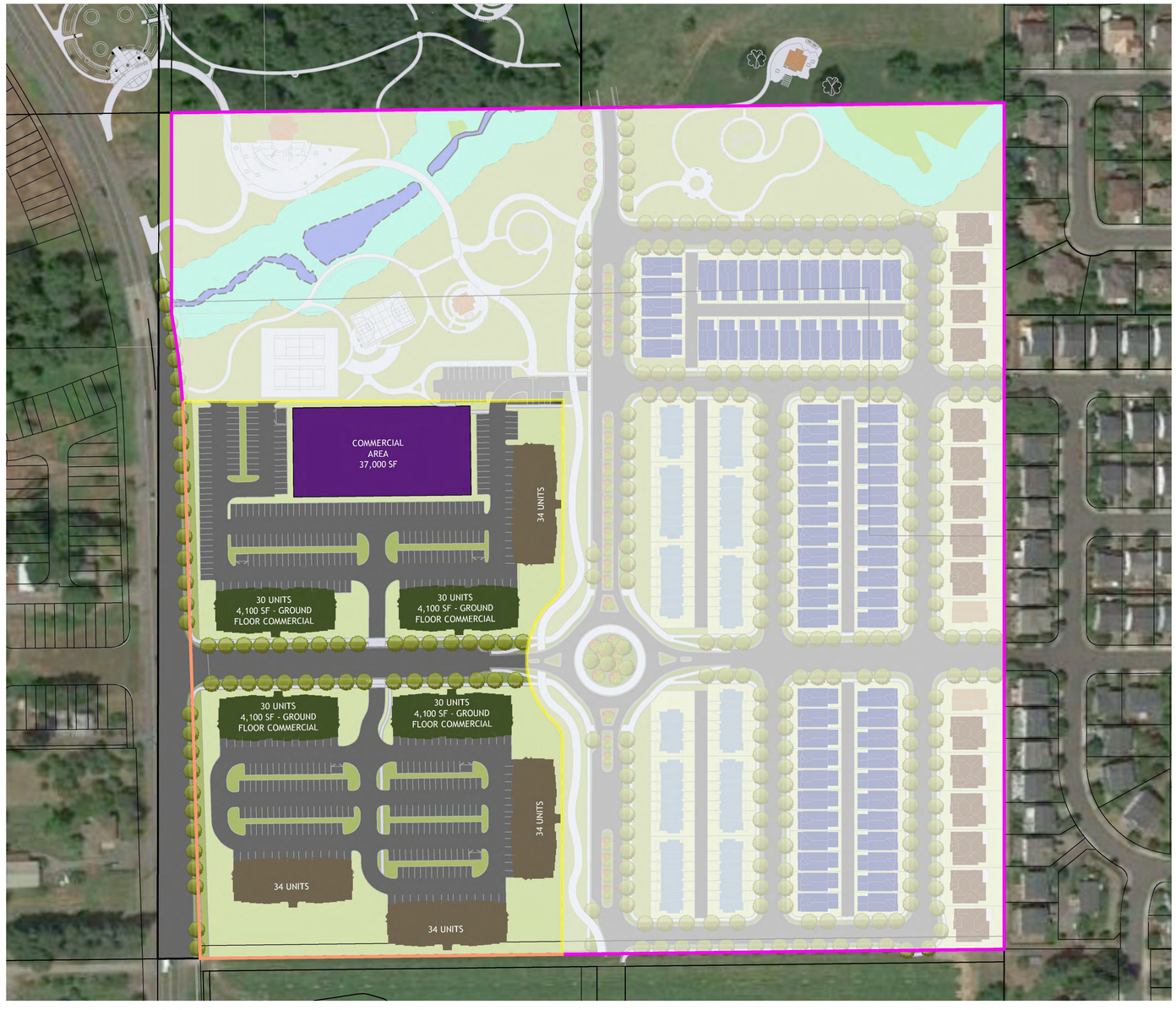
River Terrace



E8/K8	Rowhome Lots	40
E5/K5	Rowhome Lots	37
2610	Small Lots (32')	53
60	Small Lots (32')	16
3410	Medium Lots (45')	2
19	Large Lots (60')	15
	Total	163

Commercial Area Site Plan

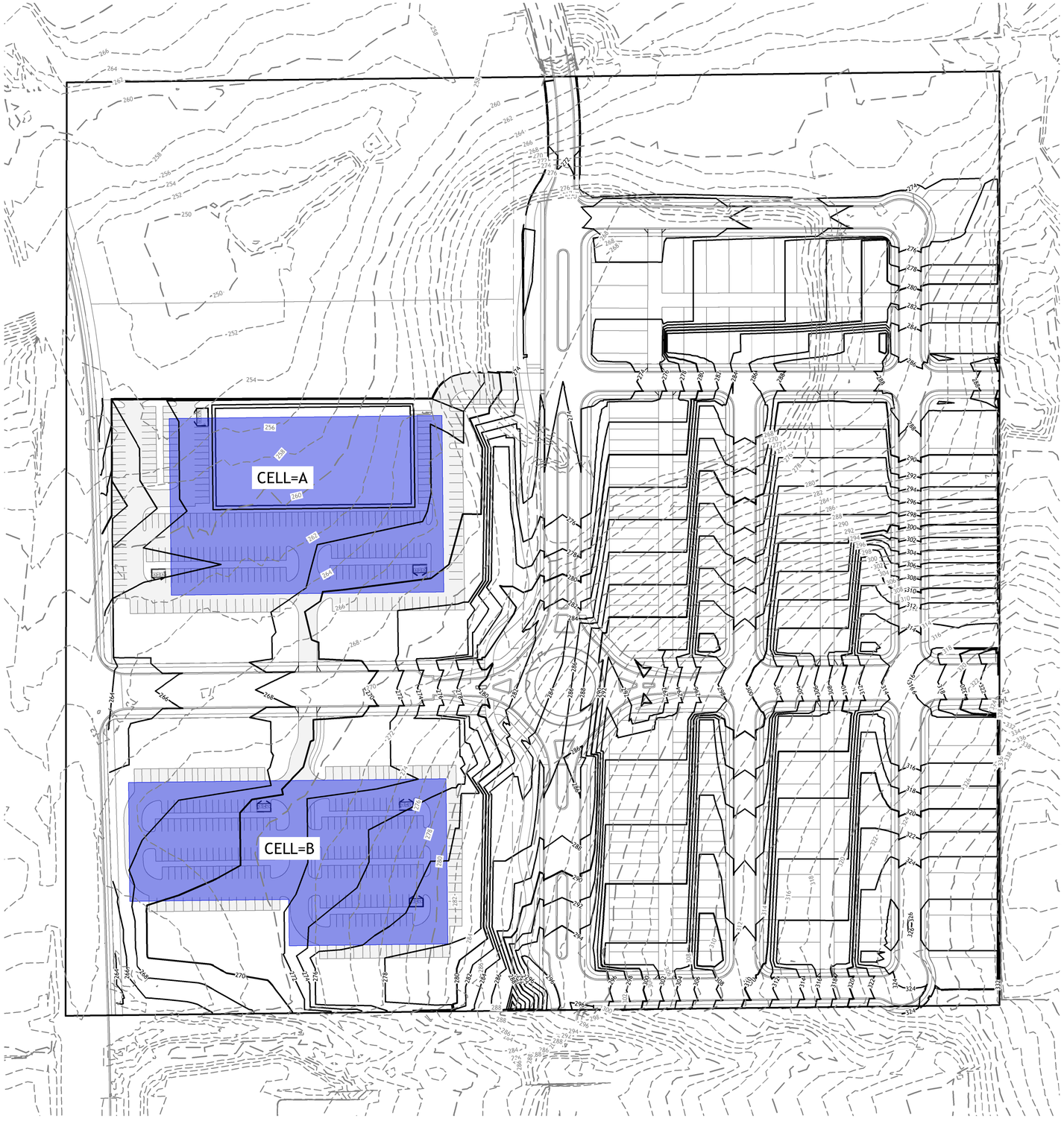
River Terrace



Commercial (37,000 SF)	
Mixed Use Commercial/ Apartments	120
Apartments	136
Total	256

Total Site Area	10.1 Acres
Total Ground Floor Commercial Area In Mixed-Use Buildings	16,400 SF
Total Available Commercial Area In Commercial Building	37,000 SF
Total Commercial Area Available	53,400 SF

APPENDIX C



SCALE
80 0 40 80
1 INCH = 80 FEET

River Terrace

POLYGON NW COMPANY

Pacific Community Design
[T] 503-941-9484 [F] 503-941-9485
GEODESIGN, INC

REVISIONS
DATE DESCRIPTION

Roshak North

Overall Grading Plan

PROJECT NO.: 395-076
TYPE: PLANNING
REVIEWED BY: JJK

A

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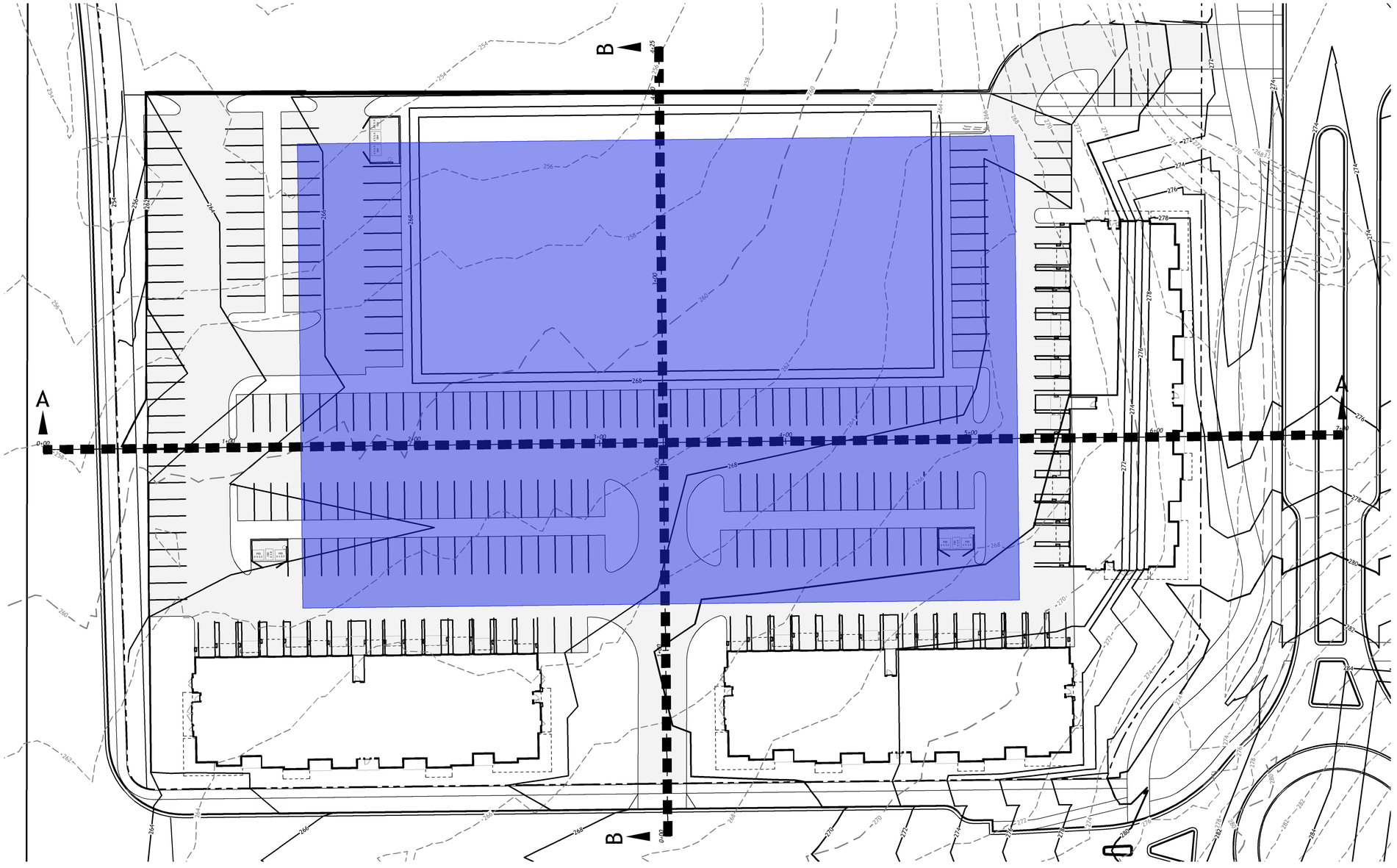

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River Terrace

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Pacific Community Design

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GEODESIGN, INC

REVISIONS

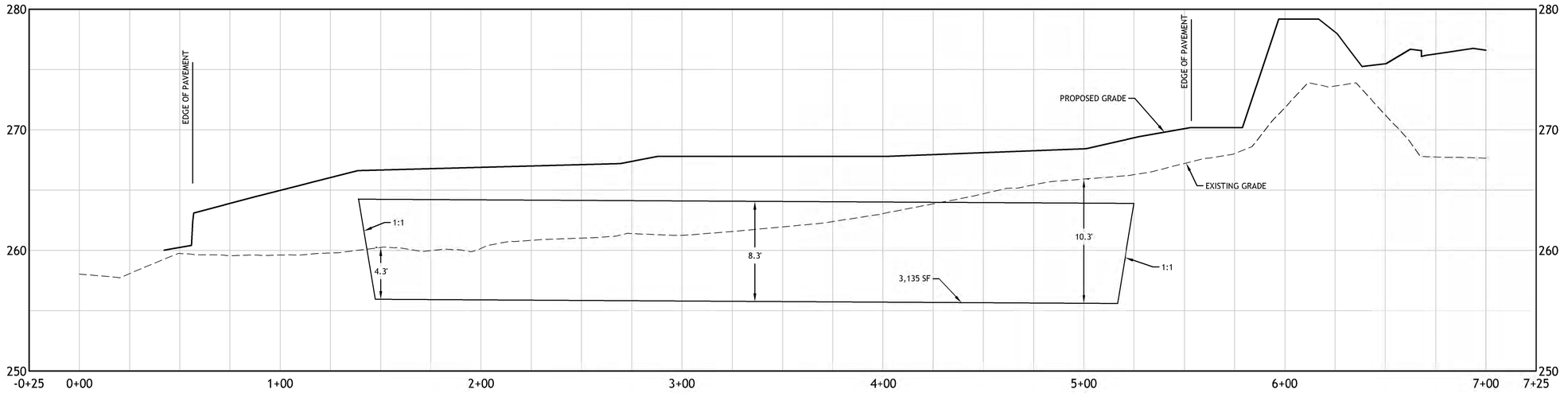
DATE	DESCRIPTION

Roshak North

Private Parking Lot Grading

PROJECT NO.:	395-076
TYPE:	PLANNING
REVIEWED BY:	JJK

B



PROFILE A-A

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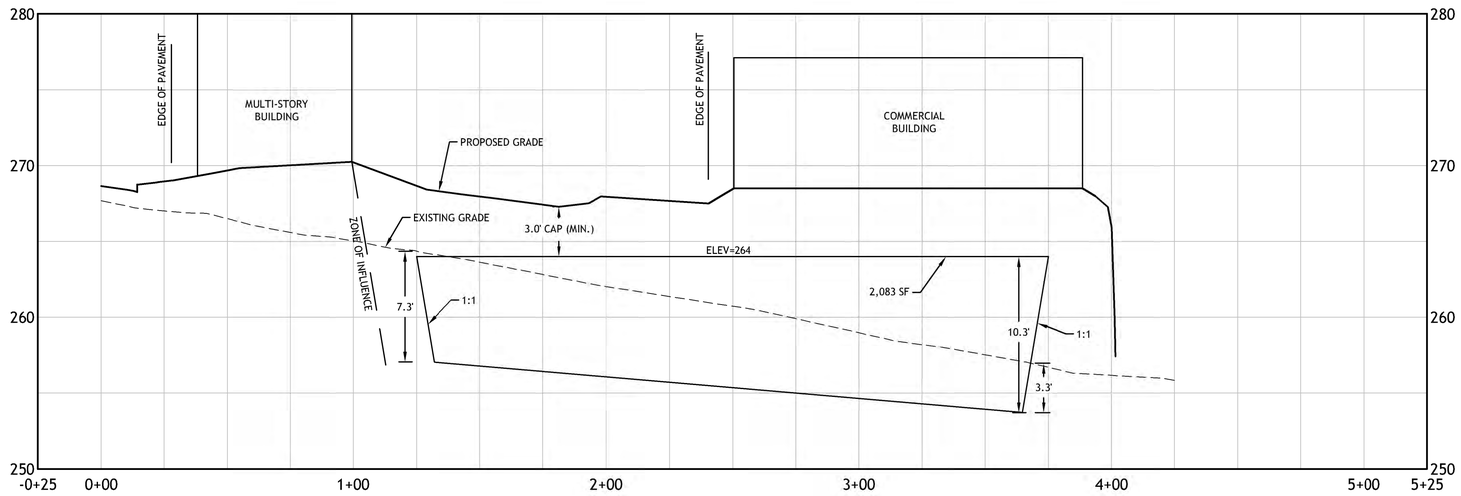
VERTICAL SCALE: 1"=5'



PROFILE B-B

HORIZONTAL SCALE: 1"=30'
VERTICAL SCALE: 1"=5'

River Terrace

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Pacific Community Design
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GEODESIGN, INC

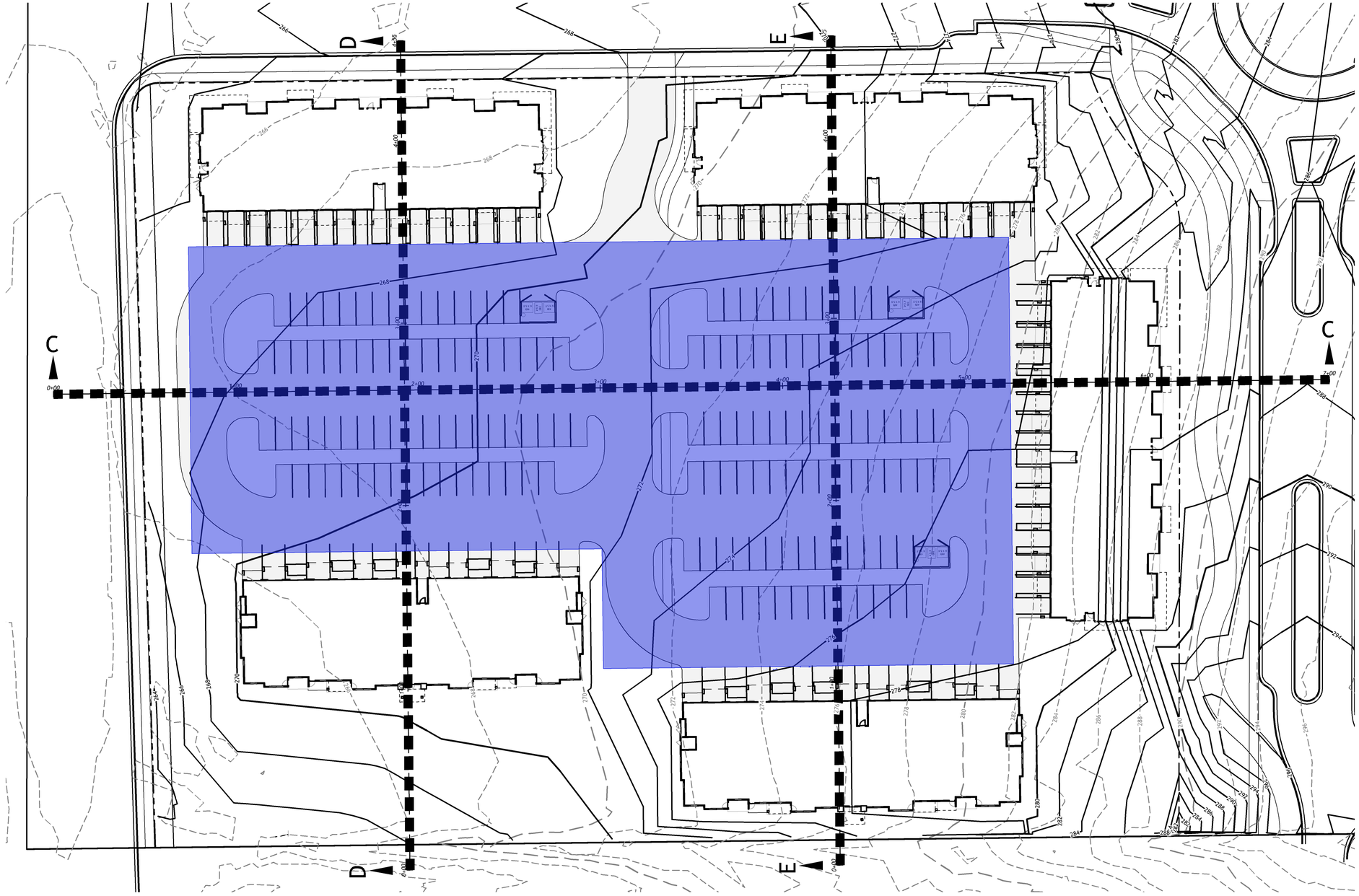
REVISIONS
DATE DESCRIPTION

Roshak North

Private Parking Lot Grading

PROJECT NO.: 395-076
TYPE: PLANNING
REVIEWED BY: JJK

C



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River Terrace

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GEODESIGN, INC

REVISIONS

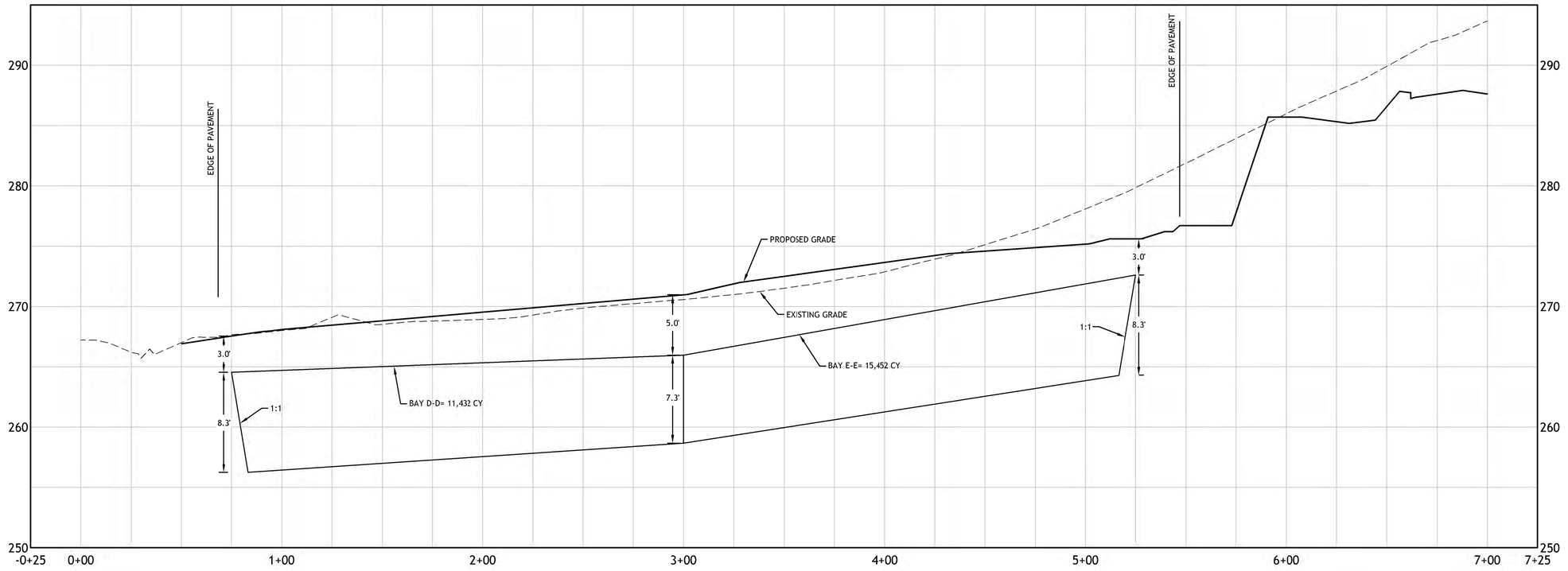
DATE	DESCRIPTION

Roshak North

Private Parking Lot Grading

PROJECT NO.:	395-076
TYPE:	PLANNING
REVIEWED BY:	JJK

D



PROFILE C-C

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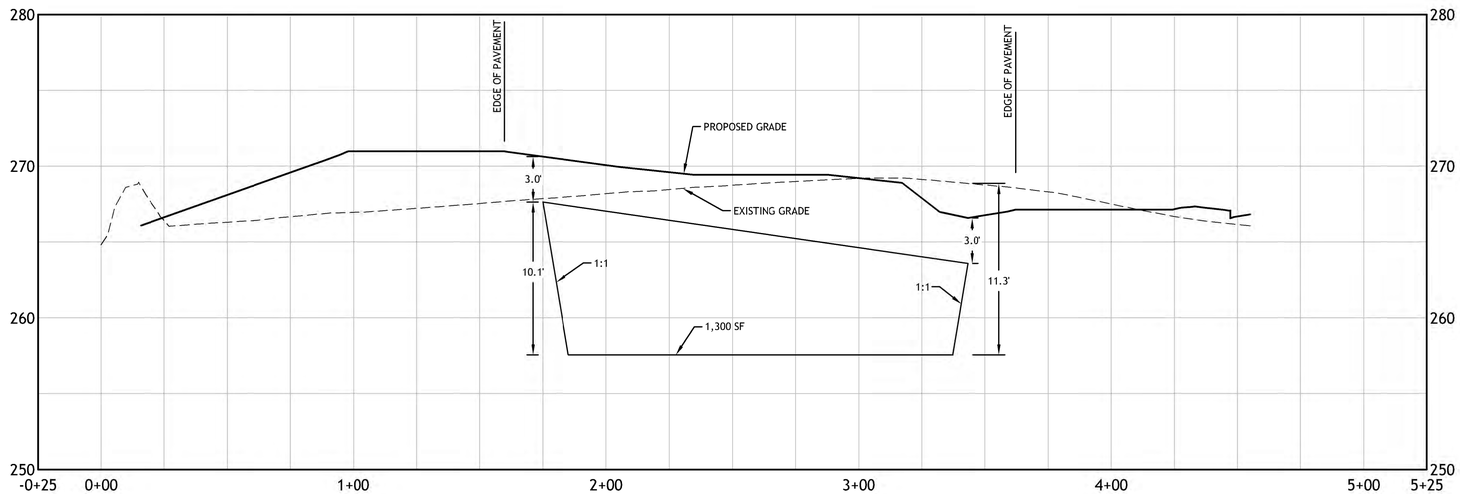
VERTICAL SCALE: 1"=5'



PROFILE D-D

HORIZONTAL SCALE: 1"=30'

VERTICAL SCALE: 1"=5'

River Terrace

POLYGON NW COMPANY

Pacific Community Design

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GEODESIGN, INC

REVISIONS

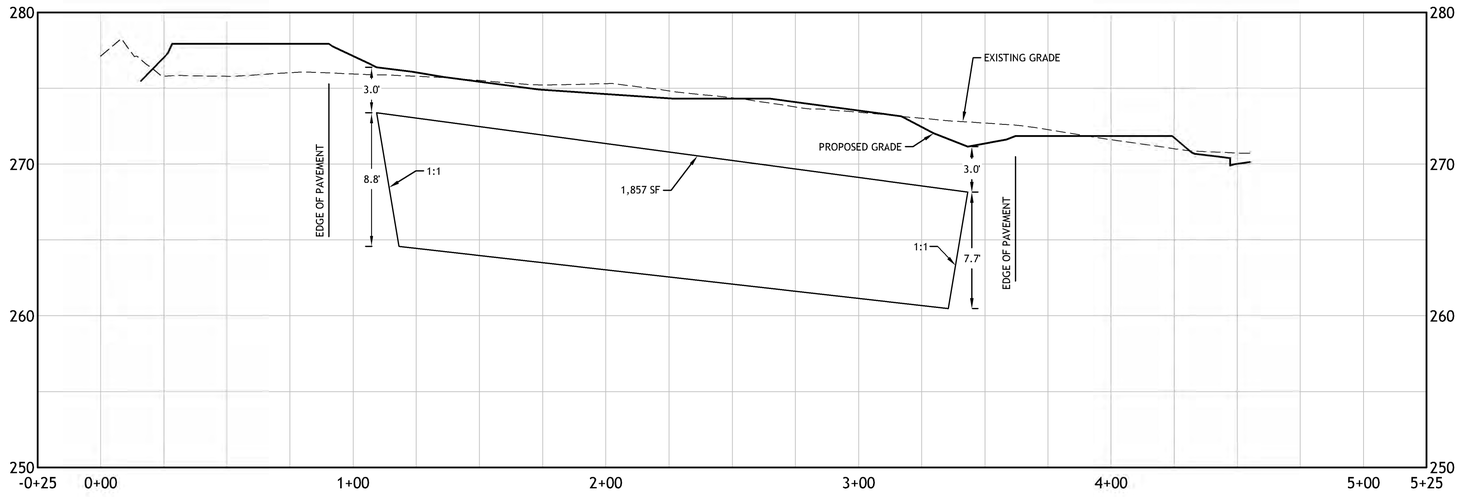
DATE	DESCRIPTION

Roshak North

Private Parking Lot Grading

PROJECT NO.:	395-076
TYPE:	PLANNING
REVIEWED BY:	JJK

E



PROFILE E-E

HORIZONTAL SCALE: 1"=30'
VERTICAL SCALE: 1"=5'

River Terrace

POLYGON NW COMPANY

Pacific Community Design

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GEODESIGN, INC

REVISIONS

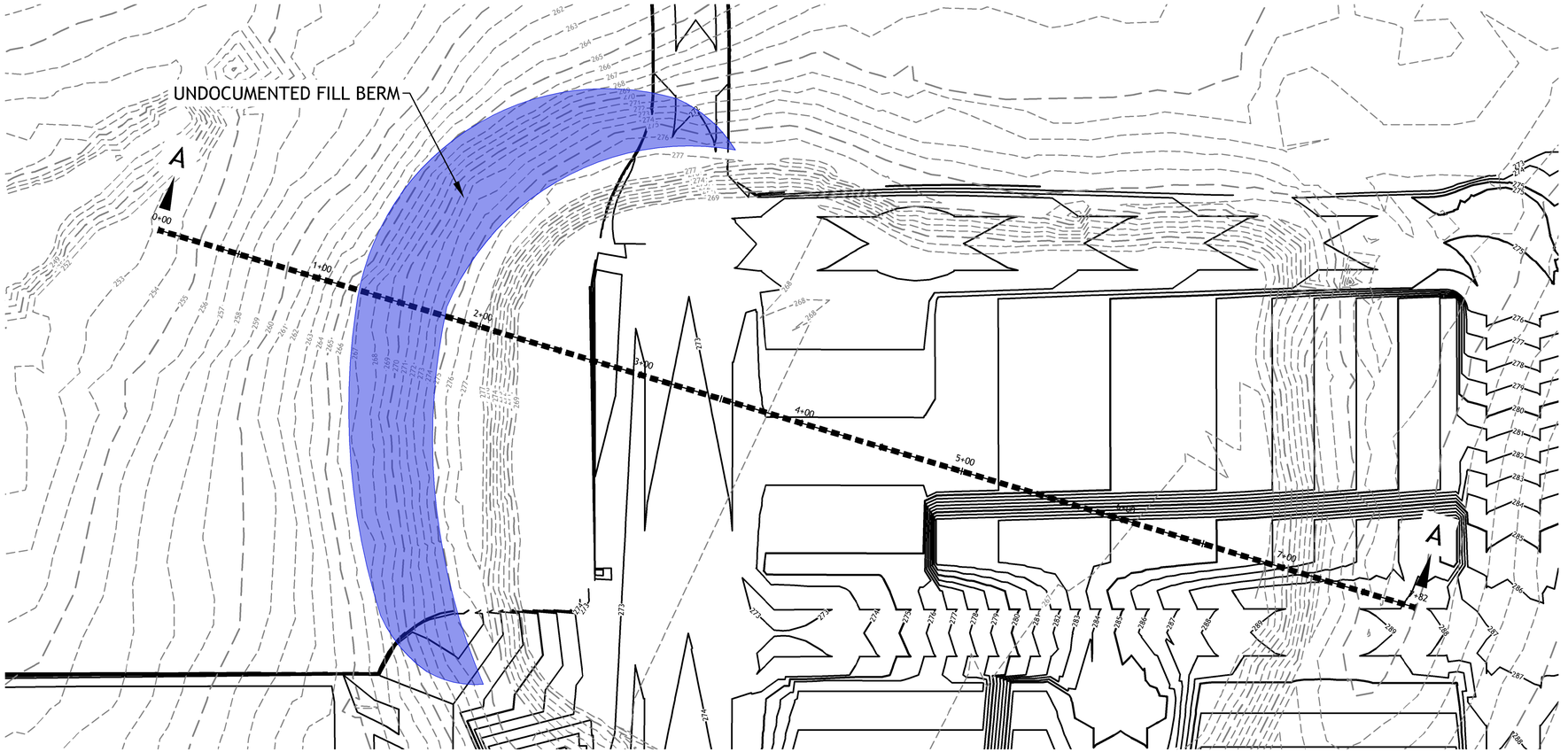
DATE	DESCRIPTION

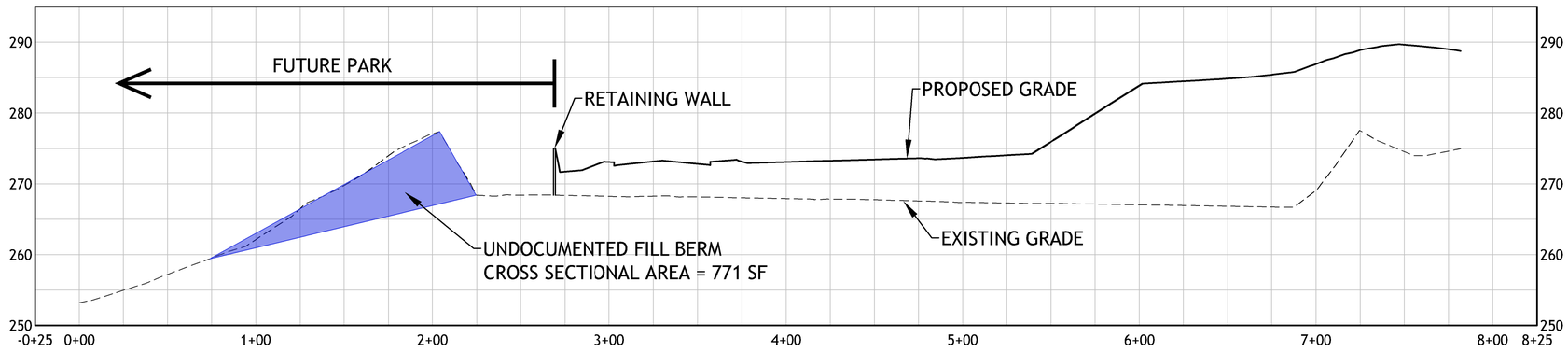
Roshak North

Private Parking Lot Grading

PROJECT NO.:	395-076
TYPE:	PLANNING
REVIEWED BY:	JJK

F





PROFILE A-A

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 10'

UNDOCUMENTD FILL BERM
LENGTH = 406 FT
VOLUME = (LENGTH) * (CROSS SECTIONAL AREA)
VOLUME = (406 FT) * (771 SF)
VOLUME = 313,026 CF = 11,594 CY

N

SCALE
40 0 20 40
1 INCH = 40 FEET

River Terrace

POLYGON NW COMPANY

Pacific Community Design
[T] 503-941-9484 [F] 503-941-9485
GEODESIGN, INC

REVISIONS
DATE DESCRIPTION

Roshak North

Berm Grading

PROJECT NO.: 395-076
TYPE: PLANNING
REVIEWED BY: PRE

G