SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [HELP]

1. Name of proposed project, if applicable:
   Sienna Hills
2. Name of applicant:
   Sienna Hills Development LLC
3. Address and phone number of applicant and contact person:
   Sienna Hills Development LLC, Greg Johnson, PO Box 344, Meridian, ID 83642 - (208) 870-3432

4. Date checklist prepared:
August 27th, 2019
5. Agency requesting checklist:
City of Richland
6. Proposed timing or schedule (including phasing, if applicable):
Preliminary Plat - Fall 2019, Site Grading - Winter of 2019/Spring 2020, Phase 1 of Project infrastructure and homes Spring/Summer 2020.
7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
Engineering plans would be permitted through City of Richland for infrastructure improvements. Project will apply for a grading permit through City of Richland, individual homes ill apply for building permits.
8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. Soil analysis for organochloride pesticides, lead, arsenic. Geotechnical Investigation of site. Topographic and boundary survey of the property.
9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
None to the applicant's knowledge.
10. List any government approvals or permits that will be needed for your proposal, if known.
Rezone of property, Preliminary Plat approval, grading permits, infrastructure permits, and building permits through City of Richland.
11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) See attached supplemental sheet

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.
See attached preliminary plat for site plan location.

B. Environmental Elements [HELP]

1. *Earth* [help]

a. General description of the site:
Hilly
(circle one): Flat, rolling, (hilly,) steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?
There are portions of the site that are sloped at a 1.5' Horizontal to 1' Vertical Slope. Majority of the site slopes at approximately 7%.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.
See attached Geotechnical report for the site prepared by PBS dated June 10th, 2019. In summary the soils are characterized as Sandy Silt with Silty Sand, Sand with Silt, Gravel and Cobbles.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. There are existing steep slopes on site that appear to be stable with slight evidence of raveling in some locations. The site has no immediate indications of unstable soils and has been primarily under agricultural production for several years until recently.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.
The site will be graded to create residential lots and graded to build infrastructure that will serve those lots from the existing Queensgate extension to Bermuda. All fill will be from material excavated on site, import of materials for grading is not anticipated.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
Potential erosion, both wind blown and runoff, are possible as a result of construction and will be managed with a temporary erosion control plan approved by the City of Richland.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 25%-35% of the site will be covered with impervious surfaces after the project completion and full build out of homes.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

During construction, erosion control measures will be implemented such as person-operated altering devices and silt fencing. After construction, the majority of the disturbed surfaces on the site will be grass and landscaping consistent with single family homes.

2. Air [help]

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. During construction there will be exhaust emissions from construction equipment as well as dust. After project completion there would be normal air emissions resulting from a residential neighborhood setting.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No off site sources of emissions will affect this proposal.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

During construction, emissions will be limited to working hours and dust will be controlled by person-operated watering devices.

3. Water [help]

a. Surface Water: [help]

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

There is an irrigation pond, operated by Badger Mountain Irrigation District located north and east of the property.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No surface water withdrawals or diversions proposed with this project.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

The proposed site does not lie within a 100-year floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

The proposed project does not involve any discharge of waste materials to surface waters.

b. Ground Water: [help]

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

No groundwater will be withdrawn or well water be discharged to the groundwater with this proposal.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None, sanitary sewer will be discharged to the City municipal system.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Storm water runoff will be collected within the roadway prism and disposed of via surface/subsurface methods consistent with the City of Richland standards for storm water disposal. There will be no off-site discharges of design storm runoff from the project.

2) Could waste materials enter ground or surface waters? If so, generally describe.

It is not anticipated that this will occur since waste materials are not allowed to be discharged to City owned and maintained storm systems.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

The proposed project would seek to alter the existing ground surface which would change current existing ground runoff that is currently impacting properties to the south of the site.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

The storm water disposal methods will be in compliance with City of Richland standards as well as the Washington State Department of Ecology Eastern Washington Stormwater Manual.

4. Plants [help]

a. Check the types of vegetation found on the site:

Existing orchard that was on the project site has been taken out of production and is being removed from the site.

____deciduous tree: alder, maple, aspen, other
____evergreen tree: fir, cedar, pine, other
X shrubs
X grass
____pasture
____crop or grain
X Orchards, vineyards or other permanent crops.
____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

Remaining grass and brush will be removed where grading will take place. All of the orchard will be removed with the development of the project.

c. List threatened and endangered species known to be on or near the site.

There are no threatened or endangered species known to be on or near the site to the applicant's knowledge.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

The single family residential lots will be landscaped with grass and trees.

e. List all noxious weeds and invasive species known to be on or near the site.

There are no noxious weeds or invasive species known to be on or near the site to the applicant's knowledge.

5. Animals [help]

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

hawk, songbirds, deer, ground squirrel

Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site.

There are no threatened or endangered species known to be on or near the site to the applicant's knowledge.

c. Is the site part of a migration route? If so, explain.

Yes, Richland is within the Pacific Flyway.

d. Proposed measures to preserve or enhance wildlife, if any:

No measures are being proposed to preserve or enhance wildlife.

e. List any invasive animal species known to be on or near the site.

There are no invasive animal species known to be on or near the site to the applicant's knowledge.

6. *Energy and Natural Resources* [help]

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The project will require energy in order to serve the proposed homes with electricity and gas.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

This project has no impact to adjacent properties potential solar needs.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

The proposed homes will be constructed in accordance with all applicable building codes as recognized by the City of Richland.

7. *Environmental Health* [help]

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

There are no identified potential health hazards with this proposal.

1) Describe any known or possible contamination at the site from present or past uses.

There are no known or possible contamination at the site from present or past uses to the applicant's knowledge.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

See attached supplement worksheet.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

None

4) Describe special emergency services that might be required.

None

5) Proposed measures to reduce or control environmental health hazards, if any:

None at this time.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

There are no known sources of noise in the area that will directly affect this proposal. The project is near existing agricultural uses and will experience seasonal noises due to the maintenance and production of agricultural products.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

On a short term basis there will be noise associated with infrastructure construction, hours of operation will be limited to those allowed by the City of Richland. The proposed project will increase the traffic in the area consistent with single family residential neighborhoods on a long-term basis.

3) Proposed measures to reduce or control noise impacts, if any:

Construction hours will be limited to working hours defined by the City of Richland.

8. *Land and Shoreline Use* [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

Currently the site and adjacent properties are vacant, single family homes, or being used for agricultural purposes. This proposal will not affect nearby land uses.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

The entirety of the project (98+ Acres) will be converted from orchard property to residential non-farm use.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

The proposal does not anticipate any adverse impacts on agricultural ground, and does not anticipate that current agricultural practices will effect the development.

c. Describe any structures on the site.

There is an existing Badger Mountain Irrigation District pump station and structure on the site just east of the future Queensgate alignment.

d. Will any structures be demolished? If so, what?

The existing pump station and building will remain in place. This land will be set aside in a tract and dedicated to Badger Mountain Irrigation District.

e. What is the current zoning classification of the site?

Agricultural (AG)

f. What is the current comprehensive plan designation of the site?

Low Density Residential, Medium Density Residential, Commercial.

g. If applicable, what is the current shoreline master program designation of the site?

N/A

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

No.

i. Approximately how many people would reside or work in the completed project?

The preliminary plat would allow for the development of single family housing with approximately 460 +/- residents.

j. Approximately how many people would the completed project displace?

None

k. Proposed measures to avoid or reduce displacement impacts, if any:

None proposed.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The site is to be built in accordance with City of Richland residential zoning and comprehensive plan requirements.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

None

9. Housing [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

285 single family homes are being proposed

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

No housing units would be eliminated.

c. Proposed measures to reduce or control housing impacts, if any:

Housing impacts will be controlled by the City of Richland zoning code for an R-1-10 and R-2 designation.

10. Aesthetics [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The tallest height of any building would be limited by the R-1-10 zoning code at 30 feet. The principal exterior building materials could vary but would most likely by either wood/composite siding or stucco.

b. What views in the immediate vicinity would be altered or obstructed?

No views in the immediate vicinity would be altered or obstructed by this project.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Aesthetics would be controlled by the City of Richland zoning code for R-1-10 and R-2, and C-LB.

11. Light and Glare [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

The project would create light from the required city street lights as well as outside lighting on the residential homes. This light would be created during the evening hours.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Not to the applicant's knowledge.

c. What existing off-site sources of light or glare may affect your proposal?

There are no off-site sources of light or glare that will affect the project proposal.

d. Proposed measures to reduce or control light and glare impacts, if any:

All proposed lighting measures would be directed downward.

12. Recreation [help]

a. What designated and informal recreational opportunities are in the immediate vicinity?

There are no informal recreational opportunities in the immediate vicinity of the site.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

The project proposes to have open space, walking paths throughout the project, a clubhouse with recreational opportunities.

13. Historic and cultural preservation [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers ? If so, specifically describe.

Not to the applicant's knowledge.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

Not to the applicants knowledge, no professional archeological studies have been completed to date on the project.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

PBS Engineering and Environmental Staff evaluated the WISAARD maps for this area. Predictive modeling identifies the area as a moderate risk level. There are no GLO features on the site based on historic mapping.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

None

14. Transportation [help]

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

See attached preliminary plat map. The site would seek to extend to major transportation routes with the project to include Queensgage Boulevard to Bermuda as well as construction of a portion of Gage Boulevard along the western boundary of the project.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

No, the closest stop is 3-5 miles away.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

The project would have the ability to provide on-street parking as well as driveway at each individual home.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

Yes, the project will require the development of new public streets to be extended to the site as well as the development of the internal roadway system to serve the single family homes.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

Approximately 2,850 vehicular trips per day will be generated by the completed project. Peak volumes would occur in the morning and evening hours. ITE Trip Generation Manual was used for estimation of traffic generated by single family residential development.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No

h. Proposed measures to reduce or control transportation impacts, if any:

Project would seek to develop offsite roadway to extend Queensgate Drive (Bermuda) to the site and connect to Bermuda as well as construction and dedication of right of way for future Gage Boulevard.

15. Public Services [help]

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

This project will result in the need for fire protection, police protection, schools, and other public services associated with housing development.

b. Proposed measures to reduce or control direct impacts on public services, if any.

The plat will be subject to impact fees implemented by the City and school district. Properties created by the project would be subject to local taxes and levies imparted by the local jurisdiction.

16. Utilities [help]

a. Circle utilities currently available at the site:
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

c. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Utilities to include water, sewer, refuse service, and electricity will be provided by the City of Richland. Irrigation will be provided by Badger Mountain Irrigation District, the natural gas provider in the area is Cascade Natural Gas, and telephone is provided by CenturyLink and Charter Communications. New sanitary sewer, water, and irrigation mains, as well as dry utilities will need to be extended into the project in order to service the lots.

C. Signature [HELP]

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee Taylor Merrill

Position and Agency/Organization Project manager

Date Submitted: 9/26/19

D. Supplemental sheet for nonproject actions [HELP]

(IT IS NOT NECESSARY to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

   Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

   Proposed measures to protect or conserve plants, animals, fish, or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

   Proposed measures to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks,

wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Proposed measures to protect such resources or to avoid or reduce impacts are:

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

Sienna Hills – SEPA Checklist
Supplemental Sheet

Section A. Questions:

Question 11: The project proposes to rezone and develop approximately 98 acres of undeveloped land located in south Richland. The site is currently under an AG zoning designation and would be seeking to be developed in accordance with the current City of Richland Comprehensive plan requiring Low Density Residential, Medium Density Residential, and Commercial (R-1-10, R-2, and C-LB). The project would initially seek to develop approximately 285 single family residential lots in multiple phases. The project would also include extensions of 2 major transportation facilities through the project to include portions of future Gage Boulevard and Queensgate Boulevard.

Question 12: Project site is located in a portion of Section 34, Township 9 North, Range 28 East of the Willamette Meridian, City of Richland, Benton County, Washington. Site can be accessed from the termination of Bermuda Boulevard which is located in the south east corner of the project site as well as Bent Road and Clover Road at the projects southern border. Latitude: 46deg13'5.19"N , Longitude: 119deg17'52.88"W.

Section B. Section 7. A,

Question 2: The site observations and laboratory results indicate that no organochloride pesticides were detected in the soil above the laboratory detection limits. Arsenic and lead levels in soil are present at concentrations consistent with natural background levels and are below MTCA Method A cleanup levels.

OVERVIEW MAP

FOR TAX PARCEL #1-3498-300-0001-005
(SWD 2019-001554)

LOCATED IN A PORTION OF SECTION 34,
TOWNSHIP 9 NORTH, RANGE 28 EAST OF THE WILLAMETTE MERIDIAN,
CITY OF RICHLAND, BENTON COUNTY, WASHINGTON

Scale 1" = 120'
0 60 120 240

NOTE
BACKGROUND AERIAL IMAGE IS SHOWN FOR REFERENCE ONLY AND IS NOT ORTHO-RECTIFIED AND SHOULD NOT BE RELIED UPON SUCH.

PBS Engineering and Environmental Inc.
400 Bradley Blvd, Ste 106
Richland, WA 99352
509.942.1600
pbsusa.com

CLIENT: SIENNA HILLS DEVELOPMENT, LLC.		PROJECT NO.: 86150
SURVEYOR: ALEXANDER D. WATARAZZO		DATE: 05/15/2019
CALC BY: ROP	DRAWN BY: ROP	SCALE: 1" = 120'
SECTION: 34	TOWNSHIP: 9 NORTH	RANGE: 28 EAST
CITY: RICHLAND	COUNTY: BENTON	SHEET 1 OF 1

SIENNA HILLS DEVELOPMENT

PRELIMINARY PLAT

LOCATED IN SECTION 34 TOWNSHIP 9 NORTH, RANGE 28 EAST, W.M.
CITY OF RICHLAND, BENTON COUNTY, WASHINGTON

SURVEY BENCHMARK:

BRASS CAP AT THE INTERSECTION OF GALA WAY AND SICILY LANE, CITY OF RICHLAND NAVD88 ELEVATION FOR THIS MONUMENT IS 699.05
ALTERNATE BENCHMARK IS A 5/8" IRON ROD IN PIPE AT THE NORTHWEST CORNER OF SECTION 34, ELEVATION FOR THIS MONUMENT IS 1072.36.

BASIS OF BEARINGS:

NAD83 WASHINGTON STATE SOUTH ZONE GRID BEARING OF S89°09'47"E ALONG THE NORTH LINE OF THE NORTHWEST QUARTER OF SECTION 34, AS MEASURED BETWEEN EXISTING MONUMENTS.

LAND USE TABLE	
PRE-PLATTED SITE AREA:	99.15 ACRES
C-LB COMMERCIAL ZONED AREA:	7.83 ACRES
R-2 RESIDENTIAL ZONED AREA:	58.96 ACRES
R-1-10 RESIDENTIAL ZONED AREA:	32.36 ACRES
TOTAL SINGLE FAMILY RESIDENTIAL ZONED AREA:	91.32 ACRES
RIGHT OF WAY DEDICATION:	23.25 ACRES
RECREATIONAL OPEN SPACE DEDICATION:	3.95 ACRES
STORM TRACT DEDICATION:	2.40 ACRES
UTILITY TRACT DEDICATION (BMID):	0.84 ACRES
SINGLE FAMILY RESIDENTIAL LOT COUNT:	285 LOTS
MINIMUM LOT AREA:	6,273 SF
MAXIMUM LOT AREA:	37,257 SF
AVERAGE LOT AREA:	9,667 SF

RESIDENTIAL LOT COUNTS BY PHASE		
PHASE #	R/W AREA (IN ACRES)	LOT COUNT
1	7.27	65
2	2.51	50
3	3.63	58
4	3.75	61
5	4.01	35
6	2.08	16

OWNER:
RICHLAND PROPERTIES, LLC
C/O: GREG JOHNSON
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MERIDIAN, ID 83642
208-888-9946

DEVELOPER:
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ENGINEER:
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400 BRADLEY BLVD, SUITE 106
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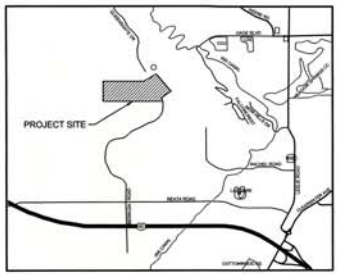
(509) 942-1600

ZONING CLASSIFICATIONS:
MEDIUM DENSITY RESIDENTIAL (R-2)
SF RESIDENTIAL DISTRICT 10,000 (R-1-10)
COMMERCIAL - LIMITED BUSINESS (C-LB)

NOTES:

1. QUEENSGATE DRIVE IMPROVEMENTS SHALL BE MADE FROM APPROXIMATELY 1050' TO THE NORTH OF PROPERTY AT THE INTERSECTION OF LEGACY LANE FROM WESTCLIFFE INTO THE PLAT.
2. ALL LOTS SHALL HAVE A 10' UTILITY EASEMENT ABUTTING STREET RIGHT-OF-WAYS.
3. SANITARY SEWER PUMP STATION WILL BE INSTALLED AS PART OF PHASE 1 IMPROVEMENTS.



VICINITY MAP
NOT TO SCALE

SHEET INDEX	
1.	PRELIMINARY PLAT OVERALL PLAN
2.	PRELIMINARY PLAT WEST PARTIAL PLAN
3.	PRELIMINARY PLAT EAST PARTIAL PLAN

Scale 1" = 160'
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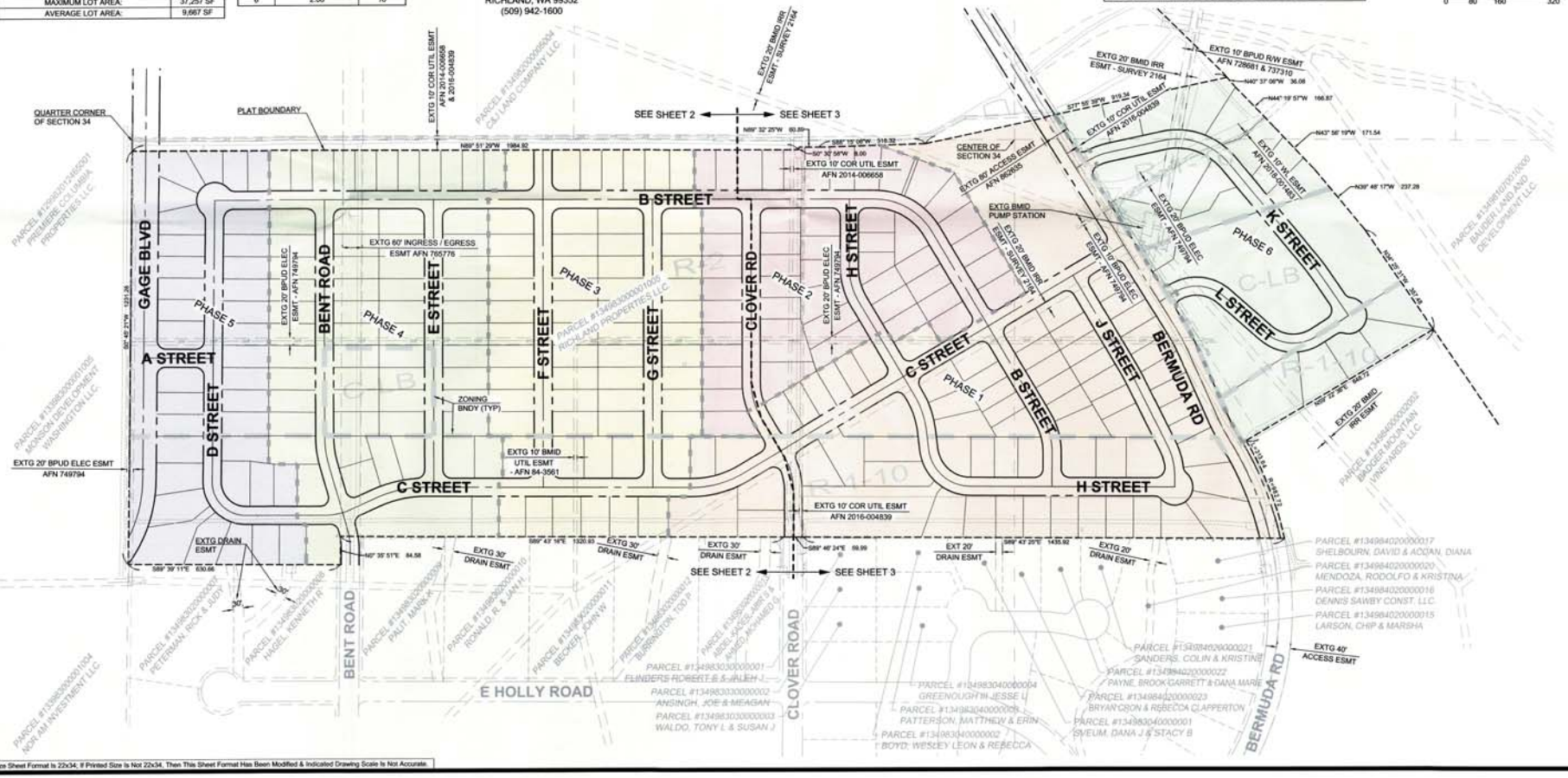


PBS Engineering and Environmental Inc.
400 Bradley Blvd, Ste 106
Richland, WA 99352
509.942.1600
pbsusa.com

PRELIMINARY PLAT OVERALL PLAN FOR:

SIENNA HILLS DEVELOPMENT

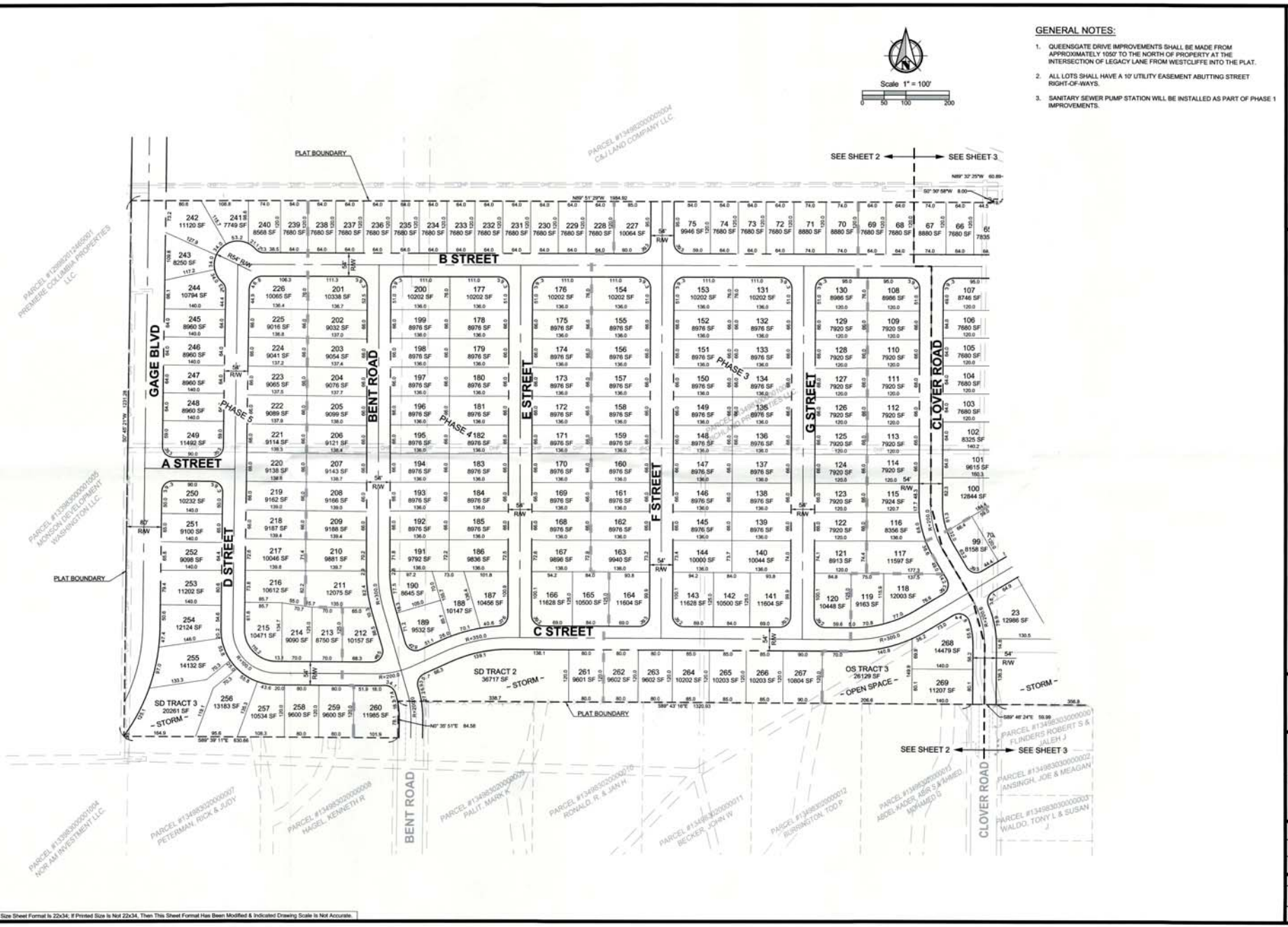
A RESIDENTIAL SUBDIVISION IN THE CITY OF RICHLAND, WA.

811 Know what's below. Call before you dig.

JASON L. MATTOX — STATE OF WASHINGTON — 22016 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

DESIGNED:	MER
CHECKED:	JLM
	OCT 2019
	96150.000
SHEET ID	
SHEET	1 OF 3

Full Size Sheet Format Is 22x34; If Printed Size Is Not 22x34, Then This Sheet Format Has Been Modified & Indicated Drawing Scale Is Not Accurate.



PBS Engineering and Environmental Inc.
405 Bradley Blvd, Ste 106
Richland, WA 99352
509.942.1600
pbsusa.com

PBS

PRELIMINARY PLAT WEST PARTIAL PLAN FOR:

SIENNA HILLS DEVELOPMENT

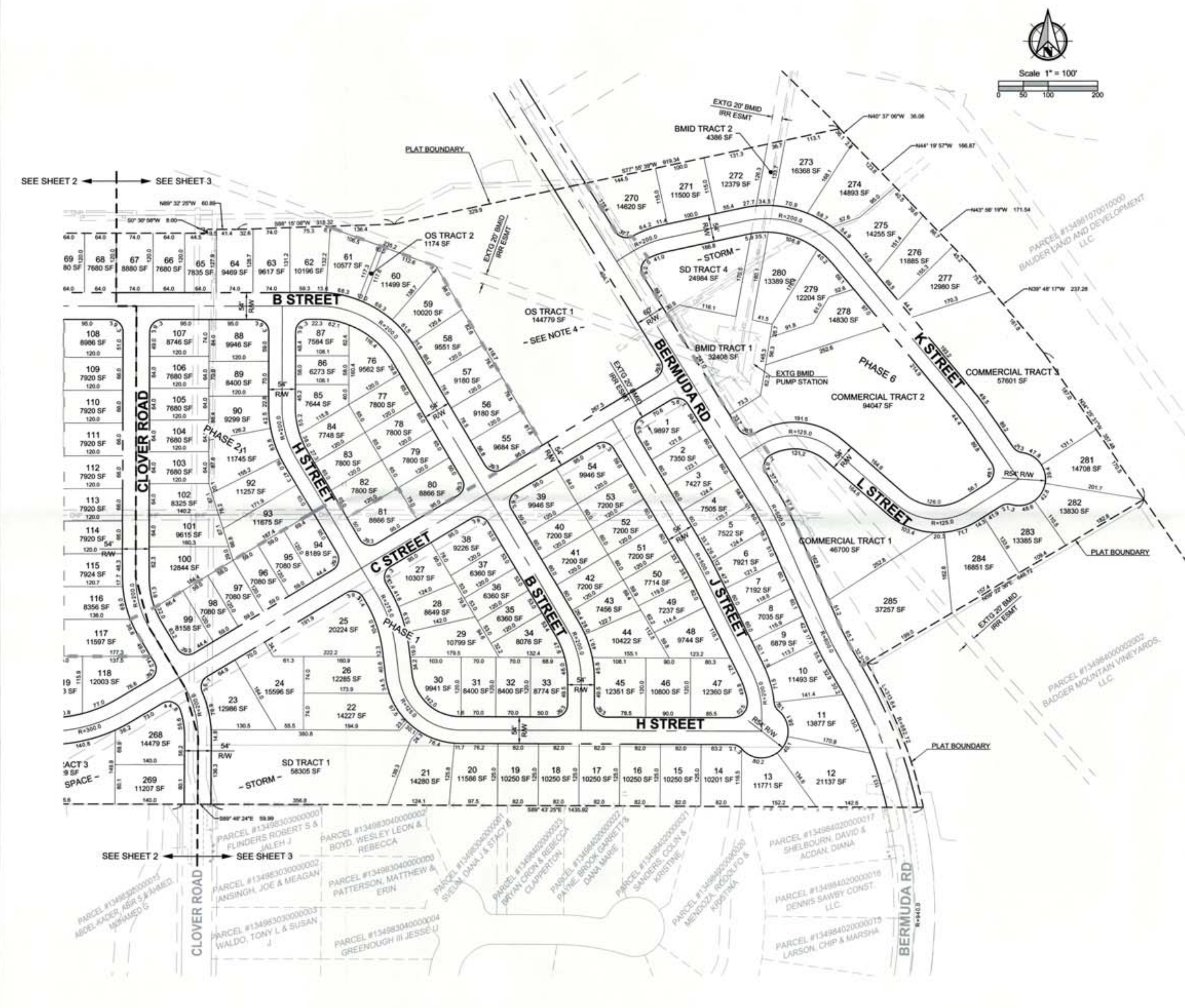
A RESIDENTIAL SUBDIVISION IN THE CITY OF RICHLAND, WA.

811 Know what's below. Call before you dig.

JASON L. MEYER STATE OF WASHINGTON 24870 REGISTERED PROFESSIONAL ENGINEER PRELIMINARY

DESIGNED:	MER
CHECKED:	JLM
	OCT 2019
	66150.000
SHEET ID	
SHEET	2 OF 3

Filename: L:\Projects\66000\66150\66150-000\Civil\CAD\Working\Sheets\PrePlat\66150000_Preplat_C02-C03.dwg Layout Tab: 66150000_PREPLAT_C02 User: Mark E. Reastman CAD Plot Date/Time: 10/8/2019 9:06:27 AM



GENERAL NOTES:

1. QUEENSGATE DRIVE IMPROVEMENTS SHALL BE MADE FROM APPROXIMATELY 1050' TO THE NORTH OF PROPERTY AT THE INTERSECTION OF LEGACY LANE FROM WESTCLIFFE INTO THE PLAT.
2. ALL LOTS SHALL HAVE A 10' UTILITY EASEMENT ABUTTING STREET RIGHT-OF-WAYS.
3. SANITARY SEWER PUMP STATION WILL BE INSTALLED AS PART OF PHASE 1 IMPROVEMENTS.
4. OPEN SPACE TRACT 1 (OS TRACT 1) SHALL BE A RECREATIONAL TRACT WITH THE FOLLOWING POTENTIAL AMENITIES:
   - CLUB HOUSE
   - OFF-STREET PARKING
   - SWIMMING POOL
   - PICNIC AREA

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Richland, WA 99352
509.942.1600
pbsusa.com

PRELIMINARY PLAT EAST PARTIAL PLAN FOR:

SIENNA HILLS DEVELOPMENT

A RESIDENTIAL SUBDIVISION IN THE CITY OF RICHLAND, WA.

811 Know what's below. Call before you dig.

JASON L. MATTOX — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

DESIGNED: MER
CHECKED: JLM
OCT 2019
66150.000
SHEET ID

SHEET 3 OF 3

Geotechnical Engineering Report

Sienna Hills
Benton County Tax Parcel 134983000001005
Richland, Washington

Prepared for:
Sienna Hills Development, LLC

June 10, 2019
PBS Project 66150.000

PBS
4412 SW CORBETT AVENUE
PORTLAND, OR 97239
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Geotechnical Engineering Report

Sienna Hills
Benton County Tax Parcel 134983000001005
Richland, Washington

Prepared for:
Sienna Hills Development, LLC

June 10, 2019
PBS Project 66150.000

Prepared by:

Digitally signed by Clinton Nealey
Date: 2019.06.11 19:31:50 -07'00'

Clint Nealey, EIT
Geotechnical Engineering Staff III

Reviewed by:

RYAN K. WHITE
STATE OF WASHINGTON
39104
REGISTERED
PROFESSIONAL ENGINEER

6/10/2019

Ryan White, PE, GE
Geotechnical Engineering Group Manager

Table of Contents

Supporting Data

TABLES

FIGURES

APPENDICES

Appendix A: Field Explorations

Appendix B: Laboratory Testing

1 INTRODUCTION

1.1 General

This report presents results of PBS Engineering and Environmental Inc. (PBS) geotechnical engineering services for the proposed development located at Benton County Tax Parcel 134983000001005 in Richland, Washington (site). The general site location is shown on the Vicinity Map, Figure 1. The locations of PBS' explorations in relation to existing site features are shown on the Site Plan, Figure 2.

1.2 Purpose and Scope

The purpose of PBS' services was to develop geotechnical design and construction recommendations in support of the planned new development. This was accomplished by performing the following scope of services.

1.2.1 Literature and Records Review

PBS reviewed various published geologic maps of the area for information regarding geologic conditions and hazards at or near the site. PBS also reviewed previously completed reports for the project site and vicinity.

1.2.2 Subsurface Explorations

PBS excavated 30 test pits within the proposed 99-acre development to depths of up to 10 feet below the existing ground surface (bgs). The test pits were logged and representative soil samples collected by a member of the PBS geotechnical engineering staff. Interpreted test pit logs are included as Figures A1 through A30 in Appendix A, Field Explorations.

1.2.3 Field Infiltration Testing

Three open-pit, falling-head field infiltration tests were completed in test pits TP-2, TP- 5, and TP-7 within the proposed development at a depths of 4.5 to 5 feet bgs. Infiltration testing was monitored by PBS geotechnical engineering staff.

1.2.4 Soils Testing

Soil samples were returned to our laboratory and classified in general accordance with the Unified Soil Classification System (ASTM D2487) and/or the Visual-Manual Procedure (ASTM D2488). Laboratory tests included natural moisture contents and grain-size analyses. Laboratory test results are included in the exploration logs in Appendix A, Field Explorations; and in Appendix B, Laboratory Testing.

1.2.5 Geotechnical Engineering Analysis

Data collected during the subsurface exploration, literature research, and testing were used to develop site-specific geotechnical design parameters and construction recommendations.

1.2.6 Report Preparation

This Geotechnical Engineering Report summarizes the results of our explorations, testing, and analyses, including information relating to the following:

- Field exploration logs and site plan showing approximate exploration locations
- Laboratory test results
- Infiltration test results
- Groundwater levels and considerations
- Earthwork and grading, cut, and fill recommendations:
    - Structural fill materials and preparation

  - Utility trench excavation and backfill requirements
  - Slab and pavement subgrade preparation
  - Wet weather considerations
- Seismic design criteria in accordance with the 2015 International Building Code (IBC) with state of Washington amendments
- Pavement subgrade preparation recommendations
- Asphalt concrete (AC) pavement section recommendations

1.3 Project Understanding

Development plans are currently in the conceptual stages; however, development of the parcel will likely be a combination of single- and multi-family residential structures.

2 SITE CONDITIONS

2.1 Surface Description

The site is roughly rectangular with the exception of the eastern edge and northeastern corner. This area includes an additional rectangular region protruding northeast. The site is bordered to the north, east, and west by agricultural fields and to the south by existing residential development. Bermuda Road separates the western, rectangular site from the northeastern portion. Based on available topographic data, the site slopes slightly down to the south and southwest, with ground surface elevations ranging from a maximum of about 925 feet above mean sea level (amsl) at the eastern edge to 831 feet amsl at the southwest corner.

2.2 Regional Geologic Setting

The site is located within the eastern extent of the Yakima fold and thrust belt, a structural-tectonic sub-province within the western Columbia Basin geologic province. The Columbia Basin province is separated from the Deschutes-Columbia Plateau and Blue Mountains Provinces of Oregon by the Oregon border. The province is composed primarily of volcanic basement rocks of the Columbia River Basalt Group (CRBG) subdivided into smaller recognizable flows and members that are overlain by Quaternary deposits (Derkey et al., 2006). The older basalt flows were generated by volcanic eruptions in eastern Oregon, eastern Washington, and western Idaho between 16.7 million years ago (Ma) and 5.5 Ma (Reidel, 2004).

The Yakima fold and thrust belt is an actively deforming series of faults and folds that is accommodating clockwise rotation through crustal shortening within the western Columbia Province (McCaffrey et al., 2016). Quaternary and Holocene active faults are found throughout the sub-province. Northwest-southeast trending anticlinal ridges and wide synclinal valleys dominate much of the Yakima fold and thrust belt, with pervasive reverse faults along the flanks of the anticlines (Gomberg et al., 2012). The eastern-most extent of the Yakima fold and thrust belt is bounded by the Horse Heaven Anticline (locally referred to as the Horse Heaven Hills) and the Wallula fault system.

The Horse Heaven Anticline forms the local topographic high point along the southern margin of the Columbia Basin, and has been continuously incised by the ancestral and historic Columbia River resulting in a narrow water gap (Reidel and Fecht, 1994; Schuster, 1994). Throughout the Late Pleistocene, cataclysmic outburst flood waters from upstream Glacial Lake Missoula resulted in rapid sedimentation that was ponded behind the Horse Heaven Anticline. Slowing flood waters backfilled the basin and blanketed it with slackwater flood deposits over much of the low-lying areas, as well as extensive gravel bars.

2.3 Local Geology and Hazards

The site is underlain by catastrophic flood sediments of silt and sand deposited by the Late Pleistocene Missoula Floods (Reidel and Fecht, 1994). These sediments are described as rhythmically bedded lacustrine silt and fine to coarse sand of predominately quartz and feldspar grains, with basalt in coarser sands.

The site is mapped within a zone of low to moderate liquefaction hazard (Palmer et al., 2004) and in relatively close proximity (less than 5 miles) from mapped active faults and seismogenic features (WADNR, 2019). These faults include the Rattlesnake Hills fault and structures (USGS ID 565) and Horse Heaven Hills fault and structures (USGS ID 567), both of which are the northern continuation of the Wallula fault system that bounds Horse Heaven Hills, Badger Mountain, Goose Hill, and Red Mountain (USGS, 2019).

2.4 Subsurface Conditions

The site was explored by excavating 30 test pits, designated TP-1 through TP-30, to depths of 8 to 10.5 feet bgs. Test pit TP-28 was terminated at a depth of 4 feet due to the possible presence of a water line. The excavations were performed by Braden and Nelson Construction of Walla Walla, Washington, using a CAT 304C excavator equipped with a 24-inch-wide bucket.

PBS has summarized the subsurface units as follows:

SANDY SILT (ML) to SILT with SAND (ML):	Brown sandy silt to silt with sand was encountered in all excavations. These soils were non-plastic to low plasticity, brown, and had occasional calcite stringers that had low to vigorous reactions to hydrochloric acid. Sand grains were typically fine grained. Occasional subrounded gravels and cobbles were encountered at depth.
SAND with SILT, GRAVEL, AND COBBLES (SP/SW-SM):	Brown sand that varied from well-graded to poorly graded was encountered beneath the sandy silt and silt with sand in some test pits near the bottom of the excavations. The sands were fine- to coarse-grained, with fine to coarse, subrounded to subangular gravels.

The findings from our field investigation are consistent with geologic mapping by Reidel and Fecht, 1994.

2.5 Groundwater

Static groundwater was not encountered during our explorations. Based on a review of regional groundwater logs available from the Washington State Department of Ecology, we anticipate that the static groundwater level is present at a depth greater than 100 feet bgs. Please note that groundwater levels can fluctuate during the year depending on climate, irrigation season, extended periods of precipitation, drought, and other factors.

2.6 Infiltration Testing

PBS completed open-pit, falling-head infiltration testing in test pits TP-2, TP-5, and TP-7. The infiltration tests were conducted in general accordance with the Stormwater Management Manual for Eastern Washington procedures. After a period of saturation, the height of the water in the excavation was then measured initially and at regular, timed intervals. Results of our field infiltration testing are presented in Table 1.

Table 1. Infiltration Test Results

Test Location	Depth (feet bgs)	Field Measured Infiltration Rate (in/hr)	Soil Classification	Recommended Hydrologic Soil Group*
TP-2	5	1.2	Sandy Silt (ML)	C
TP-5	4.5	1.08	Sandy Silt (ML)	C
TP-7	5	0.86	Sandy Silt (ML)	C

*The recommended hydrologic soil group classification is based upon infiltration rates observed in the field and lab results

The infiltration rates above are not permeabilities/hydraulic conductivities, but field-measured rates and do not include correction factors related to long-term infiltration rates. We recommend the designer include correction factors to account for the expected level of maintenance, type of system, and sediment control. Field-measured infiltration rates are typically reduced by a minimum factor of 2 to 4 for use in design.

Soil types can vary significantly over relatively short distances. The infiltration rates noted above are representative of one discrete location and depth. Installation of infiltration systems within the layer the field rate was measured is considered critical to proper performance of the systems.

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 Geotechnical Design Considerations

The subsurface conditions at the site consist of silt and fine-grained sand with varying amounts of gravel and cobbles. Based on our observations and analyses, conventional foundation support on shallow spread footings is feasible for the proposed development. Excavation with conventional equipment is feasible at the site.

The grading and final development plans for the project had not been completed when this report was prepared. Once completed, PBS should be engaged to review the project plans and update our recommendations as necessary.

3.2 Seismic Design Considerations

3.2.1 Code-Based Seismic Design Parameters

According to the Site Class Map of Benton County, Washington (Palmer, 2004), the site is located within an area classified as Site Class D, characterizing the profile as stiff soil. Based on subsurface conditions encountered in our explorations, Site Class D is appropriate for use in design. The seismic design criteria, in accordance with the 2015 International Building Code IBC with state of Washington amendments, are summarized in Table 2.

Table 2. 2015 IBC Seismic Design Parameters

Parameter	Short Period	1 Second
Maximum Credible Earthquake Spectral Acceleration	S_s = 0.43 g	S_1 = 0.16 g
Site Class	D	
Site Coefficient	F_a = 1.46	F_v = 2.14
Adjusted Spectral Acceleration	S_{MS} = 0.62 g	S_{M1} = 0.35 g
Design Spectral Response Acceleration Parameters	S_{DS} = 0.42 g	S_{D1} = 0.24 g

g= Acceleration due to gravity

3.2.2 Liquefaction Potential

Liquefaction is defined as a decrease in the shear resistance of loose, saturated, cohesionless soil (e.g., sand) or low plasticity silt soils, due to the buildup of excess pore pressures generated during an earthquake. This results in a temporary transformation of the soil deposit into a viscous fluid. Liquefaction can result in ground settlement, foundation bearing capacity failure, and lateral spreading of ground.

Based on a review of the *Washington Division of Geology and Earth Resources,* the site is shown as having a low to moderate liquefaction hazard; however, based on the soil types and relative density of site soils encountered during our exploration, our opinion is that the risk of structurally damaging liquefaction settlement at the site is low. Subsequently, the risk of structurally damaging lateral spreading is also low.

3.3 Ground Moisture

3.3.1 General

The perimeter ground surface and hardscape should be sloped to drain away from all structures and away from adjacent slopes. Gutters should be tight-lined to a suitable discharge and maintained as free-flowing. All crawl spaces should be adequately ventilated and sloped to drain to a suitable, exterior discharge.

3.4 Pavement Design

The provided pavement recommendations were developed using the American Association of State Highway and Transportation Officials (AASHTO) design methods and references the associated Washington Department of Transportation (WSDOT) specifications for construction. Our evaluation considered a maximum of two trucks per day for a 20-year design life.

The minimum recommended pavement section thicknesses are provided in Table 3. Depending on weather conditions at the time of construction, a thicker aggregate base course section could be required to support construction traffic during preparation and placement of the pavement section.

Table 3. Minimum AC Pavement Sections

Traffic Loading	AC (inches)	Base Course (inches)	Subgrade
Drive Lanes and Access Roads	3	9	Stiff subgrade as verified by PBS personnel*

* Subgrade must pass proofroll

The asphalt cement binder should be selected following WSDOT SS 9-02.1(4) – Performance Graded Asphalt Binder. The AC should consist of ½-inch hot mix asphalt (HMA) with a maximum lift thickness of 3 inches. The AC should conform to WSDOT SS 5-04.3(7)A – Mix Design, WSDOT SS 9-03.8(2) – HMA Test Requirements, and WSDOT SS 9-03.8(6) – HMA Proportions of Materials. The AC should be compacted to 91 percent of the maximum theoretical density (Rice value) of the mix, as determined in accordance with ASTM D2041, following the guidelines set in WSDOT SS 5-04.3(10) – Compaction.

Heavy construction traffic on new pavements or partial pavement sections (such as base course over the prepared subgrade) will likely exceed the design loads and could potentially damage or shorten the pavement life; therefore, we recommend construction traffic not be allowed on new pavements, or that the contractor take appropriate precautions to protect the subgrade and pavement during construction.

If construction traffic is to be allowed on newly constructed road sections, an allowance for this additional traffic will need to be made in the design pavement section.

4 CONSTRUCTION RECOMMENDATIONS

4.1 Site Preparation

Construction of the proposed development will involve clearing and grubbing of the existing vegetation or demolition of possible existing structures. Demolition should include removal of existing pavement, utilities, etc., throughout the proposed new development. Underground utility lines or other abandoned structural elements should also be removed. The voids resulting from removal of foundations or loose soil in utility lines should be backfilled with compacted structural fill. The base of these excavations should be excavated to firm native subgrade before filling, with sides sloped at a minimum of 1H:1V to allow for uniform compaction. Materials generated during demolition should be transported off site or stockpiled in areas designated by the owner's representative.

4.1.1 Proofrolling/Subgrade Verification

Following site preparation and prior to placing aggregate base over shallow foundation, floor slab, and pavement subgrades, the exposed subgrade should be evaluated either by proofrolling or another method of subgrade verification. The subgrade should be proofrolled with a fully loaded dump truck or similar heavy, rubber-tire construction equipment to identify unsuitable areas. If evaluation of the subgrades occurs during wet conditions, or if proofrolling the subgrades will result in disturbance, they should be evaluated by PBS using a steel foundation probe. We recommend that PBS be retained to observe the proofrolling and perform the subgrade verifications. Unsuitable areas identified during the field evaluation should be compacted to a firm condition or be excavated and replaced with structural fill.

4.1.2 Wet/Freezing Weather and Wet Soil Conditions

Due to the presence of fine-grained silt and sands in the near-surface materials at the site, construction equipment may have difficulty operating on the near-surface soils when the moisture content of the surface soil is more than a few percentage points above the optimum moisture required for compaction. Soils disturbed during site preparation activities, or unsuitable areas identified during proofrolling or probing, should be removed and replaced with compacted structural fill.

Site earthwork and subgrade preparation should not be completed during freezing conditions, except for mass excavation to the subgrade design elevations. We recommend the earthwork construction at the site be performed during the dry season.

Protection of the subgrade is the responsibility of the contractor. Construction of granular haul roads to the project site entrance may help reduce further damage to the pavement and disturbance of site soils. The actual thickness of haul roads and staging areas should be based on the contractors' approach to site development, and the amount and type of construction traffic. The imported granular material should be placed in one lift over the prepared undisturbed subgrade and compacted using a smooth-drum, non-vibratory roller. A geotextile fabric should be used to separate the subgrade from the imported granular material in areas of repeated construction traffic. Depending on site conditions, the geotextile should meet Washington State Department of Transportation (WSDOT) SS 9-33.2 – Geosynthetic Properties for soil separation or stabilization. The geotextile should be installed in conformance with WSDOT SS 2-12.3 – Construction Geosynthetic (Construction Requirements) and, as applicable, WSDOT SS 2-12.3(2) – Separation or WSDOT SS 2-12.3(3) – Stabilization.

4.2 Excavation

The near-surface soils at the site can be excavated with conventional earthwork equipment. Sloughing and caving should be anticipated. All excavations should be made in accordance with applicable Occupational Safety and Health Administration (OSHA) and state regulations. The contractor is solely responsible for

adherence to the OSHA requirements. Trench cuts should stand relatively vertical to a depth of approximately 4 feet bgs, provided no groundwater seepage is present in the trench walls. Open excavation techniques may be used provided the excavation is configured in accordance with the OSHA requirements, groundwater seepage is not present, and with the understanding that some sloughing may occur. Trenches/excavations should be flattened if sloughing occurs or seepage is present. Use of a trench shield or other approved temporary shoring is recommended if vertical walls are desired for cuts deeper than 4 feet bgs. If dewatering is used, we recommend that the type and design of the dewatering system be the responsibility of the contractor, who is in the best position to choose systems that fit the overall plan of operation.

4.3 Structural Fill

The extent of site grading is currently unknown; however, PBS estimates that cuts and fills will be on the order of about 5 feet. Structural fill should be placed over subgrade that has been prepared in conformance with the Site Preparation and Wet/Freezing Weather and Wet Soil Conditions sections of this report. Structural fill material should consist of relatively well-graded soil, or an approved rock product that is free of organic material and debris, and contains particles not greater than 3 inches nominal dimension.

The suitability of soil for use as compacted structural fill will depend on the gradation and moisture content of the soil when it is placed. As the amount of fines (material finer than the US Standard No. 200 Sieve) increases, soil becomes increasingly sensitive to small changes in moisture content and compaction becomes more difficult to achieve. Soils containing more than about 5 percent fines cannot consistently be compacted to a dense, non-yielding condition when the water content is significantly greater (or significantly less) than optimum.

If fill and excavated material will be placed on slopes steeper than 5H:1V (horizontal), these must be keyed/benched into the existing slopes and installed in horizontal lifts. Vertical steps between benches should be approximately 2 feet.

4.3.1 On-Site Soil

On-site soils encountered in our explorations are generally suitable for placement as structural fill during dry weather when moisture content can be maintained by air drying and/or addition of water. The fine-grained fraction of the site soils are moisture sensitive, and during wet weather, may become unworkable because of excess moisture content. In order to reduce moisture content, some aerating and drying of fine-grained soils may be required. The material should be placed in lifts with a maximum uncompacted thickness of approximately 8 inches and compacted to at least 92 percent of the maximum dry density, as determined by ASTM D1557 (modified proctor).

4.3.2 Imported Granular Materials

Imported granular material used during periods of wet weather or for haul roads, building pad subgrades, staging areas, etc., should be pit or quarry run rock, crushed rock, or crushed gravel and sand, and should meet the specifications provided in WSDOT SS 9-03.14(2) – Select Borrow. In addition, the imported granular material should be fairly well graded between coarse and fine, and of the fraction passing the US Standard No. 4 Sieve, less than 5 percent by dry weight should pass the US Standard No. 200 Sieve.

Imported granular material should be placed in lifts with a maximum uncompacted thickness of 9 inches and be compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

4.3.3 Base Aggregate

Base aggregate for floor slabs and beneath pavements should be clean crushed rock or crushed gravel. The base aggregate should contain no deleterious materials, meet specifications provided in WSDOT SS 9-03.9(3) – Crushed Surfacing Base Course, and have less than 5 percent (by dry weight) passing the US Standard No. 200 Sieve. The imported granular material should be placed in one lift and compacted to at least 95 percent of the maximum dry density, as determined by ASTM D1557.

4.3.4 Foundation Base Aggregate

Imported granular material placed at the base of excavations for spread footings, slabs-on-grade, and other below-grade structures should be clean, crushed rock or crushed gravel, and sand that is fairly well graded between coarse and fine. The granular materials should contain no deleterious materials, have a maximum particle size of 1½ inch, and meet WSDOT SS 9-03.12(1)A – Gravel Backfill for Foundations (Class A). The imported granular material should be placed in one lift and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

4.3.5 Trench Backfill

Trench backfill placed beneath, adjacent to, and for at least 2 feet above utility lines (i.e., the pipe zone) should consist of well-graded granular material with a maximum particle size of 1 inch and less than 10 percent by dry weight passing the US Standard No. 200 Sieve, and should meet the standards prescribed by WSDOT SS 9-03.12(3) – Gravel Backfill for Pipe Zone Bedding. The pipe zone backfill should be compacted to at least 90 percent of the maximum dry density as determined by ASTM D1557, or as required by the pipe manufacturer or local building department.

Within pavement areas or beneath building pads, the remainder of the trench backfill should consist of well-graded granular material with a maximum particle size of 1½ inches, less than 10 percent by dry weight passing the US Standard No. 200 Sieve, and should meet standards prescribed by WSDOT SS 9-03.19 – Bank Run Gravel for Trench Backfill. This material should be compacted to at least 92 percent of the maximum dry density, as determined by ASTM D1557, or as required by the pipe manufacturer or local building department. The upper 2 feet of the trench backfill should be compacted to at least 95 percent of the maximum dry density, as determined by ASTM D1557.

Outside of structural improvement areas (e.g., roadway alignments or building pads), trench backfill placed above the pipe zone should consist of excavated material free of wood waste, debris, clods, or rocks greater than 6 inches in diameter and meet WSDOT SS 9-03.14 – Borrow and WSDOT SS 9-03.15 – Native Material for Trench Backfill. This general trench backfill should be compacted to at least 90 percent of the maximum dry density, as determined by ASTM D1557, or as required by the pipe manufacturer or local building department.

4.3.6 Stabilization Material

Stabilization rock should consist of pit or quarry run rock that is well-graded, angular, crushed rock consisting of 4- or 6-inch-minus material with less than 5 percent passing the US Standard No. 4 Sieve. The material should be free of organic matter and other deleterious material. WSDOT SS 9-13.1(5) – Quarry Spalls can be used as a general specification for this material with the stipulation of limiting the maximum size to 6 inches.

5 ADDITIONAL SERVICES AND CONSTRUCTION OBSERVATIONS

In most cases, other services beyond completion of a final geotechnical engineering report are necessary or desirable to complete the project. Occasionally, conditions or circumstances arise that require additional work that was not anticipated when the geotechnical report was written. PBS offers a range of environmental, geological, geotechnical, and construction services to suit the varying needs of our clients.

PBS should be retained to review the plans and specifications for this project before they are finalized. Such a review allows us to verify that our recommendations and concerns have been adequately addressed in the design.

Satisfactory earthwork performance depends on the quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. We recommend that PBS be retained to observe general excavation, stripping, fill placement, footing subgrades, and/or pile installation. Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those anticipated.

6 LIMITATIONS

This report has been prepared for the exclusive use of the addressee, and their architects and engineers, for aiding in the design and construction of the proposed development and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced, in total or in part, without express written consent of the client and PBS. It is the addressee's responsibility to provide this report to the appropriate design professionals, building officials, and contractors to ensure correct implementation of the recommendations.

The opinions, comments, and conclusions presented in this report are based upon information derived from our literature review, field explorations, laboratory testing, and engineering analyses. It is possible that soil, rock, or groundwater conditions could vary between or beyond the points explored. If soil, rock, or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that PBS is notified immediately so that we may reevaluate the recommendations of this report.

Unanticipated fill, soil and rock conditions, and seasonal soil moisture and groundwater variations are commonly encountered and cannot be fully determined by merely taking soil samples or completing explorations such as test pits. Such variations may result in changes to our recommendations and may require additional funds for expenses to attain a properly constructed project; therefore, we recommend a contingency fund to accommodate such potential extra costs.

The scope of work for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, if conditions have changed due to natural causes or construction operations at or adjacent to the site, or if the basic project scheme is significantly modified from that assumed, this report should be reviewed to determine the applicability of the conclusions and recommendations presented herein. Land use, site conditions (both on and off site), or other factors may change over time and could materially affect our findings; therefore, this report should not be relied upon after three years from its issue, or in the event that the site conditions change.

7 REFERENCES

Derkey, R. E., Stradling, D. F., Lindsey, K. A., and Tolan, T. L. (2006). Geologic map of the College Place and Walla Walla 7.5-minute quadrangle, Walla Walla County, Washington, and Umatilla County, Oregon: Washington Division of Geology and Earth Resources, Geologic Map GM-62, scale 1:24,000.

Gomberg, J., Sherrod, B., Trautman, M., Burns, E., and Snyder, D. (2012). Contemporary seismicity in and around the Yakima fold-and-thrust belt in eastern Washington. Bulletin of the Seismological Society of America, Vol. 12, No., 1, pp. 309-320.

IBC. (2015). International Building Code. Country Club Hills, IL: International Code Council, Inc. Washington State Amendments to the International Building Code 2009 Edition, Effective July 1, 2010.

Palmer. S. P., Magsino, S. L., Bilderback, E. L., Poelstra, J. L., Folger, D. S., and Niggemann, R. A. (2004). Liquefaction Susceptibility Map of Benton County, Washington. Washington Division of Geology and Earth Resources, open file report 2004-20, scale 1:125,000.

McCaffrey, R., King, R. W., Wells, R. E., Lancaster, R., and Miller, M. M. (2016). Contemporary deformation in the Yakima fold and thrust belt estimated with GPS.

Riedel, Stephen P., Fecht, Karl R. (1994). Geologic Map the Richland 1:100,000 Quadrangle, Washington State Division of Geology and Earth Resources.

Reidel, S. P. (2004). The Geologic Development of the Pasco Basin, South-Central Washington. Northwest Geological Society. Society Field Trips in Pacific Northwest Geology.

Schuster, J. E. (1994). Geologic map of the Walla Walla 1:100,000 quadrangle, Washington: Washington Division of Geology and Earth Resources, Open File Report 94-3, scale 1:100,000.

USGS. (2019). Quaternary faults and fold database. U.S. Geological Survey, USGS website: http//earthquake.usgs.gov/hazards/qfaults/, accessed June 4, 2019.

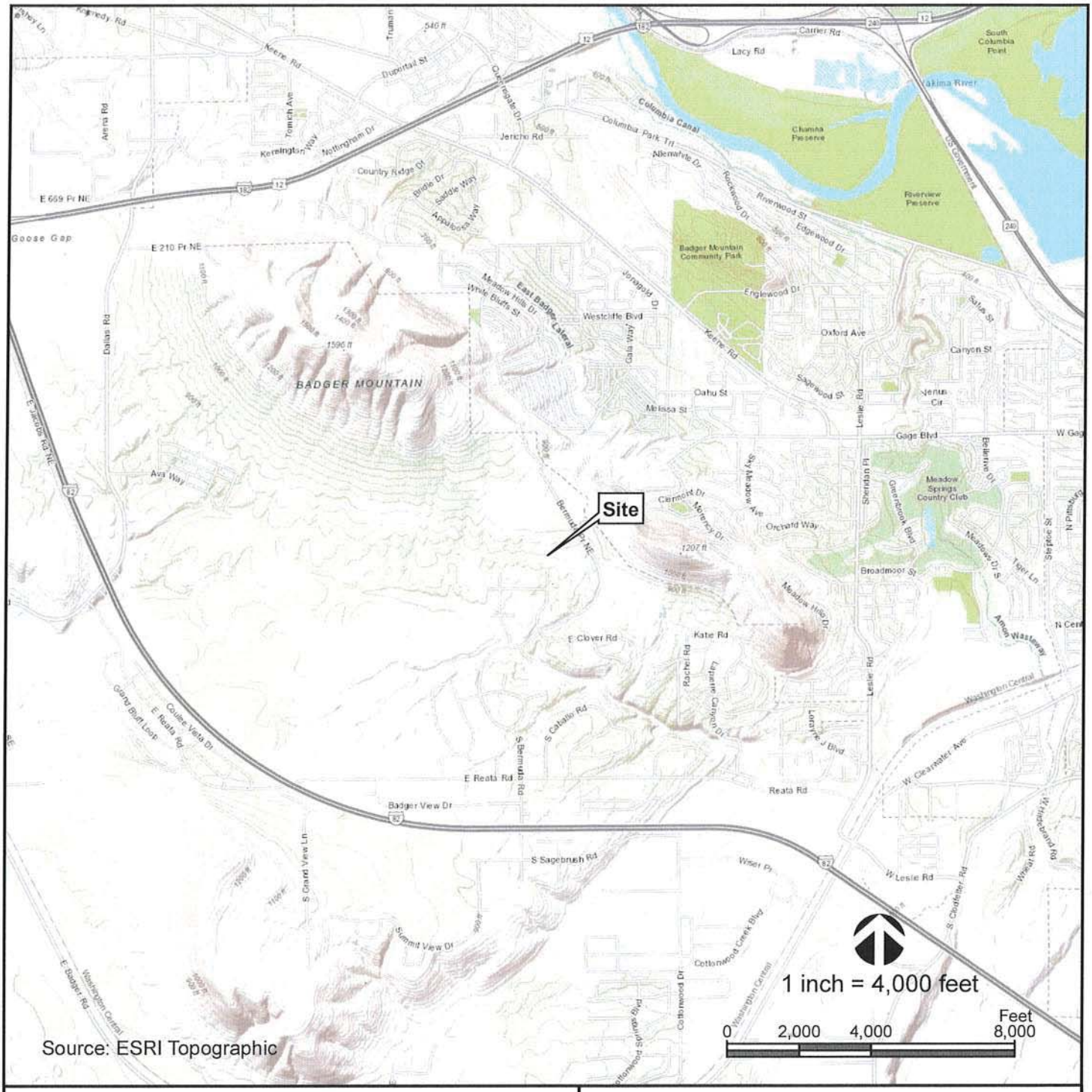
Washington State Department of Ecology (2004). Stormwater Management Manual for Eastern Washington, publication number 04-10-076.

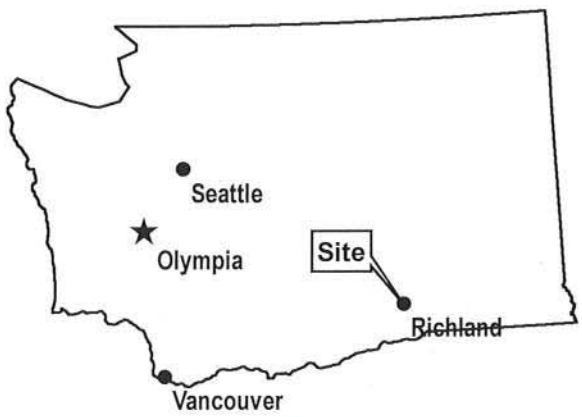
WADNR. (2019). Washington Geologic Information Portal. Washington Department of Natural Resources, Washington Division of Geology and Earth Resources, WADNR website: https://www.dnr.wa.gov/geologyportal, accessed June 4, 2019.

Washington State Department of Transportation (WSDOT SS). (2018). Standard Specifications for Road, Bridge, and Municipal Construction, M 41-10, Olympia, Washington.

Yeats, R. S., Graven, E. P., Werner, K. S., Goldfinger, Chris, and Popowski, T. A. (1996). Tectonics of the Willamette Valley, Oregon, in Rogers, A. M., Walsh, T. J., Kockelman, W. J., and Priest, G. R., eds., Assessing earthquake hazards and reducing risk in the Pacific Northwest: US Geological Survey Professional Paper 1650, v. 1, p. 183–222.

Figures





VICINITY MAP

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DATE: JUN 2019 · PROJECT: 66150.000

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Appendix A
Field Explorations

Appendix A: Field Explorations

A1 GENERAL

PBS explored subsurface conditions at the project site by excavating 30 test pits up to approximately 10 feet bgs between April 30 and May 2, 2019. The approximate locations of the explorations are shown on Figure 2, Site Plan. The procedures used to advance the test pits, collect samples, and other field techniques are described in detail in the following paragraphs. Unless otherwise noted, all soil sampling and classification procedures followed engineering practices in general accordance with relevant ASTM procedures. "General accordance" means that certain local drilling/excavation and descriptive practices and methodologies have been followed.

A2 TEST PITS

A2.1 Excavation

Test pits were excavated using a CAT 304C equipped with a 24-inch-wide bucket by Braden and Nelson Construction of Walla Walla, Washington. The test pits were observed by a member of the PBS geotechnical staff, who maintained a detailed log of the subsurface conditions and materials encountered during the course of the work.

A2.2 Sampling

Representative disturbed samples were taken at selected depths in the test pits. The disturbed soil samples were examined by a member of the PBS geotechnical staff and sealed in plastic bags for further examination.

A2.3 Test Pit Logs

The test pit logs show the various types of materials that were encountered in the excavations and the depths where the materials and/or characteristics of these materials changed, although the changes may be gradual. Where material types and descriptions changed between samples, the contacts were interpreted. The types of samples taken during excavation, along with their sample identification number, are shown to the right of the classification of materials. The natural water (moisture) contents are shown farther to the right. Measured seepage levels, if observed, are noted in the column to the right.

A3 MATERIAL DESCRIPTION

Initially, samples were classified visually in the field. Consistency, color, relative moisture, degree of plasticity, and other distinguishing characteristics of the soil samples were noted. Afterward, the samples were reexamined in the PBS laboratory, various standard classification tests were conducted, and the field classifications were modified where necessary. The terminology used in the soil classifications and other modifiers are defined in Table A-1, Terminology Used to Describe Soil.

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Table A-1
Terminology Used to Describe Soil

Soil Descriptions

Soils exist in mixtures with varying proportions of components. The predominant soil, i.e., greater than 50 percent based on total dry weight, is the primary soil type and is capitalized in our log descriptions (SAND, GRAVEL, SILT, or CLAY). Smaller percentages of other constituents in the soil mixture are indicated by use of modifier words in general accordance with the ASTM D2488-06 Visual-Manual Procedure. "General Accordance" means that certain local and common descriptive practices may have been followed. In accordance with ASTM D2488-06, group symbols (such as GP or CH) are applied on the portion of soil passing the 3-inch (75mm) sieve based on visual examination. The following describes the use of soil names and modifying terms used to describe fine- and coarse-grained soils.

Fine-Grained Soils (50% or greater fines passing 0.075 mm, No. 200 sieve)
The primary soil type, i.e., SILT or CLAY is designated through visual-manual procedures to evaluate soil toughness, dilatency, dry strength, and plasticity. The following outlines the terminology used to describe fine-grained soils, and varies from ASTM D2488 terminology in the use of some common terms.

Primary soil NAME, Symbols, and Adjectives			Plasticity Description	Plasticity Index (PI)
SILT (ML & MH)	**CLAY (CL & CH)**	**ORGANIC SOIL (OL & OH)**		
SILT		Organic SILT	Non-plastic	0 – 3
SILT		Organic SILT	Low plasticity	4 – 10
SILT/Elastic SILT	Lean CLAY	Organic SILT/ Organic CLAY	Medium Plasticity	10 – 20
Elastic SILT	Lean/Fat CLAY	Organic CLAY	High Plasticity	20 – 40
Elastic SILT	Fat CLAY	Organic CLAY	Very Plastic	>40

Modifying terms describing secondary constituents, estimated to 5 percent increments, are applied as follows:

Description	% Composition	
With Sand	% Sand ≥ % Gravel	15% to 25% plus No. 200
With Gravel	% Sand < % Gravel	
Sandy	% Sand ≥ % Gravel	≤30% to 50% plus No. 200
Gravelly	% Sand < % Gravel	

Borderline Symbols, for example CH/MH, are used when soils are not distinctly in one category or when variable soil units contain more than one soil type. **Dual Symbols,** for example CL-ML, are used when two symbols are required in accordance with ASTM D2488.

Soil Consistency terms are applied to fine-grained, plastic soils (i.e., PI ≥ 7). Descriptive terms are based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586-84, as follows. SILT soils with low to non-plastic behavior (i.e., PI < 7) may be classified using relative density.

Consistency Term	SPT N-value	Unconfined Compressive Strength	
		tsf	kPa
Very soft	Less than 2	Less than 0.25	Less than 24
Soft	2 – 4	0.25 – 0.5	24 – 48
Medium stiff	5 – 8	0.5 – 1.0	48 – 96
Stiff	9 – 15	1.0 – 2.0	96 – 192
Very stiff	16 – 30	2.0 – 4.0	192 – 383
Hard	Over 30	Over 4.0	Over 383

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Table A-1
Terminology Used to Describe Soil

Soil Descriptions

Coarse - Grained Soils (less than 50% fines)

Coarse-grained soil descriptions, i.e., SAND or GRAVEL, are based on the portion of materials passing a 3-inch (75mm) sieve. Coarse-grained soil group symbols are applied in accordance with ASTM D2488-06 based on the degree of grading, or distribution of grain sizes of the soil. For example, well-graded sand containing a wide range of grain sizes is designated SW; poorly graded gravel, GP, contains high percentages of only certain grain sizes. Terms applied to grain sizes follow.

Material NAME	Particle Diameter	
	Inches	Millimeters
SAND (SW or SP)	0.003 – 0.19	0.075 – 4.8
GRAVEL (GW or GP)	0.19 – 3	4.8 – 75
Additional Constituents:		
Cobble	3 – 12	75 – 300
Boulder	12 – 120	300 – 3050

The primary soil type is capitalized, and the fines content in the soil are described as indicated by the following examples. Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5 percent. Other soil mixtures will have similar descriptive names.

Example: Coarse-Grained Soil Descriptions with Fines

>5% to < 15% fines (Dual Symbols)	≥15% to < 50% fines
Well graded GRAVEL with silt: GW-GM	Silty GRAVEL: GM
Poorly graded SAND with clay: SP-SC	Silty SAND: SM

Additional descriptive terminology applied to coarse-grained soils follow.

Example: Coarse-Grained Soil Descriptions with Other Coarse-Grained Constituents

Coarse-Grained Soil Containing Secondary Constituents	
With sand or with gravel	≥ 15% sand or gravel
With cobbles; with boulders	Any amount of cobbles or boulders.

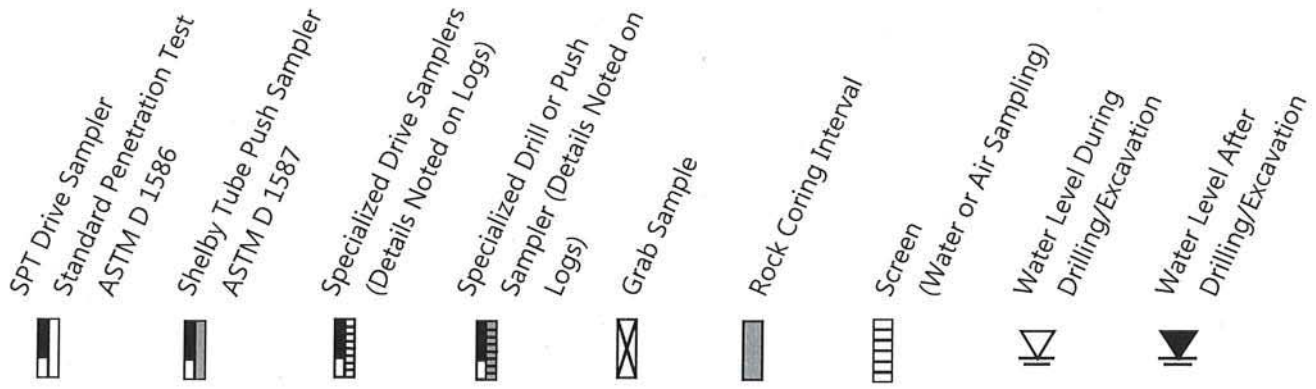
Cobble and boulder deposits may include a description of the matrix soils, as defined above.

Relative Density terms are applied to granular, non-plastic soils based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586-84.

Relative Density Term	SPT N-value
Very loose	0 – 4
Loose	5 – 10
Medium dense	11 – 30
Dense	31 – 50
Very dense	> 50

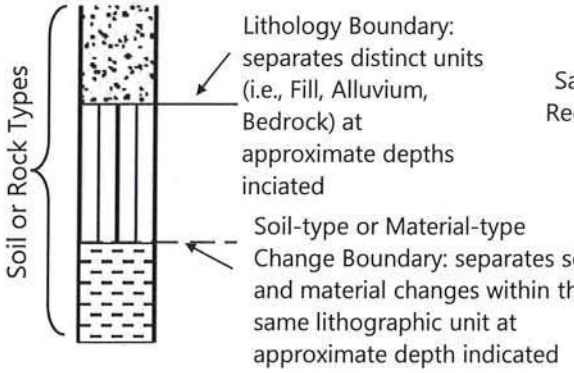
Table A-2
Key To Test Pit and Boring Log Symbols

SAMPLING DESCRIPTIONS

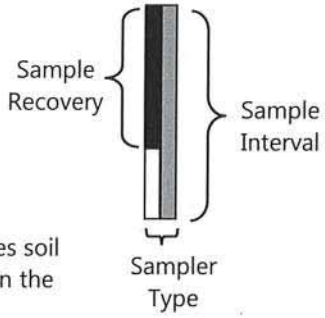


LOG GRAPHICS

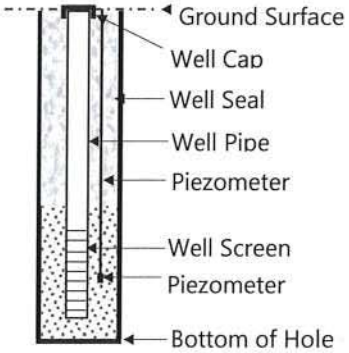
Soil and Rock



Sampling Symbols



Instrumentation Detail



Geotechnical Testing Acronym Explanations

PP	Pocket Penetrometer	HYD	Hydrometer Gradation
TOR	Torvane	SIEV	Sieve Gradation
DCP	Dynamic Cone Penetrometer	DS	Direct Shear
ATT	Atterberg Limits	DD	Dry Density
PL	Plasticity Limit	CBR	California Bearing Ratio
LL	Liquid Limit	RES	Resilient Modulus
PI	Plasticity Index	VS	Vane Shear
P200	Percent Passing US Standard No. 200 Sieve	bgs	Below ground surface
OC	Organic Content	MSL	Mean Sea Level
CON	Consolidation	HCL	Hydrochloric Acid
UC	Unconfined Compressive Strength		

Details of soil and rock classification systems are available on request.

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TEST PIT TP-1

APPROX. TEST PIT TP-1 LOCATION:
(See Site Plan)

Lat: 46.21768 Long: -119.306136

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine to medium sand; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
4.0		mild HCl reaction			S-2		
5.5		Brown, poorly graded SAND (SP) with gravel and cobbles; fine to medium sand; fine, subrounded to subangular gravel; dry	5.5		S-3		
6.0							
8.0		Brown, poorly graded SAND (SP-SM) with silt, gravel, and cobbles; fine to medium sand; fine to coarse, subrounded to subangular gravel; mild HCl reaction; dry	8.0				
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0		S-4		
12.0							
14.0							

0 50 100

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EXCAVATION METHOD: CAT 304 C

FIGURE A1
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

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TEST PIT TP-2

APPROX. TEST PIT TP-2 LOCATION:
(See Site Plan)

Lat: 46.217659 Long: -119.30423

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, silty SAND (SM) with roots; non-plastic; fine sand; strong HCl reaction; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
4.0					S-2		
				P200	S-3		Infiltration testing completed at 5 feet bgs P200 = 48%
6.0		with calcite stringers; fine to medium sand					
8.0		Final depth 8.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	8.0		S-4		
10.0							
12.0							
14.0							

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FIGURE A2
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TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

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TEST PIT TP-3

APPROX. TEST PIT TP-3 LOCATION:
(See Site Plan)

Lat: 46.217637 Long: -119.302325

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; moderate HCl reaction; dry	0.0		S-1	0 50 100	Surface Conditions: Orchard Field
2.0							
4.0		mild HCL reaction; fine to medium sand			S-2		
6.0							
8.0		fine to coarse sand					
10.0		strong HCL reaction	10.0		S-3		
12.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.					
14.0							

Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

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FIGURE A3
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19;RPG

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TEST PIT TP-4

APPROX. TEST PIT TP-4 LOCATION:
(See Site Plan)

Lat: 46.217616 Long: -119.300419

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; strong HCl reaction; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
4.0		with calcite stringers; moderate HCL reaction			S-2		
6.0							
8.0		fine to coarse sand; trace fine to coarse, subrounded to subangular gravel					
10.0		strong HCL reaction			S-3		
12.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
14.0							

0 50 100

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FIGURE A4
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000_TP1-30_20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19 RPG

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TEST PIT TP-5

APPROX. TEST PIT TP-5 LOCATION:
(See Site Plan)

Lat: 46.217595 Long: -119.298513

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
		Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.				0 50 100	Surface Conditions: Orchard Field
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; strong HCl reaction; dry	0.0		S-1		
2.0		with fine to medium sand			S-2		
4.0				P200	S-3		Infiltration testing completed at 4.5 feet bgs P200 = 86%
6.0							
		Brown, well-graded SAND (SW-SM) with silt, gravel, cobbles, and boulders; non-plastic; fine to coarse sand; fine to coarse, subrounded to subangular gravel; moderate HCL reaction; dry	7.0				
8.0					S-4		
		Final depth 9.5 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	9.5				
10.0							
12.0							
14.0						0 50 100	

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FIGURE A5

TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL.GEO.GDT PRINT DATE: 6/7/19:RPG

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TEST PIT TP-6

PBS PROJECT NUMBER:
66150.000

APPROX. TEST PIT TP-6 LOCATION:
(See Site Plan)

Lat: 46.217573 Long: -119.296608

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML) with roots; non-plastic; fine sand; moderate HCL reaction; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
4.0		with calcite stringers; fine to medium sand; without roots			S-2		
6.0		with trace fine to coarse, subrounded gravel; cobbles					
8.0							
10.0		fine to coarse sand	10.0		S-3		
12.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.					
14.0							

0 50 100

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FIGURE A6
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19 RPG

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TEST PIT TP-7

APPROX. TEST PIT TP-7 LOCATION:
(See Site Plan)

Lat: 46.217552 Long: -119.294702

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, sandy SILT (ML) with roots; non-plastic; fine sand; no HCl reaction; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
4.0		without roots			S-2		
				P200	S-3		Infiltration testing completed at 5 feet bgs P200 = 90%
6.0							
8.0							
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0		S-4		
12.0							
14.0							

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FIGURE A7

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TEST PIT TP-8

APPROX. TEST PIT TP-8 LOCATION:
(See Site Plan)

Lat: 46.218531 Long: -119.306116

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown silty SAND (SM); non-plastic; fine to medium sand; no HCl reaction; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
4.0				P200	S-2		P200 = 33%
6.0					S-3		
8.0		Brown, well-graded SAND (SW) with gravel, cobbles, and calcite stringers; fine to coarse sand; fine to coarse, subrounded to subangular gravel; dry	8.0				
			9.5		S-4		
10.0		Final depth 9.5 feet bgs due to refusal in cobbles; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.					
12.0							
14.0						0 50 100	

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FIGURE A8
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TEST PIT LOG - 1 PER PAGE 66150.000_TP1-30_20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19 RPG

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TEST PIT TP-9

APPROX. TEST PIT TP-9 LOCATION:
(See Site Plan)
Lat: 46.21851 Long: -119.30421

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML) with roots; non-plastic; fine sand; moderate HCL reaction; dry	0.0		S-1	0 50 100	Surface Conditions: Orchard Field
2.0							
4.0		with calcite stringers; basalt cobbles; without roots			S-2		
6.0		mild HCl reaction					
8.0		strong HCl reaction; strong cementation			S-3		
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
12.0							
14.0						0 50 100	

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FIGURE A9

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TEST PIT TP-10

APPROX. TEST PIT TP-10 LOCATION:
(See Site Plan)

Lat: 46.218488 Long: -119.302305

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, sandy SILT (ML) with roots; non-plastic; fine sand; strong HCl reaction; dry	0.0	P200	S-1		P200 = 73%
2.0							
4.0		fine to medium sand; without roots			S-2		
6.0							
8.0		fine to coarse sand					
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0		S-3		
12.0							
14.0							

Surface Conditions: Orchard Field

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FIGURE A10

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TEST PIT TP-11

APPROX. TEST PIT TP-11 LOCATION:
(See Site Plan)

Lat: 46.218467 Long: -119.300399

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE / SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 – 50 – 100)	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; mild HCl reaction; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
4.0					S-2		
6.0							
8.0		Brown and gray, well-graded SAND (SW-SM) with silt and calcite stringers; non-plastic; fine to coarse sand; dry trace fine, subrounded to subangular gravel	8.0	P200	S-3		P200 = 66%
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
12.0							
14.0							

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FIGURE A11
Page 1 of 1

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TEST PIT TP-12

APPROX. TEST PIT TP-12 LOCATION:
(See Site Plan)

Lat: 46.218445 Long: -119.298493

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
		Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.				0 50 100	Surface Conditions: Orchard Field
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; mild HCl reaction; dry	0.0		S-1		
2.0							
4.0		with gray silt nodules; moderate HCl reaction; without roots					
6.0					S-2		
		trace gravel and cobbles					
8.0							
		fine to coarse sand; mild HCl reaction			S-3		
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
12.0							
14.0						0 50 100	

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FIGURE A12
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000_TP1-30_20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19 RPG

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TEST PIT TP-13

APPROX. TEST PIT TP-13 LOCATION:
(See Site Plan)
Lat: 46.218424 Long: -119.296588

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, sandy SILT (ML) with roots; non-plastic; fine to medium sand; mild HCl reaction; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
4.0		strong HCl reaction; without roots		P200	S-2	●	P200 = 66%
6.0							
7.0		Brown, silty SAND (SM) with gravel and cobbles; non-plastic; fine to coarse sand; fine to coarse, subrounded to subangular gravel; strong HCl reaction; dry	7.0		S-3		
8.0							
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0		S-4		
12.0							
14.0							

0 50 100

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FIGURE A13
Page 1 of 1

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TEST PIT TP-14

APPROX. TEST PIT TP-14 LOCATION:
(See Site Plan)

Lat: 46.218403 Long: -119.294682

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
4.0		mild HCl reaction			S-2		
		with calcite stringers					
6.0							
8.0							
		fine to medium sand; trace fine to coarse, subrounded gravel; no HCl reaction			S-3		
		Final depth 9.5 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	9.5				
10.0							
12.0							
14.0							

0 50 100

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FIGURE A14
Page 1 of 1

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TEST PIT TP-15

APPROX. TEST PIT TP-15 LOCATION:
(See Site Plan)

Lat: 46.219382 Long: -119.306096

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, silty SAND (SM) with roots; non-plastic; fine to medium sand; no HCl reaction; dry	0.0				Surface Conditions: Orchard Field
2.0					S-1		
4.0		strong HCl reaction			S-2		
6.0					S-3		
		Brown, silty SAND (SM) with gravel and cobbles; non-plastic; fine to medium sand; fine to coarse, subrounded to subangular gravel; strong HCl reaction; dry	7.0				
8.0		Brown, well-graded SAND (SW) with gravel and cobbles; fine to coarse sand; fine to coarse, subangular gravel; dry	8.0		S-4		
10.0					S-5		
		Final depth 10.5 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.5				
12.0							
14.0							

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FIGURE A15
Page 1 of 1

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TEST PIT TP-16

APPROX. TEST PIT TP-16 LOCATION:
(See Site Plan)
Lat: 46.21936 Long: -119.30419

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, sandy SILT (ML) with calcite stringers; non-plastic; fine sand; dry	0.0	P200	S-1		P200 = 86%
2.0		strong HCl reaction					Surface Conditions: Orchard Field
4.0		deceased silt			S-2		
6.0							
8.0		Light brown, silty SAND (SM) with few cobbles; non-plastic; fine to medium sand; strong HCl reaction; dry	8.0		S-3		
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0		S-4		
12.0							
14.0							

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FIGURE A16
Page 1 of 1

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TEST PIT TP-17

APPROX. TEST PIT TP-17 LOCATION:
(See Site Plan)

Lat: 46.219339 Long: -119.302285

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; strong HCl reaction; dry	0.0		S-1	0 50 100	Surface Conditions: Orchard Field
2.0							
4.0					S-2		
		without roots					
6.0							
		fine to coarse sand; trace fine to coarse, subrounded to subangular gravel; cobbles					
8.0					S-3		
		Final depth 9.5 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	9.5				
10.0							
12.0							
14.0						0 50 100	

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FIGURE A17
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

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TEST PIT TP-18

APPROX. TEST PIT TP-18 LOCATION:
(See Site Plan)

Lat: 46.219318 Long: -119.300379

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine to medium sand; moderate HCl reaction; dry	0.0		S-1	0 50 100	Surface Conditions: Orchard Field
2.0							
4.0					S-2		
6.0							
8.0		Brown, well-graded SAND (SW-SM) with silt, gravel, and cobbles; non-plastic; fine to coarse sand; fine to coarse, subrounded gravel; moderate HCl reaction; dry	8.0				
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0		S-3		
12.0							
14.0						0 50 100	

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FIGURE A18
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000_TP1-30_20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

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TEST PIT TP-19

APPROX. TEST PIT TP-19 LOCATION:
(See Site Plan)

Lat: 46.219296 Long: -119.298473

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, ssandy SILT (ML); non-plastic; fine sand; strong HCl reaction; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0							
		Brown, sandy SILT (ML) with gravel, cobbles; and boulders; non-plastic; fine to coarse sand; fine to coarse, subrounded to subangular gravel; mild HCl reaction; dry	3.0		S-2		
4.0							
6.0		fine to medium sand; with calcite stringers; deceased gravel, cobbles, and boulders					
8.0							
		Final depth 9.5 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	9.5		S-3		
10.0							
12.0							
14.0							

0 50 100

0 50 100

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FIGURE A19
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000_TP1-30_20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

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TEST PIT TP-20

APPROX. TEST PIT TP-20 LOCATION:
(See Site Plan)

Lat: 46.219275 Long: -119.296568

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine to medium sand; strong HCl reaction; dry	0.0		S-1	0 50 100	Surface Conditions: Orchard Field
2.0							
4.0		with calcite stringers			S-2		
6.0							
8.0							
10.0		fine to coarse sand; with trace fine, subrounded to subangular gravel; cobbles			S-3		
		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
12.0							
14.0						0 50 100	

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FIGURE A20

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TEST PIT TP-21

APPROX. TEST PIT TP-21 LOCATION:
(See Site Plan)

Lat: 46.219253 Long: -119.294662

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; moderate HCl reaction; dry	0.0		S-1	0 50 100	Surface Conditions: Weeds
2.0							
4.0					S-2		
6.0							
8.0							
10.0		fine to medium sand Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0		S-3		
12.0							
14.0						0 50 100	

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FIGURE A21
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

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TEST PIT TP-22

APPROX. TEST PIT TP-22 LOCATION:
(See Site Plan)

Lat: 46.218936 Long: -119.292777

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE / SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; dry	0.0		S-1		Surface Conditions: Weeds Possible fill material stockpile
2.0		fine to coarse sand			S-2		
4.0							
6.0							
8.0				P200	S-3		P200 = 73%
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
12.0							
14.0							

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FIGURE A22
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

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TEST PIT TP-23

APPROX. TEST PIT TP-23 LOCATION:
(See Site Plan)

Lat: 46.220233 Long: -119.306076

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, silty SAND (SM) with roots; dry	0.0		S-1	0 50 100	Surface Conditions: Orchard Field
2.0							
4.0					S-2		
6.0		without roots					
8.0		Brown, silty SAND (SM) with gravel and cobbles; non-plastic; fine to medium sand; fine, subrounded gravel; dry	8.0		S-3		
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
12.0							
14.0						0 50 100	

Lines representing the interface between soil/rock units of differing description are approximate only, inferred where between samples, and may indicate gradual transition.

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FIGURE A23
Page 1 of 1

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TEST PIT TP-24

APPROX. TEST PIT TP-24 LOCATION:
(See Site Plan)

Lat: 46.220211 Long: -119.30417

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML) with roots; non-plastic; fine sand; strong HCl reaction; dry	0.0		S-1	0 50 100	Surface Conditions: Orchard Field
2.0							
4.0		with calcite stringers; without roots			S-2		
6.0		fine to medium sand					
8.0			8.5		S-3		
		Brown, silty SAND (SM) with gravel and cobbles; fine to coarse sand; fine to coarse, subangular gravel; dry			S-4		
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
12.0							
14.0						0 50 100	

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FIGURE A24
Page 1 of 1

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TEST PIT TP-25

APPROX. TEST PIT TP-25 LOCATION:
(See Site Plan)
Lat: 46.22019 Long: -119.302265

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown sandy SILT (ML) with roots; non-plastic; fine sand; strong HCl reaction; dry	0.0		S-1	0 50 100	Surface Conditions: Orchard Field
2.0							
4.0		with calcite stringers; without roots			S-2		
6.0							
7.0		Brown, silty SAND (SM) with gravel; and cobbles; non-plastic; fine to coarse sand; fine to coarse, subrounded to subangular gravel; moderate HCl reaction; dry	7.0				
8.0							
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0		S-3		
12.0							
14.0						0 50 100	

TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

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FIGURE A25

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TEST PIT TP-26

APPROX. TEST PIT TP-26 LOCATION:
(See Site Plan)
Lat: 46.220168 Long: -119.300359

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; moderate HCl reaction; dry	0.0	P200	S-1		P200 = 66%
2.0					S-2		
4.0							
6.0							
8.0		Brown, well-graded SAND (SW-SM) with silt and gravel; non-plastic; fine to coarse sand; fine to coarse, subrounded to subangular gravel; mild HCl reaction; dry	8.0		S-3		
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
12.0							
14.0							

Surface Conditions: Orchard Field

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FIGURE A26

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TEST PIT TP-27

APPROX. TEST PIT TP-27 LOCATION:
(See Site Plan)

Lat: 46.220147 Long: -119.298453

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, sandy SILT (ML) with calcite stringers; non-plastic; fine to medium sand; strong HCl reaction; dry	0.0		S-1		Surface Conditions: Orchard Field
2.0		without calcite stringers			S-2		
4.0							
5.5		Brown, well-graded SAND (SW-SM) with silt, gravel; and cobbles; non-plastic; fine to coarse sand; fine to coarse, subrounded to subangular gravel; dry	5.5				
6.0							
8.0		Brown, silty SAND (SM) with trace gravel; non-plastic; fine to medium sand; fine to coarse, subangular gravel; strong HCl reaction; dry	8.0		S-3		
10.0		Final depth 10.0 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	10.0				
12.0							
14.0							

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FIGURE A27
Page 1 of 1

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PBS PROJECT NUMBER:
66150.000

TEST PIT TP-28

APPROX. TEST PIT TP-28 LOCATION:
(See Site Plan)

Lat: 46.220126 Long: -119.296548

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		Brown, sandy SILT (ML); non-plastic; fine sand; strong HCl reaction; dry	0.0		S-1	0 50 100	Surface Conditions: Orchard Field
2.0							
4.0		Final depth 4.0 feet bgs due to possible water line; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	4.0		S-2		
6.0							
8.0							
10.0							
12.0							
14.0							

LOGGED BY: C. Grant
COMPLETED: 5/01/19

EXCAVATED BY: Braden and Nelson, Inc.
EXCAVATION METHOD: CAT 304 C

FIGURE A28
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000 TP1-30 20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

PBS

SIENNA HILLS
RICHLAND, WASHINGTON

PBS PROJECT NUMBER:
66150.000

TEST PIT TP-29

APPROX. TEST PIT TP-29 LOCATION:
(See Site Plan)

Lat: 46.220104 Long: -119.294642

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE / SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT % (0 50 100)	COMMENTS
0.0		Brown, sandy SILT (ML); fine to medium sand; dry	0.0		S-1		Surface Conditions: Weeds
2.0							
4.0		mild HCl reaction		P200	S-2		P200 = 85%
6.0		Brown, silty SAND (SM) with gravel, cobbles, and boulders; non-plastic; fine to coarse sand; fine to coarse, subrounded to subangular gravel; dry	6.0				
8.0					S-3		
		Final depth 8.5 feet bgs due to refusal in gravel and cobbles/boulders; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	8.5				
10.0							
12.0							
14.0							

TEST PIT LOG - 1 PER PAGE 66150.000_TP1-30_20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

LOGGED BY: C. Grant
COMPLETED: 5/01/19

EXCAVATED BY: Braden and Nelson, Inc.
EXCAVATION METHOD: CAT 304 C

FIGURE A29
Page 1 of 1

PBS

SIENNA HILLS
RICHLAND, WASHINGTON

PBS PROJECT NUMBER:
66150.000

TEST PIT TP-30

APPROX. TEST PIT TP-30 LOCATION:
(See Site Plan)

Lat: 46.22101 Long: -119.295257

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH	TESTING	SAMPLE TYPE SAMPLE ID	DYNAMIC CONE PENETROMETER / STATIC PENETROMETER / MOISTURE CONTENT %	COMMENTS
0.0		FILL	0.0				Surface Conditions: Weeds
		Brown, sandy SILT (ML); non-plastic; fine sand; moderate HCl reaction; dry	0.5		S-1		
2.0							
					S-2		
4.0							
6.0		Brown, well-graded SAND (SW-SM) with silt, gravel, and cobbles; non-plastic; fine to coarse sand; fine to coarse, subrounded to subangular gravel; dry	6.0				
8.0							
					S-3		
		Final depth 9.5 feet bgs; test pit backfilled with excavated material to existing ground surface. Groundwater not encountered at time of exploration.	9.5				
10.0							
12.0							
14.0							

MOISTURE CONTENT % scale: 0 50 100

LOGGED BY: C. Grant
COMPLETED: 5/01/19

EXCAVATED BY: Braden and Nelson, Inc.
EXCAVATION METHOD: CAT 304 Mini Excavator

FIGURE A30
Page 1 of 1

TEST PIT LOG - 1 PER PAGE 66150.000_TP1-30_20190513.GPJ PBS_DATATMPL_GEO.GDT PRINT DATE: 6/7/19:RPG

Appendix B
Laboratory Testing

Appendix B: Laboratory Testing

B1 GENERAL

Samples obtained during the field explorations were examined in the PBS laboratory. The physical characteristics of the samples were noted and field classifications were modified where necessary. During the course of examination, representative samples were selected for further testing. The testing program for the soil samples included standard classification tests, which yield certain index properties of the soils important to an evaluation of soil behavior. The testing procedures are described in the following paragraphs. Unless noted otherwise, all test procedures are in general accordance with applicable ASTM standards. "General accordance" means that certain local and common descriptive practices and methodologies have been followed.

B2 CLASSIFICATION TESTS

B2.1 Visual Classification

The soils were classified in accordance with the Unified Soil Classification System with certain other terminology, such as the relative density or consistency of the soil deposits, in general accordance with engineering practice. In determining the soil type (that is, gravel, sand, silt, or clay) the term that best described the major portion of the sample is used. Modifying terminology to further describe the samples is defined in Table A-1, Terminology Used to Describe Soil, in Appendix A.

B2.2 Moisture (Water) Contents

Natural moisture content determinations were made on samples of the fine-grained soils (that is, silts, clays, and silty sands). The natural moisture content is defined as the ratio of the weight of water to dry weight of soil, expressed as a percentage. The results of the moisture content determinations are presented on the exploration logs in Appendix A and on Figure B2, Summary of Laboratory Data, in Appendix B.

B2.3 Grain-Size Analyses (P200 Wash)

Washed sieve analyses (P200) were completed on samples to determine the portion of soil samples passing the No. 200 Sieve (i.e., silt and clay). The results of the P200 test results are presented on the exploration logs in Appendix A and on Figure B2, Summary of Laboratory Data, in Appendix B.

PBS

SUMMARY OF LABORATORY DATA

SIENNA HILLS
RICHLAND, WASHINGTON

PBS PROJECT NUMBER:
66150.000

SAMPLE INFORMATION				MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	SIEVE			ATTERBERG LIMITS		
EXPLORATION NUMBER	SAMPLE NUMBER	SAMPLE DEPTH (FEET)	ELEVATION (FEET)			GRAVEL (PERCENT)	SAND (PERCENT)	P200 (PERCENT)	LIQUID LIMIT (PERCENT)	PLASTIC LIMIT (PERCENT)	PLASTICITY INDEX (PERCENT)
TP-2	S-3	5		21.7				48			
TP-5	S-3	4.5		30.6				86			
TP-7	S-3	5		37.3				90			
TP-8	S-2	3.5		11.5				33			
TP-10	S-1	1.5		13.8				73			
TP-11	S-3	9.5		14.7				66			
TP-13	S-2	3.5		16.6				66			
TP-16	S-1	1.5		17.3				86			
TP-22	S-3	9		10.7				73			
TP-26	S-1	1.5		12.6				66			
TP-29	S-2	3.5		12.4				85			

FIGURE B1
Page 1 of 1

Organochlorine, Lead, Arsenic Soil Sampling Report

February 4, 2019

Greg Johnson
Siena Hills Development, LLC
PO Box 344
Meridian, Idaho 83642

Via email: greg@westparkco.com

Regarding: Limited Soil Investigation Results
Richland Orchard Parcels
Benton County Tax Lot 134983000001005
South Bermuda Road
Kennewick, Washington 99336
PBS Project No. 66150.000

Dear Mr. Johnson:

PBS Engineering and Environmental Inc. (PBS) is pleased to submit this letter report that provides the findings of limited soil sampling and laboratory analysis completed for the above-referenced property. This work was done as part of site redevelopment plans.

PROJECT BACKGROUND

The subject property is a 98-acre tax lot in Benton County, Washington. It is currently active as an orchard, except for the easternmost portion of the subject property, which appears not to be in use. There are no permanent structures on the subject property. Aerial photographs indicate that the majority of the property was used as an orchard from the late 1970s or early 1980s until the present. Based on the aerial photography, the eastern side of the property across Bermuda Road was not used as an orchard until the mid-1980s or early 1990s, and this portion of the property was out of use as an orchard sometime between 2013 and 2017.

The use of regulated agricultural chemicals such as pesticides, herbicides, and fertilizers is considered an acceptable practice. However, spillage, mixing, or handling of these chemicals in bulk quantities or intense usage can result in hazardous soil conditions requiring remedial action in accordance with state or federal agencies. PBS did not encounter information indicating that these conditions existed on the subject property; however, based on the timeframe of active orchard use at the site, and the proposed development of the site for residential use, the former agricultural use posed a high concern for the presence of pesticide residues.

General Background on Pesticides

Organochlorines contain carbon, hydrogen, and chlorine. They were developed in the mid-1940s through the 1950s and tend to persist in the environment for decades. Key organochlorines include Dichloro-Diphenyl-Trichloroethane (DDT), chlordanes, toxaphene, aldrin, dieldrin, and endrin, all of which were banned for sale in the United States by the late 1980s.

Historically, orchard pesticides contained heavy metals such as arsenic and lead, as well as DDT. Lead arsenate (LA) was the most extensively used of the arsenical insecticides and its use was effectively terminated in 1948 when DDT became widely available to the public (Benson et al., 1968). All insecticidal uses of lead arsenate in the United

States were officially banned on August 1, 1988 (USEPA, 1988). Organochlorine pesticides have been found to persist in soil at levels that may present health risks, despite subsequent redevelopment of the property.

SITE INVESTIGATION

PBS' scope, as presented in the Proposal for Limited Soil Investigation (dated November 28, 2018) was to perform limited soil sampling to provide a screening-level assessment for the presence of residual organochlorine pesticides, lead and arsenic in shallow soil within the active orchard. This scope consisted of collecting samples on an approximate grid, set using a handheld GPS in the field, within the orchard area. PBS planned to collect samples at any visible indication of soil discoloration, but no staining or other indications were observed.

PBS conducted the sampling at the site on December 12 and 13, 2018. At the time of the field work the majority of the site was in use as an orchard. The eastern portion of the site was undeveloped and covered with sparse vegetation. Twenty samples were collected in an approximate grid pattern and sample locations were recorded by a handheld GPS unit. The sample locations are shown on Figure 2.

The soil samples were collected using hand tools from the surface to a depth of 6-inches. Soil throughout the area of sampling consisted of a dry light brown silt. Each sample was individually labeled and placed into laboratory-provided containers by PBS field personnel wearing new disposable nitrile gloves at each location. Hand tools were decontaminated between sampling sites.

The samples were placed on ice in a cooler until transported to the lab under chain of custody documentation. Samples were submitted to a Washington-accredited laboratory and analyzed for Pesticides by EPA Method 8081 and Total Lead and Arsenic by EPA Method 6010C.

REGULATORY CRITERIA

The Model Toxics Control Act (MTCA) Cleanup Regulation, chapter 173-340 WAC, sets forth the requirements and procedures for establishing cleanup levels that are protective of human health and the environment. To determine the appropriate screening criteria for concentrations of hazardous substances in soil under MTCA, the site use and pathways of potential concern should consider the potential for direct contact; exposure to wildlife and plants; and potential for leaching of contaminants into the groundwater.

Given that the project site is planned for development and the existing surface soils will be removed or capped during redevelopment, the direct contact is the likely pathway of concern.

1. Under the MTCA regulation the direct contact pathway is evaluated using MTCA Method A or B screening levels. The MTCA Method A soil cleanup standards (Table 740-1) are protective of human health and the environment and can be used for unrestricted land use application. Subsequent hazardous substances not included in the Method A list can be found in the CLARC Table for Method B and C screening criteria. Based on proposed site development, the Method A soil criteria is appropriate for this project.

2. Under the MTCA regulation, a terrestrial ecological evaluation (TEE) may be necessary if hazardous substances are released into the soils at a Site (WAC 173-340-7490 through 7494). The purpose of a TEE is to protect land-based plants and animals from exposure to contaminated soil. If necessary, the soil screening levels unrestricted land use for a TEE evaluation would be compared to concentrations presented in MTCA Table 749-2. Because this Site is planned for redevelopment, the site will have very little habitat or little opportunity for plants and animals to be exposed to the contamination and would be exempt from conducting further evaluation.

3. Under the MTCA regulation, when selecting a cleanup level for a chemical contaminate in soil, one criterion is to consider the potential for the contaminant to leach from soil into groundwater. Specifically, the concentrations of a hazardous substance in soil should not cause contamination of groundwater that exceeds cleanup levels established under WAC 173-340-720. This pathway is considered in addition to the direct-contact criterion that is based on ingestion of soil (and dermal absorption for modified Method B and C evaluations).

The results of the soil analyses were compared to the MTCA Method A soil cleanup levels for unrestricted land use (Table 740-1). The MTCA Method A cleanup levels are presented in Washington Administrative Code (WAC) 173-340, which includes common contaminants of concern. The only organochlorine pesticide listed in MTCA Method A is DDT. The soil sample data and relevant MTCA Method A cleanup levels for lead, arsenic, and DDT are presented in Table 1 in the attachments.

FINDINGS

No organochloride pesticides were detected above the laboratory reporting limits any of the twenty samples. Arsenic was detected above the lab reporting limit in three samples, but concentrations in these samples are consistent with local background levels. Lead was detected above the laboratory reporting limit in each sample, but concentrations are consistent with local background levels (Table 1).

Of the detected compounds, the concentrations are below the MTCA Method A cleanup levels of 20 mg/kg for arsenic and 250 mg/kg for lead. The analytical results are presented in Table 1. Laboratory analytical results are included as an attachment.

CONCLUSIONS

The site observations and laboratory results indicate that no organochloride pesticides were detected in the soil above laboratory detection limits. Arsenic and lead levels in soil are present at concentrations consistent with natural background levels and are below MTCA Method A cleanup levels.

RECOMMENDATIONS

PBS has the following recommendations:

- There is no indication of soil impacts at this Site that would prohibit unrestricted land use.
- PBS recommends that if soil staining or other evidence of contamination is uncovered during redevelopment activities, sampling and analysis of this suspect material should be completed prior to further construction activities.
- PBS recommends that Siena Hills Development keep this report as a permanent record of the site investigation that took place at the site

LIMITATIONS OF SCOPE

PBS has prepared this report for use by Siena Hills Development and is not intended for use by others without the written consent of PBS. The site as a whole may have other contamination that was not characterized by this study. The findings and conclusions of this work are not scientific certainties, but probabilities based on professional judgment concerning the significance of the data gathered during the course of this investigation.

PBS is not able to represent that the site or adjoining land contains no hazardous waste, oil, or other latent conditions beyond that detected or observed by PBS.

Please feel free to contact me at 509.942.1600 or angela.mcguire@pbsusa.com with any questions or comments.

Sincerely,

Digitally signed by Angela McGuire
Date: 2019.02.04 16:05:07 -08'00'

Angela McGuire, LG
Project Geologist

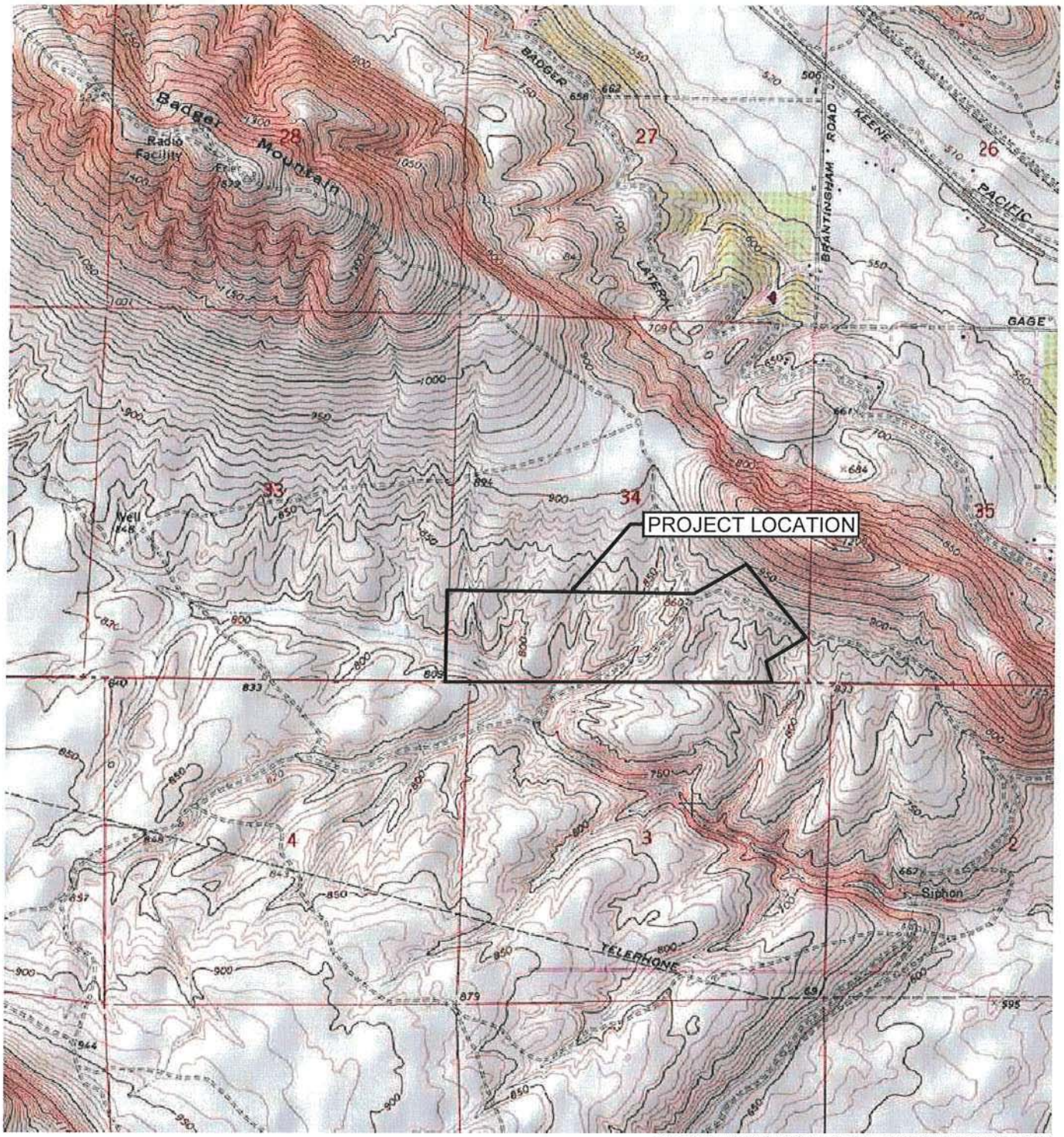
Digitally signed by Thomas Mergy
Date: 2019.02.06 12:08:51 -08'00'

Thomas Mergy, LHG
PBS Senior Hydrogeologist

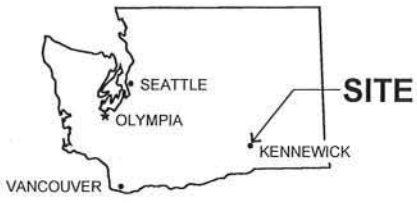
Attachments: Figure 1. Vicinity Map
Figure 2. Site and Soil Sample Location Map

Table 1. Summary of Soil Analytical Results

Historical Aerial Photographs
Pace Laboratory Analytical Report



SOURCE: USGS BADGER MOUNTAIN, WA QUADRANGLE 1970, PHOTO REVISED 1978.



WASHINGTON

SCALE 1" = 2000'

0' 1,000' 2,000' 4,000'

PREPARED FOR: SIENA HILLS DEVELOPMENT, LLC

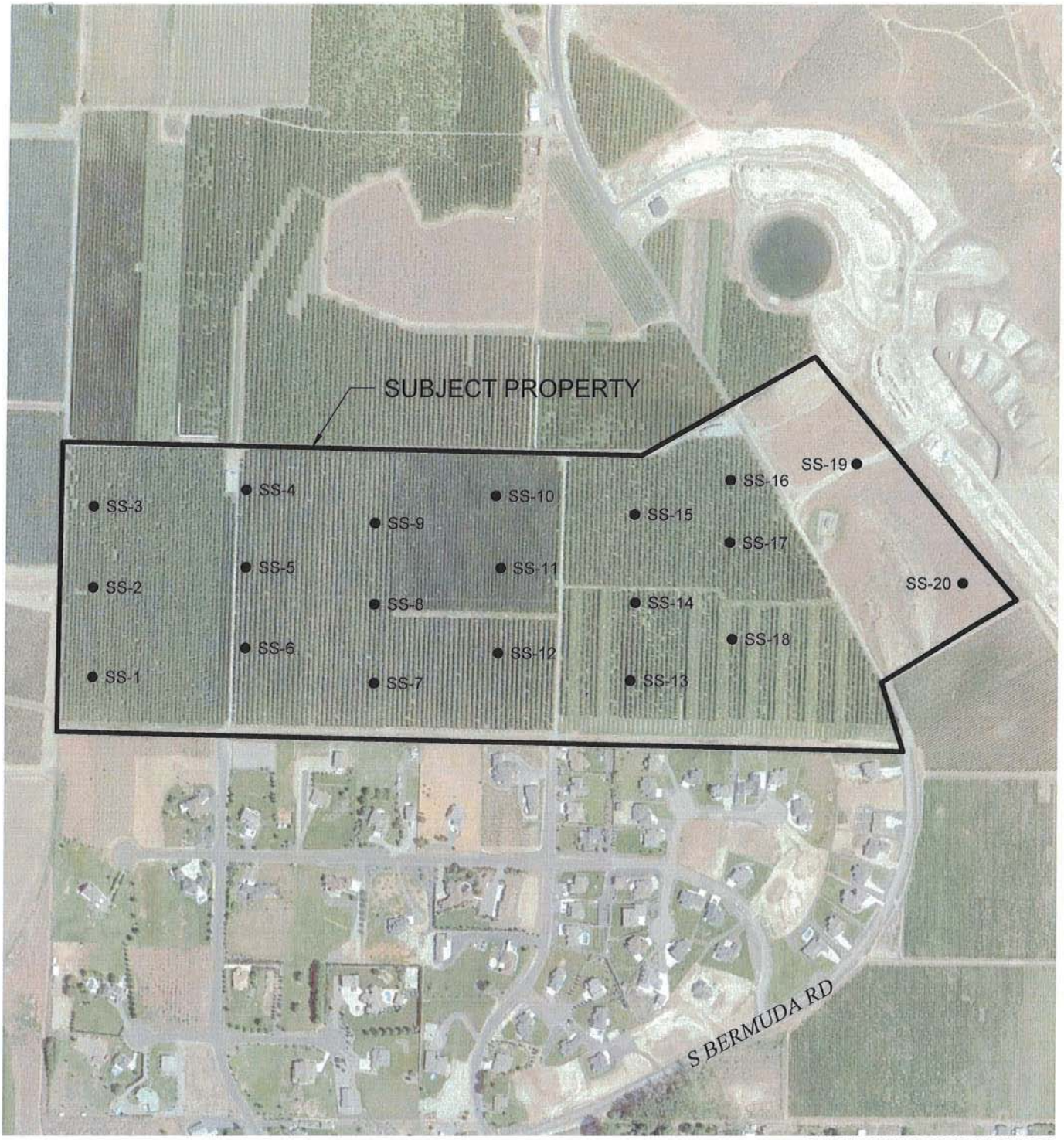
PBS

VICINITY MAP

BENTON COUNTY ORCHARD PARCELS
SOUTH BERMUDA ROAD
KENNEWICK, WASHINGTON

JAN 2019
66150.000

FIGURE
1



SOURCE: © 2018 GOOGLE EARTH PRO

LEGEND

● SS-1 SOIL SAMPLE NUMBER AND LOCATION

SCALE 1" = 600'

0' 300' 600' 1,200'

PREPARED FOR: SIENA HILLS DEVELOPMENT, LLC

PBS

SOIL ASSESSMENT SITE PLAN

BENTON COUNTY ORCHARD PARCELS
SOUTH BERMUDA ROAD
KENNEWICK, WASHINGTON

JAN 2019
66150.000

FIGURE
2

Summary of Soil Analytical Results
Benton County Tax Lot 134983000001005
Kennewick, Washington

Sample ID	Sample Date	Metals		Pesticides[A] (mg/kg)
		Arsenic (mg/kg)	Lead (mg/kg)	
SS-1-6	12/12/2018	ND	7.77	ND
SS-2-6	12/12/2018	2.98	8.92	ND
SS-3-6	12/12/2018	ND	7.85	ND
SS-4-6	12/12/2018	ND	9.29	ND
SS-5-6	12/12/2018	ND	9.16	ND
SS-6-6	12/12/2018	2.75	11.2	ND
SS-7-6	12/12/2018	3.40	9.52	ND
SS-8-6	12/12/2018	ND	9.86	ND
SS-9-6	12/12/2018	ND	9.04	ND
SS-10-6	12/12/2018	ND	9.21	ND
SS-11-6	12/12/2018	ND	9.24	ND
SS-12-6	12/12/2018	2.85	9.13	ND
SS-13-6	12/12/2018	ND	10.8	ND
SS-14-6	12/12/2018	ND	9.91	ND
SS-15-6	12/12/2018	ND	9.72	ND
SS-16-6	12/12/2018	ND	9.41	ND
SS-17-6	12/12/2018	ND	9.45	ND
SS-18-6	12/12/2018	ND	9.49	ND
SS-19-6	12/13/2018	ND	9.88	ND
SS-20-6	12/13/2018	ND	8.41	ND
MTCA Method A Soil Cleanup Levels		20	250	3[B]
Regional Median Background Metals Concentrations[C]		2.95	7.82	NA

Samples taken in a grid pattern at depths of 0-6 in.
ND = Compound not detected above laboratory reporting limit.
NA = Not applicable.
[A]See laboratory report for full list of pesticides.
[B]Method A Cleanup Level for DDT only.
[C]Washington Department of Ecology, Natural Background Soil Metals Concentrations in Washington State, Eastern Washington, October 1994.

Richland Orchards

South Bermuda Road

Kennewick, WA 99338

Inquiry Number: 5489381.1

November 21, 2018

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

11/21/18

Site Name:

Richland Orchards
South Bermuda Road
Kennewick, WA 99338
EDR Inquiry # 5489381.1

Client Name:

PBS Engineering & Env.
400 Bradley Boulevard , Suite 300
Richland, WA 99352
Contact: Angela Mcguire

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2017	1"=625'	Flight Year: 2017	USDA/NAIP
2013	1"=625'	Flight Year: 2013	USDA/NAIP
2009	1"=625'	Flight Year: 2009	USDA/NAIP
2006	1"=625'	Flight Year: 2006	USDA/NAIP
1996	1"=625'	Acquisition Date: July 08, 1996	USGS/DOQQ
1991	1"=625'	Flight Date: July 02, 1991	USGS
1982	1"=625'	Flight Date: August 01, 1982	USDA
1976	1"=625'	Flight Date: July 01, 1976	USGS
1963	1"=625'	Flight Date: September 09, 1963	USGS
1952	1"=625'	Flight Date: October 17, 1952	USGS
1948	1"=625'	Flight Date: June 02, 1948	USGS

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

INQUIRY #: 5489381.1

YEAR: 2017

= 625'

N

EDR


INQUIRY #: 5489381.1
YEAR: 2013
= 625'
N
EDR


INQUIRY #: 5489381.1
YEAR: 2009
= 625'
N
EDR


INQUIRY #: 5489381.1
YEAR: 2006
= 625'
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EDR

INQUIRY #: 5489381.1

YEAR: 1996

= 625'

N

EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.

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YEAR: 1991

= 625'

N

EDR

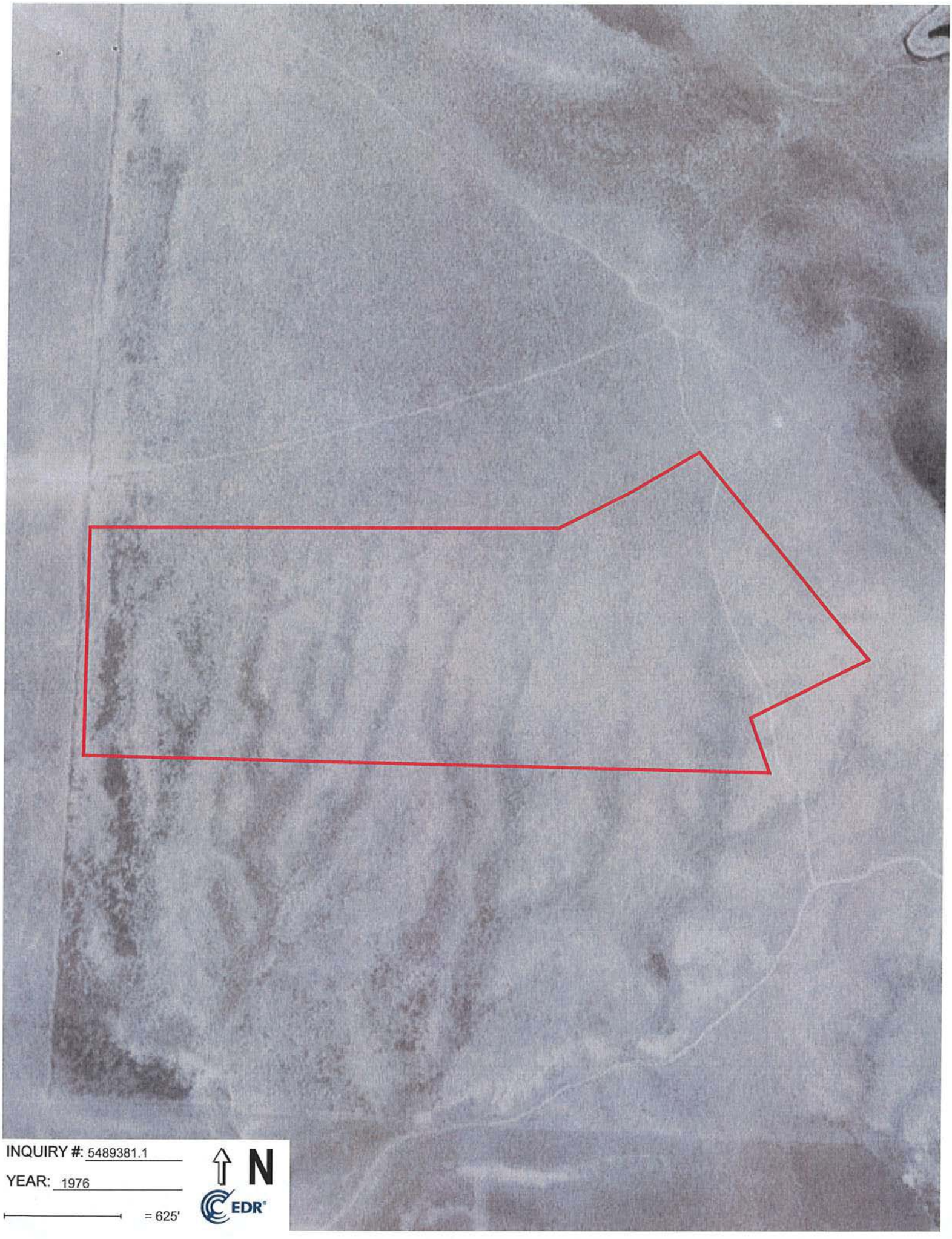
INQUIRY #: 5489381.1

YEAR: 1982

= 625'

N

EDR



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YEAR: 1976

= 625'

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EDR

INQUIRY #: 5489381.1

YEAR: 1963

= 625'

N

EDR


INQUIRY #: 5489381.1
YEAR: 1952
= 625'
N
EDR

INQUIRY #: 5489381.1

YEAR: 1948

= 625'

N

EDR

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

December 24, 2018

PBS Engineering & Env.- WA

Sample Delivery Group:	L1053387
Samples Received:	12/14/2018
Project Number:	66150
Description:	Richland Orchards

Report To:

Angela McGuire
400 Bradley Blvd
Suite 106
Richland, WA 99352

Entire Report Reviewed By: Brian Ford

Brian Ford
Project Manager

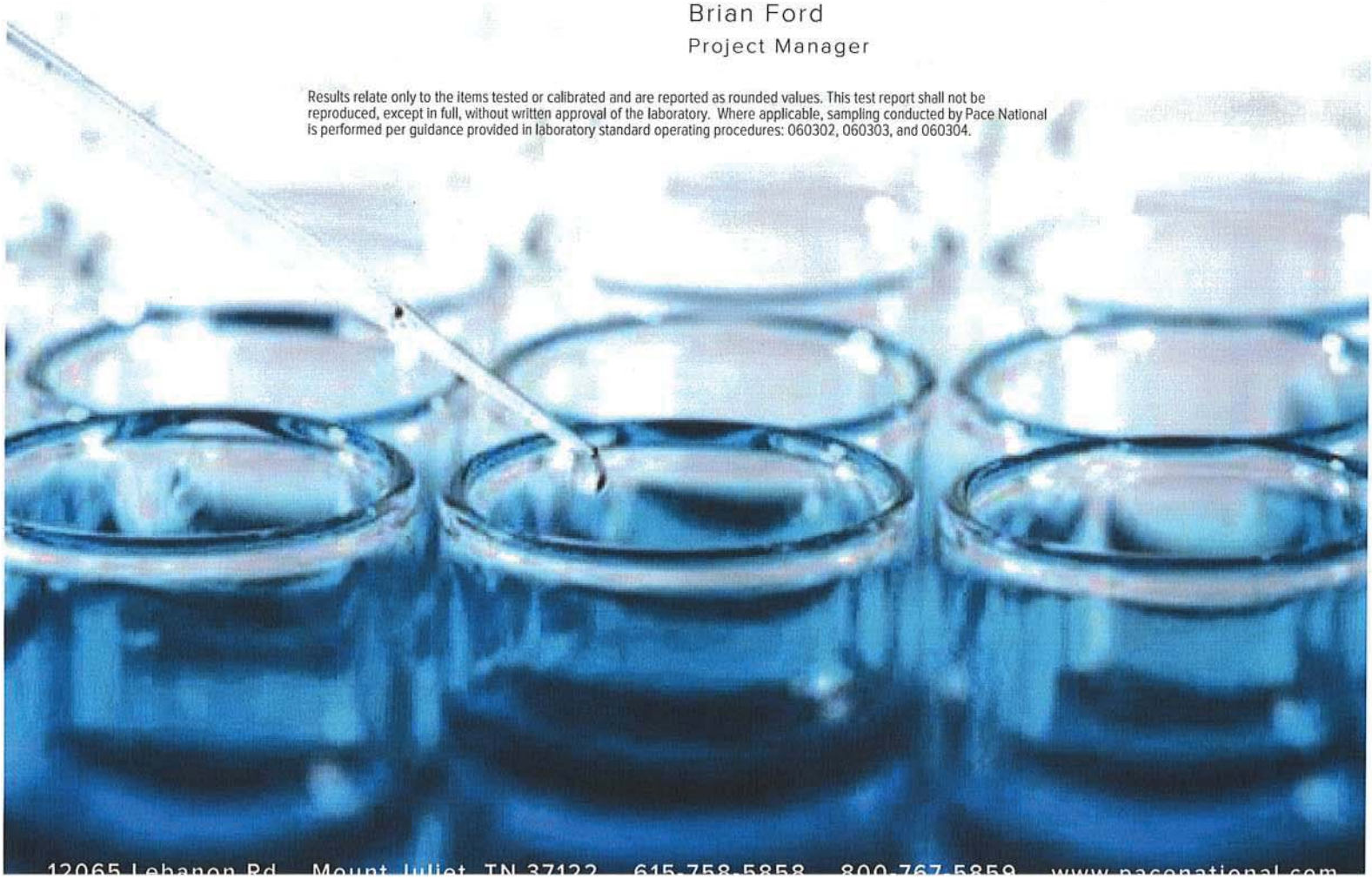

TABLE OF CONTENTS

SS-1-6 L1053387-01 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 10:11 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211423	1	12/17/18 13:55	12/17/18 14:04	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:09	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 18:38	VKS

SS-2-6 L1053387-02 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 10:44 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211423	1	12/17/18 13:55	12/17/18 14:04	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:12	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 18:53	VKS

SS-3-6 L1053387-03 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 11:10 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211423	1	12/17/18 13:55	12/17/18 14:04	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:19	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 19:08	VKS

SS-4-6 L1053387-04 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 11:25 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211423	1	12/17/18 13:55	12/17/18 14:04	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:22	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 19:23	VKS

SS-5-6 L1053387-05 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 11:37 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:24	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 19:37	VKS

SS-6-6 L1053387-06 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 11:48 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:27	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 19:52	VKS

SS-7-6 L1053387-07 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 12:43 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:29	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 20:07	VKS

SS-8-6 L1053387-08 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 12:51 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:32	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 20:51	VKS

SS-9-6 L1053387-09 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 13:03 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:34	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 21:06	VKS

SS-10-6 L1053387-10 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 13:17 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:37	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 21:21	VKS

SS-11-6 L1053387-11 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 13:27 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 16:57	ST
Pesticides (GC) by Method 8081B	WG1211736	1	12/17/18 09:05	12/17/18 21:35	VKS

SS-12-6 L1053387-12 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 13:38 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:39	ST
Pesticides (GC) by Method 8081B	WG1213431	1	12/20/18 06:58	12/21/18 00:15	TD

SS-13-6 L1053387-13 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 14:18 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:42	ST
Pesticides (GC) by Method 8081B	WG1212395	1	12/18/18 09:39	12/19/18 12:44	RP

SS-14-6 L1053387-14 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 14:28 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211424	1	12/17/18 13:44	12/17/18 13:52	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:50	ST
Pesticides (GC) by Method 8081B	WG1212395	1	12/18/18 09:39	12/19/18 12:56	RP

SS-15-6 L1053387-15 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 14:38 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211857	1	12/17/18 10:21	12/17/18 10:31	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:52	ST
Pesticides (GC) by Method 8081B	WG1212395	1	12/18/18 09:39	12/19/18 13:09	RP

SS-16-6 L1053387-16 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 14:50 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211857	1	12/17/18 10:21	12/17/18 10:31	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:55	ST
Pesticides (GC) by Method 8081B	WG1212395	1	12/18/18 09:39	12/19/18 13:21	RP

SS-17-6 L1053387-17 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 15:01 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211857	1	12/17/18 10:21	12/17/18 10:31	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 17:57	ST
Pesticides (GC) by Method 8081B	WG1212395	1	12/18/18 09:39	12/19/18 13:34	RP

SS-18-6 L1053387-18 Solid

Collected by: Angela McGuire | Collected date/time: 12/12/18 15:08 | Received date/time: 12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211857	1	12/17/18 10:21	12/17/18 10:31	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 18:00	ST
Pesticides (GC) by Method 8081B	WG1212395	1	12/18/18 09:39	12/19/18 14:11	RP

SS-19-6 L1053387-19 Solid

Collected by	Collected date/time	Received date/time
Angela McGuire	12/13/18 10:23	12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211857	1	12/17/18 10:21	12/17/18 10:31	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 18:02	ST
Pesticides (GC) by Method 8081B	WG1212395	1	12/18/18 09:39	12/19/18 14:24	RP

SS-20-6 L1053387-20 Solid

Collected by	Collected date/time	Received date/time
Angela McGuire	12/13/18 10:46	12/14/18 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1211907	1	12/17/18 12:43	12/17/18 12:55	JD
Metals (ICP) by Method 6010D	WG1211653	1	12/16/18 08:01	12/17/18 18:05	ST
Pesticides (GC) by Method 8081B	WG1212395	1	12/18/18 09:39	12/19/18 14:36	RP

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford

Brian Ford
Project Manager

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	73.7		1	12/17/2018 14:04	WG1211423

Metals (ICP) by Method 6010D

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Arsenic	ND		2.72	1	12/17/2018 17:09	WG1211653
Lead	7.77		0.679	1	12/17/2018 17:09	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Aldrin	ND		0.0272	1	12/17/2018 18:38	WG1211736
Alpha BHC	ND		0.0272	1	12/17/2018 18:38	WG1211736
Beta BHC	ND		0.0272	1	12/17/2018 18:38	WG1211736
Delta BHC	ND		0.0272	1	12/17/2018 18:38	WG1211736
Gamma BHC	ND		0.0272	1	12/17/2018 18:38	WG1211736
Chlordane	ND		0.272	1	12/17/2018 18:38	WG1211736
4,4-DDD	ND		0.0272	1	12/17/2018 18:38	WG1211736
4,4-DDE	ND		0.0272	1	12/17/2018 18:38	WG1211736
4,4-DDT	ND		0.0272	1	12/17/2018 18:38	WG1211736
Dieldrin	ND		0.0272	1	12/17/2018 18:38	WG1211736
Endosulfan I	ND		0.0272	1	12/17/2018 18:38	WG1211736
Endosulfan II	ND		0.0272	1	12/17/2018 18:38	WG1211736
Endosulfan sulfate	ND		0.0272	1	12/17/2018 18:38	WG1211736
Endrin	ND		0.0272	1	12/17/2018 18:38	WG1211736
Endrin aldehyde	ND		0.0272	1	12/17/2018 18:38	WG1211736
Endrin ketone	ND		0.0272	1	12/17/2018 18:38	WG1211736
Hexachlorobenzene	ND		0.0272	1	12/17/2018 18:38	WG1211736
Heptachlor	ND		0.0272	1	12/17/2018 18:38	WG1211736
Heptachlor epoxide	ND		0.0272	1	12/17/2018 18:38	WG1211736
Methoxychlor	ND		0.0272	1	12/17/2018 18:38	WG1211736
Toxaphene	ND		0.543	1	12/17/2018 18:38	WG1211736
(S) Decachlorobiphenyl	*107*		*10.0-135*		*12/17/2018 18:38*	WG1211736
(S) Tetrachloro-m-xylene	*103*		*10.0-139*		*12/17/2018 18:38*	WG1211736

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	84.4		1	12/17/2018 14:04	WG1211423

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	2.98		2.37	1	12/17/2018 17:12	WG1211653
Lead	8.92		0.593	1	12/17/2018 17:12	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0237	1	12/17/2018 18:53	WG1211736
Alpha BHC	ND		0.0237	1	12/17/2018 18:53	WG1211736
Beta BHC	ND		0.0237	1	12/17/2018 18:53	WG1211736
Delta BHC	ND		0.0237	1	12/17/2018 18:53	WG1211736
Gamma BHC	ND		0.0237	1	12/17/2018 18:53	WG1211736
Chlordane	ND		0.237	1	12/17/2018 18:53	WG1211736
4,4-DDD	ND		0.0237	1	12/17/2018 18:53	WG1211736
4,4-DDE	ND		0.0237	1	12/17/2018 18:53	WG1211736
4,4-DDT	ND		0.0237	1	12/17/2018 18:53	WG1211736
Dieldrin	ND		0.0237	1	12/17/2018 18:53	WG1211736
Endosulfan I	ND		0.0237	1	12/17/2018 18:53	WG1211736
Endosulfan II	ND		0.0237	1	12/17/2018 18:53	WG1211736
Endosulfan sulfate	ND		0.0237	1	12/17/2018 18:53	WG1211736
Endrin	ND		0.0237	1	12/17/2018 18:53	WG1211736
Endrin aldehyde	ND		0.0237	1	12/17/2018 18:53	WG1211736
Endrin ketone	ND		0.0237	1	12/17/2018 18:53	WG1211736
Hexachlorobenzene	ND		0.0237	1	12/17/2018 18:53	WG1211736
Heptachlor	ND		0.0237	1	12/17/2018 18:53	WG1211736
Heptachlor epoxide	ND		0.0237	1	12/17/2018 18:53	WG1211736
Methoxychlor	ND		0.0237	1	12/17/2018 18:53	WG1211736
Toxaphene	ND		0.474	1	12/17/2018 18:53	WG1211736
(S) Decachlorobiphenyl	*79.5*		*10.0-135*		*12/17/2018 18:53*	WG1211736
(S) Tetrachloro-m-xylene	*77.4*		*10.0-139*		*12/17/2018 18:53*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	82.9		1	12/17/2018 14:04	WG1211423

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	ND		2.41	1	12/17/2018 17:19	WG1211653
Lead	7.85		0.603	1	12/17/2018 17:19	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aldrin	ND		0.0241	1	12/17/2018 19:08	WG1211736
Alpha BHC	ND		0.0241	1	12/17/2018 19:08	WG1211736
Beta BHC	ND		0.0241	1	12/17/2018 19:08	WG1211736
Delta BHC	ND		0.0241	1	12/17/2018 19:08	WG1211736
Gamma BHC	ND		0.0241	1	12/17/2018 19:08	WG1211736
Chlordane	ND		0.241	1	12/17/2018 19:08	WG1211736
4,4-DDD	ND		0.0241	1	12/17/2018 19:08	WG1211736
4,4-DDE	ND		0.0241	1	12/17/2018 19:08	WG1211736
4,4-DDT	ND		0.0241	1	12/17/2018 19:08	WG1211736
Dieldrin	ND		0.0241	1	12/17/2018 19:08	WG1211736
Endosulfan I	ND		0.0241	1	12/17/2018 19:08	WG1211736
Endosulfan II	ND		0.0241	1	12/17/2018 19:08	WG1211736
Endosulfan sulfate	ND		0.0241	1	12/17/2018 19:08	WG1211736
Endrin	ND		0.0241	1	12/17/2018 19:08	WG1211736
Endrin aldehyde	ND		0.0241	1	12/17/2018 19:08	WG1211736
Endrin ketone	ND		0.0241	1	12/17/2018 19:08	WG1211736
Hexachlorobenzene	ND		0.0241	1	12/17/2018 19:08	WG1211736
Heptachlor	ND		0.0241	1	12/17/2018 19:08	WG1211736
Heptachlor epoxide	ND		0.0241	1	12/17/2018 19:08	WG1211736
Methoxychlor	ND		0.0241	1	12/17/2018 19:08	WG1211736
Toxaphene	ND		0.483	1	12/17/2018 19:08	WG1211736
(S) Decachlorobiphenyl	*85.7*		*10.0-135*		*12/17/2018 19:08*	WG1211736
(S) Tetrachloro-m-xylene	*80.7*		*10.0-139*		*12/17/2018 19:08*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	82.5		1	12/17/2018 14:04	WG1211423

Metals (ICP) by Method 6010D

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Arsenic	ND		2.42	1	12/17/2018 17:22	WG1211653
Lead	9.29		0.606	1	12/17/2018 17:22	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Aldrin	ND		0.0242	1	12/17/2018 19:23	WG1211736
Alpha BHC	ND		0.0242	1	12/17/2018 19:23	WG1211736
Beta BHC	ND		0.0242	1	12/17/2018 19:23	WG1211736
Delta BHC	ND		0.0242	1	12/17/2018 19:23	WG1211736
Gamma BHC	ND		0.0242	1	12/17/2018 19:23	WG1211736
Chlordane	ND		0.242	1	12/17/2018 19:23	WG1211736
4,4-DDD	ND		0.0242	1	12/17/2018 19:23	WG1211736
4,4-DDE	ND		0.0242	1	12/17/2018 19:23	WG1211736
4,4-DDT	ND		0.0242	1	12/17/2018 19:23	WG1211736
Dieldrin	ND		0.0242	1	12/17/2018 19:23	WG1211736
Endosulfan I	ND		0.0242	1	12/17/2018 19:23	WG1211736
Endosulfan II	ND		0.0242	1	12/17/2018 19:23	WG1211736
Endosulfan sulfate	ND		0.0242	1	12/17/2018 19:23	WG1211736
Endrin	ND		0.0242	1	12/17/2018 19:23	WG1211736
Endrin aldehyde	ND		0.0242	1	12/17/2018 19:23	WG1211736
Endrin ketone	ND		0.0242	1	12/17/2018 19:23	WG1211736
Hexachlorobenzene	ND		0.0242	1	12/17/2018 19:23	WG1211736
Heptachlor	ND		0.0242	1	12/17/2018 19:23	WG1211736
Heptachlor epoxide	ND		0.0242	1	12/17/2018 19:23	WG1211736
Methoxychlor	ND		0.0242	1	12/17/2018 19:23	WG1211736
Toxaphene	ND		0.485	1	12/17/2018 19:23	WG1211736
(S) Decachlorobiphenyl	*91.4*		*10.0-135*		*12/17/2018 19:23*	WG1211736
(S) Tetrachloro-m-xylene	*91.9*		*10.0-139*		*12/17/2018 19:23*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	77.9		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Arsenic	ND		2.57	1	12/17/2018 17:24	WG1211653
Lead	9.16		0.642	1	12/17/2018 17:24	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Aldrin	ND		0.0257	1	12/17/2018 19:37	WG1211736
Alpha BHC	ND		0.0257	1	12/17/2018 19:37	WG1211736
Beta BHC	ND		0.0257	1	12/17/2018 19:37	WG1211736
Delta BHC	ND		0.0257	1	12/17/2018 19:37	WG1211736
Gamma BHC	ND		0.0257	1	12/17/2018 19:37	WG1211736
Chlordane	ND		0.257	1	12/17/2018 19:37	WG1211736
4,4-DDD	ND		0.0257	1	12/17/2018 19:37	WG1211736
4,4-DDE	ND		0.0257	1	12/17/2018 19:37	WG1211736
4,4-DDT	ND		0.0257	1	12/17/2018 19:37	WG1211736
Dieldrin	ND		0.0257	1	12/17/2018 19:37	WG1211736
Endosulfan I	ND		0.0257	1	12/17/2018 19:37	WG1211736
Endosulfan II	ND		0.0257	1	12/17/2018 19:37	WG1211736
Endosulfan sulfate	ND		0.0257	1	12/17/2018 19:37	WG1211736
Endrin	ND		0.0257	1	12/17/2018 19:37	WG1211736
Endrin aldehyde	ND		0.0257	1	12/17/2018 19:37	WG1211736
Endrin ketone	ND		0.0257	1	12/17/2018 19:37	WG1211736
Hexachlorobenzene	ND		0.0257	1	12/17/2018 19:37	WG1211736
Heptachlor	ND		0.0257	1	12/17/2018 19:37	WG1211736
Heptachlor epoxide	ND		0.0257	1	12/17/2018 19:37	WG1211736
Methoxychlor	ND		0.0257	1	12/17/2018 19:37	WG1211736
Toxaphene	ND		0.514	1	12/17/2018 19:37	WG1211736
(S) Decachlorobiphenyl	*98.5*		*10.0-135*		*12/17/2018 19:37*	WG1211736
(S) Tetrachloro-m-xylene	*92.7*		*10.0-139*		*12/17/2018 19:37*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	79.7		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	2.75		2.51	1	12/17/2018 17:27	WG1211653
Lead	11.2		0.627	1	12/17/2018 17:27	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aldrin	ND		0.0251	1	12/17/2018 19:52	WG1211736
Alpha BHC	ND		0.0251	1	12/17/2018 19:52	WG1211736
Beta BHC	ND		0.0251	1	12/17/2018 19:52	WG1211736
Delta BHC	ND		0.0251	1	12/17/2018 19:52	WG1211736
Gamma BHC	ND		0.0251	1	12/17/2018 19:52	WG1211736
Chlordane	ND		0.251	1	12/17/2018 19:52	WG1211736
4,4-DDD	ND		0.0251	1	12/17/2018 19:52	WG1211736
4,4-DDE	ND		0.0251	1	12/17/2018 19:52	WG1211736
4,4-DDT	ND		0.0251	1	12/17/2018 19:52	WG1211736
Dieldrin	ND		0.0251	1	12/17/2018 19:52	WG1211736
Endosulfan I	ND		0.0251	1	12/17/2018 19:52	WG1211736
Endosulfan II	ND		0.0251	1	12/17/2018 19:52	WG1211736
Endosulfan sulfate	ND		0.0251	1	12/17/2018 19:52	WG1211736
Endrin	ND		0.0251	1	12/17/2018 19:52	WG1211736
Endrin aldehyde	ND		0.0251	1	12/17/2018 19:52	WG1211736
Endrin ketone	ND		0.0251	1	12/17/2018 19:52	WG1211736
Hexachlorobenzene	ND		0.0251	1	12/17/2018 19:52	WG1211736
Heptachlor	ND		0.0251	1	12/17/2018 19:52	WG1211736
Heptachlor epoxide	ND		0.0251	1	12/17/2018 19:52	WG1211736
Methoxychlor	ND		0.0251	1	12/17/2018 19:52	WG1211736
Toxaphene	ND		0.502	1	12/17/2018 19:52	WG1211736
(S) Decachlorobiphenyl	*93.9*		*10.0-135*		*12/17/2018 19:52*	WG1211736
(S) Tetrachloro-m-xylene	*89.9*		*10.0-139*		*12/17/2018 19:52*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	85.0		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	3.40		2.35	1	12/17/2018 17:29	WG1211653
Lead	9.52		0.588	1	12/17/2018 17:29	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0235	1	12/17/2018 20:07	WG1211736
Alpha BHC	ND		0.0235	1	12/17/2018 20:07	WG1211736
Beta BHC	ND		0.0235	1	12/17/2018 20:07	WG1211736
Delta BHC	ND		0.0235	1	12/17/2018 20:07	WG1211736
Gamma BHC	ND		0.0235	1	12/17/2018 20:07	WG1211736
Chlordane	ND		0.235	1	12/17/2018 20:07	WG1211736
4,4-DDD	ND		0.0235	1	12/17/2018 20:07	WG1211736
4,4-DDE	ND		0.0235	1	12/17/2018 20:07	WG1211736
4,4-DDT	ND		0.0235	1	12/17/2018 20:07	WG1211736
Dieldrin	ND		0.0235	1	12/17/2018 20:07	WG1211736
Endosulfan I	ND		0.0235	1	12/17/2018 20:07	WG1211736
Endosulfan II	ND		0.0235	1	12/17/2018 20:07	WG1211736
Endosulfan sulfate	ND		0.0235	1	12/17/2018 20:07	WG1211736
Endrin	ND		0.0235	1	12/17/2018 20:07	WG1211736
Endrin aldehyde	ND		0.0235	1	12/17/2018 20:07	WG1211736
Endrin ketone	ND		0.0235	1	12/17/2018 20:07	WG1211736
Hexachlorobenzene	ND		0.0235	1	12/17/2018 20:07	WG1211736
Heptachlor	ND		0.0235	1	12/17/2018 20:07	WG1211736
Heptachlor epoxide	ND		0.0235	1	12/17/2018 20:07	WG1211736
Methoxychlor	ND		0.0235	1	12/17/2018 20:07	WG1211736
Toxaphene	ND		0.470	1	12/17/2018 20:07	WG1211736
(S) Decachlorobiphenyl	*81.7*		*10.0-135*		*12/17/2018 20:07*	WG1211736
(S) Tetrachloro-m-xylene	*78.7*		*10.0-139*		*12/17/2018 20:07*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	77.7		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	ND		2.57	1	12/17/2018 17:32	WG1211653
Lead	9.86		0.644	1	12/17/2018 17:32	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0257	1	12/17/2018 20:51	WG1211736
Alpha BHC	ND		0.0257	1	12/17/2018 20:51	WG1211736
Beta BHC	ND		0.0257	1	12/17/2018 20:51	WG1211736
Delta BHC	ND		0.0257	1	12/17/2018 20:51	WG1211736
Gamma BHC	ND		0.0257	1	12/17/2018 20:51	WG1211736
Chlordane	ND		0.257	1	12/17/2018 20:51	WG1211736
4,4-DDD	ND		0.0257	1	12/17/2018 20:51	WG1211736
4,4-DDE	ND		0.0257	1	12/17/2018 20:51	WG1211736
4,4-DDT	ND		0.0257	1	12/17/2018 20:51	WG1211736
Dieldrin	ND		0.0257	1	12/17/2018 20:51	WG1211736
Endosulfan I	ND		0.0257	1	12/17/2018 20:51	WG1211736
Endosulfan II	ND		0.0257	1	12/17/2018 20:51	WG1211736
Endosulfan sulfate	ND		0.0257	1	12/17/2018 20:51	WG1211736
Endrin	ND		0.0257	1	12/17/2018 20:51	WG1211736
Endrin aldehyde	ND		0.0257	1	12/17/2018 20:51	WG1211736
Endrin ketone	ND		0.0257	1	12/17/2018 20:51	WG1211736
Hexachlorobenzene	ND		0.0257	1	12/17/2018 20:51	WG1211736
Heptachlor	ND		0.0257	1	12/17/2018 20:51	WG1211736
Heptachlor epoxide	ND		0.0257	1	12/17/2018 20:51	WG1211736
Methoxychlor	ND		0.0257	1	12/17/2018 20:51	WG1211736
Toxaphene	ND		0.515	1	12/17/2018 20:51	WG1211736
(S) Decachlorobiphenyl	*121*		*10.0-135*		*12/17/2018 20:51*	WG1211736
(S) Tetrachloro-m-xylene	*109*		*10.0-139*		*12/17/2018 20:51*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	78.8		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	ND		2.54	1	12/17/2018 17:34	WG1211653
Lead	9.04		0.634	1	12/17/2018 17:34	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aldrin	ND		0.0254	1	12/17/2018 21:06	WG1211736
Alpha BHC	ND		0.0254	1	12/17/2018 21:06	WG1211736
Beta BHC	ND		0.0254	1	12/17/2018 21:06	WG1211736
Delta BHC	ND		0.0254	1	12/17/2018 21:06	WG1211736
Gamma BHC	ND		0.0254	1	12/17/2018 21:06	WG1211736
Chlordane	ND		0.254	1	12/17/2018 21:06	WG1211736
4,4-DDD	ND		0.0254	1	12/17/2018 21:06	WG1211736
4,4-DDE	ND		0.0254	1	12/17/2018 21:06	WG1211736
4,4-DDT	ND		0.0254	1	12/17/2018 21:06	WG1211736
Dieldrin	ND		0.0254	1	12/17/2018 21:06	WG1211736
Endosulfan I	ND		0.0254	1	12/17/2018 21:06	WG1211736
Endosulfan II	ND		0.0254	1	12/17/2018 21:06	WG1211736
Endosulfan sulfate	ND		0.0254	1	12/17/2018 21:06	WG1211736
Endrin	ND		0.0254	1	12/17/2018 21:06	WG1211736
Endrin aldehyde	ND		0.0254	1	12/17/2018 21:06	WG1211736
Endrin ketone	ND		0.0254	1	12/17/2018 21:06	WG1211736
Hexachlorobenzene	ND		0.0254	1	12/17/2018 21:06	WG1211736
Heptachlor	ND		0.0254	1	12/17/2018 21:06	WG1211736
Heptachlor epoxide	ND		0.0254	1	12/17/2018 21:06	WG1211736
Methoxychlor	ND		0.0254	1	12/17/2018 21:06	WG1211736
Toxaphene	ND		0.508	1	12/17/2018 21:06	WG1211736
(S) Decachlorobiphenyl	*89.8*		*10.0-135*		*12/17/2018 21:06*	WG1211736
(S) Tetrachloro-m-xylene	*81.1*		*10.0-139*		*12/17/2018 21:06*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	83.3		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	ND		2.40	1	12/17/2018 17:37	WG1211653
Lead	9.21		0.600	1	12/17/2018 17:37	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aldrin	ND		0.0240	1	12/17/2018 21:21	WG1211736
Alpha BHC	ND		0.0240	1	12/17/2018 21:21	WG1211736
Beta BHC	ND		0.0240	1	12/17/2018 21:21	WG1211736
Delta BHC	ND		0.0240	1	12/17/2018 21:21	WG1211736
Gamma BHC	ND		0.0240	1	12/17/2018 21:21	WG1211736
Chlordane	ND		0.240	1	12/17/2018 21:21	WG1211736
4,4-DDD	ND		0.0240	1	12/17/2018 21:21	WG1211736
4,4-DDE	ND		0.0240	1	12/17/2018 21:21	WG1211736
4,4-DDT	ND		0.0240	1	12/17/2018 21:21	WG1211736
Dieldrin	ND		0.0240	1	12/17/2018 21:21	WG1211736
Endosulfan I	ND		0.0240	1	12/17/2018 21:21	WG1211736
Endosulfan II	ND		0.0240	1	12/17/2018 21:21	WG1211736
Endosulfan sulfate	ND		0.0240	1	12/17/2018 21:21	WG1211736
Endrin	ND		0.0240	1	12/17/2018 21:21	WG1211736
Endrin aldehyde	ND		0.0240	1	12/17/2018 21:21	WG1211736
Endrin ketone	ND		0.0240	1	12/17/2018 21:21	WG1211736
Hexachlorobenzene	ND		0.0240	1	12/17/2018 21:21	WG1211736
Heptachlor	ND		0.0240	1	12/17/2018 21:21	WG1211736
Heptachlor epoxide	ND		0.0240	1	12/17/2018 21:21	WG1211736
Methoxychlor	ND		0.0240	1	12/17/2018 21:21	WG1211736
Toxaphene	ND		0.480	1	12/17/2018 21:21	WG1211736
(S) Decachlorobiphenyl	*118*		*10.0-135*		*12/17/2018 21:21*	WG1211736
(S) Tetrachloro-m-xylene	*103*		*10.0-139*		*12/17/2018 21:21*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	81.7		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	ND		2.45	1	12/17/2018 16:57	WG1211653
Lead	9.24		0.612	1	12/17/2018 16:57	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0245	1	12/17/2018 21:35	WG1211736
Alpha BHC	ND		0.0245	1	12/17/2018 21:35	WG1211736
Beta BHC	ND		0.0245	1	12/17/2018 21:35	WG1211736
Delta BHC	ND		0.0245	1	12/17/2018 21:35	WG1211736
Gamma BHC	ND		0.0245	1	12/17/2018 21:35	WG1211736
Chlordane	ND		0.245	1	12/17/2018 21:35	WG1211736
4,4-DDD	ND		0.0245	1	12/17/2018 21:35	WG1211736
4,4-DDE	ND		0.0245	1	12/17/2018 21:35	WG1211736
4,4-DDT	ND		0.0245	1	12/17/2018 21:35	WG1211736
Dieldrin	ND		0.0245	1	12/17/2018 21:35	WG1211736
Endosulfan I	ND		0.0245	1	12/17/2018 21:35	WG1211736
Endosulfan II	ND		0.0245	1	12/17/2018 21:35	WG1211736
Endosulfan sulfate	ND		0.0245	1	12/17/2018 21:35	WG1211736
Endrin	ND		0.0245	1	12/17/2018 21:35	WG1211736
Endrin aldehyde	ND		0.0245	1	12/17/2018 21:35	WG1211736
Endrin ketone	ND		0.0245	1	12/17/2018 21:35	WG1211736
Hexachlorobenzene	ND		0.0245	1	12/17/2018 21:35	WG1211736
Heptachlor	ND		0.0245	1	12/17/2018 21:35	WG1211736
Heptachlor epoxide	ND		0.0245	1	12/17/2018 21:35	WG1211736
Methoxychlor	ND		0.0245	1	12/17/2018 21:35	WG1211736
Toxaphene	ND		0.490	1	12/17/2018 21:35	WG1211736
(S) Decachlorobiphenyl	*118*		*10.0-135*		*12/17/2018 21:35*	WG1211736
(S) Tetrachloro-m-xylene	*106*		*10.0-139*		*12/17/2018 21:35*	WG1211736

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	80.4		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	2.85		2.49	1	12/17/2018 17:39	WG1211653
Lead	9.13		0.622	1	12/17/2018 17:39	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0249	1	12/21/2018 00:15	WG1213431
Alpha BHC	ND		0.0249	1	12/21/2018 00:15	WG1213431
Beta BHC	ND		0.0249	1	12/21/2018 00:15	WG1213431
Delta BHC	ND		0.0249	1	12/21/2018 00:15	WG1213431
Gamma BHC	ND		0.0249	1	12/21/2018 00:15	WG1213431
Chlordane	ND		0.249	1	12/21/2018 00:15	WG1213431
4,4-DDD	ND		0.0249	1	12/21/2018 00:15	WG1213431
4,4-DDE	ND		0.0249	1	12/21/2018 00:15	WG1213431
4,4-DDT	ND		0.0249	1	12/21/2018 00:15	WG1213431
Dieldrin	ND		0.0249	1	12/21/2018 00:15	WG1213431
Endosulfan I	ND		0.0249	1	12/21/2018 00:15	WG1213431
Endosulfan II	ND		0.0249	1	12/21/2018 00:15	WG1213431
Endosulfan sulfate	ND		0.0249	1	12/21/2018 00:15	WG1213431
Endrin	ND		0.0249	1	12/21/2018 00:15	WG1213431
Endrin aldehyde	ND		0.0249	1	12/21/2018 00:15	WG1213431
Endrin ketone	ND		0.0249	1	12/21/2018 00:15	WG1213431
Hexachlorobenzene	ND		0.0249	1	12/21/2018 00:15	WG1213431
Heptachlor	ND		0.0249	1	12/21/2018 00:15	WG1213431
Heptachlor epoxide	ND		0.0249	1	12/21/2018 00:15	WG1213431
Methoxychlor	ND		0.0249	1	12/21/2018 00:15	WG1213431
Toxaphene	ND		0.498	1	12/21/2018 00:15	WG1213431
(S) Decachlorobiphenyl	*69.8*		*10.0-135*		*12/21/2018 00:15*	WG1213431
(S) Tetrachloro-m-xylene	*74.0*		*10.0-139*		*12/21/2018 00:15*	WG1213431

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	75.7		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	ND		2.64	1	12/17/2018 17:42	WG1211653
Lead	10.8		0.661	1	12/17/2018 17:42	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0264	1	12/19/2018 12:44	WG1212395
Alpha BHC	ND		0.0264	1	12/19/2018 12:44	WG1212395
Beta BHC	ND		0.0264	1	12/19/2018 12:44	WG1212395
Delta BHC	ND		0.0264	1	12/19/2018 12:44	WG1212395
Gamma BHC	ND		0.0264	1	12/19/2018 12:44	WG1212395
Chlordane	ND		0.264	1	12/19/2018 12:44	WG1212395
4,4-DDD	ND		0.0264	1	12/19/2018 12:44	WG1212395
4,4-DDE	ND		0.0264	1	12/19/2018 12:44	WG1212395
4,4-DDT	ND		0.0264	1	12/19/2018 12:44	WG1212395
Dieldrin	ND		0.0264	1	12/19/2018 12:44	WG1212395
Endosulfan I	ND		0.0264	1	12/19/2018 12:44	WG1212395
Endosulfan II	ND		0.0264	1	12/19/2018 12:44	WG1212395
Endosulfan sulfate	ND		0.0264	1	12/19/2018 12:44	WG1212395
Endrin	ND		0.0264	1	12/19/2018 12:44	WG1212395
Endrin aldehyde	ND		0.0264	1	12/19/2018 12:44	WG1212395
Endrin ketone	ND		0.0264	1	12/19/2018 12:44	WG1212395
Hexachlorobenzene	ND		0.0264	1	12/19/2018 12:44	WG1212395
Heptachlor	ND		0.0264	1	12/19/2018 12:44	WG1212395
Heptachlor epoxide	ND		0.0264	1	12/19/2018 12:44	WG1212395
Methoxychlor	ND		0.0264	1	12/19/2018 12:44	WG1212395
Toxaphene	ND		0.529	1	12/19/2018 12:44	WG1212395
(S) Decachlorobiphenyl	*60.8*		*10.0-135*		*12/19/2018 12:44*	WG1212395
(S) Tetrachloro-m-xylene	*68.6*		*10.0-139*		*12/19/2018 12:44*	WG1212395

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	82.8		1	12/17/2018 13:52	WG1211424

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	ND		2.41	1	12/17/2018 17:50	WG1211653
Lead	9.91		0.604	1	12/17/2018 17:50	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0241	1	12/19/2018 12:56	WG1212395
Alpha BHC	ND		0.0241	1	12/19/2018 12:56	WG1212395
Beta BHC	ND		0.0241	1	12/19/2018 12:56	WG1212395
Delta BHC	ND		0.0241	1	12/19/2018 12:56	WG1212395
Gamma BHC	ND		0.0241	1	12/19/2018 12:56	WG1212395
Chlordane	ND		0.241	1	12/19/2018 12:56	WG1212395
4,4-DDD	ND		0.0241	1	12/19/2018 12:56	WG1212395
4,4-DDE	ND		0.0241	1	12/19/2018 12:56	WG1212395
4,4-DDT	ND		0.0241	1	12/19/2018 12:56	WG1212395
Dieldrin	ND		0.0241	1	12/19/2018 12:56	WG1212395
Endosulfan I	ND		0.0241	1	12/19/2018 12:56	WG1212395
Endosulfan II	ND		0.0241	1	12/19/2018 12:56	WG1212395
Endosulfan sulfate	ND		0.0241	1	12/19/2018 12:56	WG1212395
Endrin	ND		0.0241	1	12/19/2018 12:56	WG1212395
Endrin aldehyde	ND		0.0241	1	12/19/2018 12:56	WG1212395
Endrin ketone	ND		0.0241	1	12/19/2018 12:56	WG1212395
Hexachlorobenzene	ND		0.0241	1	12/19/2018 12:56	WG1212395
Heptachlor	ND		0.0241	1	12/19/2018 12:56	WG1212395
Heptachlor epoxide	ND		0.0241	1	12/19/2018 12:56	WG1212395
Methoxychlor	ND		0.0241	1	12/19/2018 12:56	WG1212395
Toxaphene	ND		0.483	1	12/19/2018 12:56	WG1212395
(S) Decachlorobiphenyl	*58.6*		*10.0-135*		*12/19/2018 12:56*	WG1212395
(S) Tetrachloro-m-xylene	*72.4*		*10.0-139*		*12/19/2018 12:56*	WG1212395

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	81.9		1	12/17/2018 10:31	WG1211857

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	ND		2.44	1	12/17/2018 17:52	WG1211653
Lead	9.72		0.610	1	12/17/2018 17:52	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0244	1	12/19/2018 13:09	WG1212395
Alpha BHC	ND		0.0244	1	12/19/2018 13:09	WG1212395
Beta BHC	ND		0.0244	1	12/19/2018 13:09	WG1212395
Delta BHC	ND		0.0244	1	12/19/2018 13:09	WG1212395
Gamma BHC	ND		0.0244	1	12/19/2018 13:09	WG1212395
Chlordane	ND		0.244	1	12/19/2018 13:09	WG1212395
4,4-DDD	ND		0.0244	1	12/19/2018 13:09	WG1212395
4,4-DDE	ND		0.0244	1	12/19/2018 13:09	WG1212395
4,4-DDT	ND		0.0244	1	12/19/2018 13:09	WG1212395
Dieldrin	ND		0.0244	1	12/19/2018 13:09	WG1212395
Endosulfan I	ND		0.0244	1	12/19/2018 13:09	WG1212395
Endosulfan II	ND		0.0244	1	12/19/2018 13:09	WG1212395
Endosulfan sulfate	ND		0.0244	1	12/19/2018 13:09	WG1212395
Endrin	ND		0.0244	1	12/19/2018 13:09	WG1212395
Endrin aldehyde	ND		0.0244	1	12/19/2018 13:09	WG1212395
Endrin ketone	ND		0.0244	1	12/19/2018 13:09	WG1212395
Hexachlorobenzene	ND		0.0244	1	12/19/2018 13:09	WG1212395
Heptachlor	ND		0.0244	1	12/19/2018 13:09	WG1212395
Heptachlor epoxide	ND		0.0244	1	12/19/2018 13:09	WG1212395
Methoxychlor	ND		0.0244	1	12/19/2018 13:09	WG1212395
Toxaphene	ND		0.488	1	12/19/2018 13:09	WG1212395
(S) Decachlorobiphenyl	*66.4*		*10.0-135*		*12/19/2018 13:09*	WG1212395
(S) Tetrachloro-m-xylene	*75.0*		*10.0-139*		*12/19/2018 13:09*	WG1212395

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	84.3		1	12/17/2018 10:31	WG1211857

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	ND		2.37	1	12/17/2018 17:55	WG1211653
Lead	9.41		0.593	1	12/17/2018 17:55	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aldrin	ND		0.0237	1	12/19/2018 13:21	WG1212395
Alpha BHC	ND		0.0237	1	12/19/2018 13:21	WG1212395
Beta BHC	ND		0.0237	1	12/19/2018 13:21	WG1212395
Delta BHC	ND		0.0237	1	12/19/2018 13:21	WG1212395
Gamma BHC	ND		0.0237	1	12/19/2018 13:21	WG1212395
Chlordane	ND		0.237	1	12/19/2018 13:21	WG1212395
4,4-DDD	ND		0.0237	1	12/19/2018 13:21	WG1212395
4,4-DDE	ND		0.0237	1	12/19/2018 13:21	WG1212395
4,4-DDT	ND		0.0237	1	12/19/2018 13:21	WG1212395
Dieldrin	ND		0.0237	1	12/19/2018 13:21	WG1212395
Endosulfan I	ND		0.0237	1	12/19/2018 13:21	WG1212395
Endosulfan II	ND		0.0237	1	12/19/2018 13:21	WG1212395
Endosulfan sulfate	ND		0.0237	1	12/19/2018 13:21	WG1212395
Endrin	ND		0.0237	1	12/19/2018 13:21	WG1212395
Endrin aldehyde	ND		0.0237	1	12/19/2018 13:21	WG1212395
Endrin ketone	ND		0.0237	1	12/19/2018 13:21	WG1212395
Hexachlorobenzene	ND		0.0237	1	12/19/2018 13:21	WG1212395
Heptachlor	ND		0.0237	1	12/19/2018 13:21	WG1212395
Heptachlor epoxide	ND		0.0237	1	12/19/2018 13:21	WG1212395
Methoxychlor	ND		0.0237	1	12/19/2018 13:21	WG1212395
Toxaphene	ND		0.475	1	12/19/2018 13:21	WG1212395
(S) Decachlorobiphenyl	*61.3*		*10.0-135*		*12/19/2018 13:21*	WG1212395
(S) Tetrachloro-m-xylene	*70.1*		*10.0-139*		*12/19/2018 13:21*	WG1212395

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	85.2		1	12/17/2018 10:31	WG1211857

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	ND		2.35	1	12/17/2018 17:57	WG1211653
Lead	9.45		0.587	1	12/17/2018 17:57	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0235	1	12/19/2018 13:34	WG1212395
Alpha BHC	ND		0.0235	1	12/19/2018 13:34	WG1212395
Beta BHC	ND		0.0235	1	12/19/2018 13:34	WG1212395
Delta BHC	ND		0.0235	1	12/19/2018 13:34	WG1212395
Gamma BHC	ND		0.0235	1	12/19/2018 13:34	WG1212395
Chlordane	ND		0.235	1	12/19/2018 13:34	WG1212395
4,4-DDD	ND		0.0235	1	12/19/2018 13:34	WG1212395
4,4-DDE	ND		0.0235	1	12/19/2018 13:34	WG1212395
4,4-DDT	ND		0.0235	1	12/19/2018 13:34	WG1212395
Dieldrin	ND		0.0235	1	12/19/2018 13:34	WG1212395
Endosulfan I	ND		0.0235	1	12/19/2018 13:34	WG1212395
Endosulfan II	ND		0.0235	1	12/19/2018 13:34	WG1212395
Endosulfan sulfate	ND		0.0235	1	12/19/2018 13:34	WG1212395
Endrin	ND		0.0235	1	12/19/2018 13:34	WG1212395
Endrin aldehyde	ND		0.0235	1	12/19/2018 13:34	WG1212395
Endrin ketone	ND		0.0235	1	12/19/2018 13:34	WG1212395
Hexachlorobenzene	ND		0.0235	1	12/19/2018 13:34	WG1212395
Heptachlor	ND		0.0235	1	12/19/2018 13:34	WG1212395
Heptachlor epoxide	ND		0.0235	1	12/19/2018 13:34	WG1212395
Methoxychlor	ND		0.0235	1	12/19/2018 13:34	WG1212395
Toxaphene	ND		0.469	1	12/19/2018 13:34	WG1212395
(S) Decachlorobiphenyl	*61.5*		*10.0-135*		*12/19/2018 13:34*	WG1212395
(S) Tetrachloro-m-xylene	*71.1*		*10.0-139*		*12/19/2018 13:34*	WG1212395

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	81.4		1	12/17/2018 10:31	WG1211857

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Arsenic	ND		2.46	1	12/17/2018 18:00	WG1211653
Lead	9.49		0.614	1	12/17/2018 18:00	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aldrin	ND		0.0246	1	12/19/2018 14:11	WG1212395
Alpha BHC	ND		0.0246	1	12/19/2018 14:11	WG1212395
Beta BHC	ND		0.0246	1	12/19/2018 14:11	WG1212395
Delta BHC	ND		0.0246	1	12/19/2018 14:11	WG1212395
Gamma BHC	ND		0.0246	1	12/19/2018 14:11	WG1212395
Chlordane	ND		0.246	1	12/19/2018 14:11	WG1212395
4,4-DDD	ND		0.0246	1	12/19/2018 14:11	WG1212395
4,4-DDE	ND		0.0246	1	12/19/2018 14:11	WG1212395
4,4-DDT	ND		0.0246	1	12/19/2018 14:11	WG1212395
Dieldrin	ND		0.0246	1	12/19/2018 14:11	WG1212395
Endosulfan I	ND		0.0246	1	12/19/2018 14:11	WG1212395
Endosulfan II	ND		0.0246	1	12/19/2018 14:11	WG1212395
Endosulfan sulfate	ND		0.0246	1	12/19/2018 14:11	WG1212395
Endrin	ND		0.0246	1	12/19/2018 14:11	WG1212395
Endrin aldehyde	ND		0.0246	1	12/19/2018 14:11	WG1212395
Endrin ketone	ND		0.0246	1	12/19/2018 14:11	WG1212395
Hexachlorobenzene	ND		0.0246	1	12/19/2018 14:11	WG1212395
Heptachlor	ND		0.0246	1	12/19/2018 14:11	WG1212395
Heptachlor epoxide	ND		0.0246	1	12/19/2018 14:11	WG1212395
Methoxychlor	ND		0.0246	1	12/19/2018 14:11	WG1212395
Toxaphene	ND		0.491	1	12/19/2018 14:11	WG1212395
(S) Decachlorobiphenyl	*65.5*		*10.0-135*		*12/19/2018 14:11*	WG1212395
(S) Tetrachloro-m-xylene	*73.5*		*10.0-139*		*12/19/2018 14:11*	WG1212395

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
	%				
Total Solids	84.4		1	12/17/2018 10:31	WG1211857

Metals (ICP) by Method 6010D

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Arsenic	ND		2.37	1	12/17/2018 18:02	WG1211653
Lead	9.88		0.592	1	12/17/2018 18:02	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry)	Qualifier	RDL (dry)	Dilution	Analysis date / time	Batch
	mg/kg		mg/kg			
Aldrin	ND		0.0237	1	12/19/2018 14:24	WG1212395
Alpha BHC	ND		0.0237	1	12/19/2018 14:24	WG1212395
Beta BHC	ND		0.0237	1	12/19/2018 14:24	WG1212395
Delta BHC	ND		0.0237	1	12/19/2018 14:24	WG1212395
Gamma BHC	ND		0.0237	1	12/19/2018 14:24	WG1212395
Chlordane	ND		0.237	1	12/19/2018 14:24	WG1212395
4,4-DDD	ND		0.0237	1	12/19/2018 14:24	WG1212395
4,4-DDE	ND		0.0237	1	12/19/2018 14:24	WG1212395
4,4-DDT	ND		0.0237	1	12/19/2018 14:24	WG1212395
Dieldrin	ND		0.0237	1	12/19/2018 14:24	WG1212395
Endosulfan I	ND		0.0237	1	12/19/2018 14:24	WG1212395
Endosulfan II	ND		0.0237	1	12/19/2018 14:24	WG1212395
Endosulfan sulfate	ND		0.0237	1	12/19/2018 14:24	WG1212395
Endrin	ND		0.0237	1	12/19/2018 14:24	WG1212395
Endrin aldehyde	ND		0.0237	1	12/19/2018 14:24	WG1212395
Endrin ketone	ND		0.0237	1	12/19/2018 14:24	WG1212395
Hexachlorobenzene	ND		0.0237	1	12/19/2018 14:24	WG1212395
Heptachlor	ND		0.0237	1	12/19/2018 14:24	WG1212395
Heptachlor epoxide	ND		0.0237	1	12/19/2018 14:24	WG1212395
Methoxychlor	ND		0.0237	1	12/19/2018 14:24	WG1212395
Toxaphene	ND		0.474	1	12/19/2018 14:24	WG1212395
(S) Decachlorobiphenyl	*64.4*		*10.0-135*		*12/19/2018 14:24*	WG1212395
(S) Tetrachloro-m-xylene	*71.4*		*10.0-139*		*12/19/2018 14:24*	WG1212395

Total Solids by Method 2540 G-2011

Analyte	Result %	Qualifier	Dilution	Analysis date / time	Batch
Total Solids	86.2		1	12/17/2018 12:55	WG1211907

Metals (ICP) by Method 6010D

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Arsenic	ND		2.32	1	12/17/2018 18:05	WG1211653
Lead	8.41		0.580	1	12/17/2018 18:05	WG1211653

Pesticides (GC) by Method 8081B

Analyte	Result (dry) mg/kg	Qualifier	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
Aldrin	ND		0.0232	1	12/19/2018 14:36	WG1212395
Alpha BHC	ND		0.0232	1	12/19/2018 14:36	WG1212395
Beta BHC	ND		0.0232	1	12/19/2018 14:36	WG1212395
Delta BHC	ND		0.0232	1	12/19/2018 14:36	WG1212395
Gamma BHC	ND		0.0232	1	12/19/2018 14:36	WG1212395
Chlordane	ND		0.232	1	12/19/2018 14:36	WG1212395
4,4-DDD	ND		0.0232	1	12/19/2018 14:36	WG1212395
4,4-DDE	ND		0.0232	1	12/19/2018 14:36	WG1212395
4,4-DDT	ND		0.0232	1	12/19/2018 14:36	WG1212395
Dieldrin	ND		0.0232	1	12/19/2018 14:36	WG1212395
Endosulfan I	ND		0.0232	1	12/19/2018 14:36	WG1212395
Endosulfan II	ND		0.0232	1	12/19/2018 14:36	WG1212395
Endosulfan sulfate	ND		0.0232	1	12/19/2018 14:36	WG1212395
Endrin	ND		0.0232	1	12/19/2018 14:36	WG1212395
Endrin aldehyde	ND		0.0232	1	12/19/2018 14:36	WG1212395
Endrin ketone	ND		0.0232	1	12/19/2018 14:36	WG1212395
Hexachlorobenzene	ND		0.0232	1	12/19/2018 14:36	WG1212395
Heptachlor	ND		0.0232	1	12/19/2018 14:36	WG1212395
Heptachlor epoxide	ND		0.0232	1	12/19/2018 14:36	WG1212395
Methoxychlor	ND		0.0232	1	12/19/2018 14:36	WG1212395
Toxaphene	ND		0.464	1	12/19/2018 14:36	WG1212395
(S) Decachlorobiphenyl	*65.6*		*10.0-135*		*12/19/2018 14:36*	WG1212395
(S) Tetrachloro-m-xylene	*72.8*		*10.0-139*		*12/19/2018 14:36*	WG1212395

QUALITY CONTROL SUMMARY

L1053387-01,02,03,04

Method Blank (MB)

(MB) R3369039-1 12/17/18 14:04

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1053373-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1053373-01 12/17/18 14:04 • (DUP) R3369039-3 12/17/18 14:04

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	75.0	74.5	1	0.691		10

Laboratory Control Sample (LCS)

(LCS) R3369039-2 12/17/18 14:04

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	50.0	100	85.0-115	

QUALITY CONTROL SUMMARY

L1053387-05,06,07,08,09,10,11,12,13,14

Method Blank (MB)

(MB) R3369037-1 12/17/18 13:52

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1053387-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1053387-11 12/17/18 13:52 • (DUP) R3369037-3 12/17/18 13:52

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	81.7	81.7	1	0.00122		10

Laboratory Control Sample (LCS)

(LCS) R3369037-2 12/17/18 13:52

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	50.0	100	85.0-115	

Method Blank (MB)

(MB) R3369026-1 12/17/18 10:31

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1053594-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1053594-02 12/17/18 10:31 • (DUP) R3369026-3 12/17/18 10:31

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	83.5	83.6	1	0.0917		10

Laboratory Control Sample (LCS)

(LCS) R3369026-2 12/17/18 10:31

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	50.0	100	85.0-115	

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Method Blank (MB)

(MB) R3369031-1 12/17/18 12:55

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L1053388-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1053388-01 12/17/18 12:55 • (DUP) R3369031-3 12/17/18 12:55

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	78.3	77.9	1	0.454		10

Laboratory Control Sample (LCS)

(LCS) R3369031-2 12/17/18 12:55

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	50.0	100	85.0-115	

Method Blank (MB)

(MB) R3368991-1 12/17/18 16:50

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.460	2.00
Lead	0.233	J	0.190	0.500

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3368991-2 12/17/18 16:52 • (LCSD) R3368991-3 12/17/18 16:54

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Arsenic	100	107	105	107	105	80.0-120			2.48	20
Lead	100	108	105	108	105	80.0-120			2.86	20

L1053387-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053387-11 12/17/18 16:57 • (MS) R3368991-6 12/17/18 17:04 • (MSD) R3368991-7 12/17/18 17:07

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	122	ND	117	116	94.7	93.9	1	75.0-125			0.832	20
Lead	122	9.24	130	129	98.7	97.4	1	75.0-125			1.24	20

Method Blank (MB)

(MB) R3369232-3 12/17/18 16:11

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Aldrin	U		0.00135	0.0200
Alpha BHC	U		0.00136	0.0200
Beta BHC	U		0.00160	0.0200
Delta BHC	U		0.00143	0.0200
Gamma BHC	U		0.00145	0.0200
4,4-DDD	U		0.00156	0.0200
4,4-DDE	U		0.00154	0.0200
4,4-DDT	U		0.00200	0.0200
Dieldrin	U		0.00152	0.0200
Endosulfan I	U		0.00149	0.0200
Endosulfan II	U		0.00160	0.0200
Endosulfan sulfate	U		0.00151	0.0200
Endrin	U		0.00157	0.0200
Endrin aldehyde	U		0.00129	0.0200
Endrin ketone	U		0.00165	0.0200
Heptachlor	U		0.00154	0.0200
Heptachlor epoxide	U		0.00161	0.0200
Hexachlorobenzene	U		0.00124	0.0200
Methoxychlor	U		0.00178	0.0200
Chlordane	U		0.0390	0.200
Toxaphene	U		0.0360	0.400
(S) Decachlorobiphenyl	*100*			*10.0-135*
(S) Tetrachloro-m-xylene	*92.5*			*10.0-139*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3369232-1 12/17/18 15:41 • (LCSD) R3369232-2 12/17/18 15:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aldrin	0.0666	0.0651	0.0568	97.7	85.3	34.0-136			13.6	38
Alpha BHC	0.0666	0.0672	0.0587	101	88.1	34.0-139			13.5	38
Beta BHC	0.0666	0.0621	0.0547	93.2	82.1	34.0-133			12.7	37
Delta BHC	0.0666	0.0660	0.0580	99.1	87.1	34.0-135			12.9	38
Gamma BHC	0.0666	0.0651	0.0570	97.7	85.6	34.0-136			13.3	38
4,4-DDD	0.0666	0.0654	0.0570	98.2	85.6	33.0-141			13.7	39
4,4-DDE	0.0666	0.0655	0.0571	98.3	85.7	34.0-134			13.7	38
4,4-DDT	0.0666	0.0572	0.0495	85.9	74.3	30.0-143			14.4	40
Dieldrin	0.0666	0.0655	0.0573	98.3	86.0	35.0-137			13.4	37
Endosulfan I	0.0666	0.0633	0.0554	95.0	83.2	34.0-134			13.3	37

QUALITY CONTROL SUMMARY

L1053387-01,02,03,04,05,06,07,08,09,10,11

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3369232-1 12/17/18 15:41 • (LCSD) R3369232-2 12/17/18 15:56

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Endosulfan II	0.0666	0.0599	0.0523	89.9	78.5	35.0-132			13.5	38
Endosulfan sulfate	0.0666	0.0656	0.0581	98.5	87.2	35.0-132			12.1	37
Endrin	0.0666	0.0611	0.0532	91.7	79.9	34.0-137			13.8	37
Endrin aldehyde	0.0666	0.0534	0.0484	80.2	72.7	23.0-121			9.82	39
Endrin ketone	0.0666	0.0628	0.0554	94.3	83.2	35.0-144			12.5	37
Heptachlor	0.0666	0.0609	0.0535	91.4	80.3	36.0-141			12.9	37
Heptachlor epoxide	0.0666	0.0644	0.0566	96.7	85.0	36.0-134			12.9	37
Hexachlorobenzene	0.0666	0.0607	0.0534	91.1	80.2	33.0-129			12.8	37
Methoxychlor	0.0666	0.0594	0.0520	89.2	78.1	28.0-150			13.3	38
(S) Decachlorobiphenyl				*97.3*	*89.9*	*10.0-135*				
(S) Tetrachloro-m-xylene				*90.5*	*82.7*	*10.0-139*				

L1053387-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053387-07 12/17/18 20:07 • (MS) R3369232-4 12/17/18 20:22 • (MSD) R3369232-5 12/17/18 20:36

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aldrin	0.0783	ND	0.0702	0.0821	89.6	105	1	20.0-135			15.6	37
Alpha BHC	0.0783	ND	0.0860	0.100	110	128	1	27.0-140			15.1	35
Beta BHC	0.0783	ND	0.0797	0.0928	102	118	1	23.0-141			15.1	37
Delta BHC	0.0783	ND	0.0845	0.0991	108	127	1	21.0-138			15.9	35
Gamma BHC	0.0783	ND	0.0831	0.0972	106	124	1	27.0-137			15.6	36
4,4-DDD	0.0783	ND	0.0795	0.0927	102	118	1	15.0-152			15.3	39
4,4-DDE	0.0783	ND	0.0702	0.0828	89.6	106	1	10.0-152			16.4	40
4,4-DDT	0.0783	ND	0.0561	0.0686	71.6	87.5	1	10.0-151			20.0	40
Dieldrin	0.0783	ND	0.0794	0.0929	101	119	1	17.0-145			15.7	37
Endosulfan I	0.0783	ND	0.0764	0.0889	97.6	114	1	20.0-137			15.1	36
Endosulfan II	0.0783	ND	0.0738	0.0861	94.3	110	1	15.0-141			15.3	37
Endosulfan sulfate	0.0783	ND	0.0814	0.0947	104	121	1	15.0-143			15.1	38
Endrin	0.0783	ND	0.0862	0.107	110	136	1	19.0-143			21.1	37
Endrin aldehyde	0.0783	ND	0.0664	0.0780	84.8	99.5	1	10.0-139			16.0	40
Endrin ketone	0.0783	ND	0.0758	0.0895	96.8	114	1	17.0-149			16.5	38
Heptachlor	0.0783	ND	0.0697	0.0847	89.0	108	1	22.0-138			19.3	37
Heptachlor epoxide	0.0783	ND	0.0788	0.0922	101	118	1	22.0-138			15.7	36
Hexachlorobenzene	0.0783	ND	0.0767	0.0908	97.9	116	1	25.0-126			16.9	35
Methoxychlor	0.0783	ND	0.0683	0.0825	87.2	105	1	10.0-159			18.9	40
(S) Decachlorobiphenyl					*92.6*	*105*		*10.0-135*				
(S) Tetrachloro-m-xylene					*94.6*	*110*		*10.0-139*				

Method Blank (MB)

(MB) R3369588-3 12/19/18 10:51

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Aldrin	U		0.00135	0.0200
Alpha BHC	U		0.00136	0.0200
Beta BHC	U		0.00160	0.0200
Delta BHC	U		0.00143	0.0200
Gamma BHC	U		0.00145	0.0200
4,4-DDD	U		0.00156	0.0200
4,4-DDE	U		0.00154	0.0200
4,4-DDT	U		0.00200	0.0200
Dieldrin	U		0.00152	0.0200
Endosulfan I	U		0.00149	0.0200
Endosulfan II	U		0.00160	0.0200
Endosulfan sulfate	U		0.00151	0.0200
Endrin	U		0.00157	0.0200
Endrin aldehyde	U		0.00129	0.0200
Endrin ketone	U		0.00165	0.0200
Heptachlor	U		0.00154	0.0200
Heptachlor epoxide	U		0.00161	0.0200
Hexachlorobenzene	U		0.00124	0.0200
Methoxychlor	U		0.00178	0.0200
Chlordane	U		0.0390	0.200
Toxaphene	U		0.0360	0.400
(S) Decachlorobiphenyl	*70.1*			*10.0-135*
(S) Tetrachloro-m-xylene	*74.0*			*10.0-139*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3369588-1 12/19/18 10:26 • (LCSD) R3369588-2 12/19/18 10:39

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aldrin	0.0666	0.0570	0.0613	85.6	92.0	34.0-136			7.27	38
Alpha BHC	0.0666	0.0514	0.0562	77.2	84.4	34.0-139			8.92	38
Beta BHC	0.0666	0.0562	0.0617	84.4	92.6	34.0-133			9.33	37
Delta BHC	0.0666	0.0497	0.0547	74.6	82.1	34.0-135			9.58	38
Gamma BHC	0.0666	0.0491	0.0540	73.7	81.1	34.0-136			9.51	38
4,4-DDD	0.0666	0.0544	0.0586	81.7	88.0	33.0-141			7.43	39
4,4-DDE	0.0666	0.0481	0.0518	72.2	77.8	34.0-134			7.41	38
4,4-DDT	0.0666	0.0493	0.0535	74.0	80.3	30.0-143			8.17	40
Dieldrin	0.0666	0.0589	0.0632	88.4	94.9	35.0-137			7.04	37
Endosulfan I	0.0666	0.0569	0.0609	85.4	91.4	34.0-134			6.79	37

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3369588-1 12/19/18 10:26 • (LCSD) R3369588-2 12/19/18 10:39

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Endosulfan II	0.0666	0.0522	0.0564	78.4	84.7	35.0-132			7.73	38
Endosulfan sulfate	0.0666	0.0574	0.0623	86.2	93.5	35.0-132			8.19	37
Endrin	0.0666	0.0582	0.0624	87.4	93.7	34.0-137			6.97	37
Endrin aldehyde	0.0666	0.0503	0.0548	75.5	82.3	23.0-121			8.56	39
Endrin ketone	0.0666	0.0574	0.0613	86.2	92.0	35.0-144			6.57	37
Heptachlor	0.0666	0.0552	0.0606	82.9	91.0	36.0-141			9.33	37
Heptachlor epoxide	0.0666	0.0588	0.0632	88.3	94.9	36.0-134			7.21	37
Hexachlorobenzene	0.0666	0.0500	0.0543	75.1	81.5	33.0-129			8.25	37
Methoxychlor	0.0666	0.0544	0.0608	81.7	91.3	28.0-150			11.1	38
(S) Decachlorobiphenyl				*76.9*	*78.8*	*10.0-135*				
(S) Tetrachloro-m-xylene				*76.9*	*80.8*	*10.0-139*				

L1053387-17 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053387-17 12/19/18 13:34 • (MS) R3369588-4 12/19/18 13:46 • (MSD) R3369588-5 12/19/18 13:59

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aldrin	0.0782	ND	0.0625	0.0629	80.0	80.5	1	20.0-135			0.561	37
Alpha BHC	0.0782	ND	0.0604	0.0611	77.3	78.2	1	27.0-140			1.16	35
Beta BHC	0.0782	ND	0.0663	0.0668	84.8	85.4	1	23.0-141			0.705	37
Delta BHC	0.0782	ND	0.0554	0.0562	70.9	71.9	1	21.0-138			1.47	35
Gamma BHC	0.0782	ND	0.0573	0.0581	73.3	74.3	1	27.0-137			1.42	36
4,4-DDD	0.0782	ND	0.0637	0.0641	81.5	82.0	1	15.0-152			0.551	39
4,4-DDE	0.0782	ND	0.0536	0.0536	68.6	68.6	1	10.0-152			0.000	40
4,4-DDT	0.0782	ND	0.0447	0.0444	57.2	56.8	1	10.0-151			0.791	40
Dieldrin	0.0782	ND	0.0660	0.0661	84.4	84.5	1	17.0-145			0.178	37
Endosulfan I	0.0782	ND	0.0629	0.0635	80.5	81.2	1	20.0-137			0.929	36
Endosulfan II	0.0782	ND	0.0581	0.0586	74.3	74.9	1	15.0-141			0.805	37
Endosulfan sulfate	0.0782	ND	0.0662	0.0671	84.7	85.9	1	15.0-143			1.41	38
Endrin	0.0782	ND	0.0647	0.0654	82.7	83.6	1	19.0-143			1.08	37
Endrin aldehyde	0.0782	ND	0.0601	0.0602	76.9	77.0	1	10.0-139			0.195	40
Endrin ketone	0.0782	ND	0.0608	0.0617	77.8	79.0	1	17.0-149			1.53	38
Heptachlor	0.0782	ND	0.0609	0.0610	77.9	78.1	1	22.0-138			0.192	37
Heptachlor epoxide	0.0782	ND	0.0660	0.0662	84.4	84.7	1	22.0-138			0.355	36
Hexachlorobenzene	0.0782	ND	0.0567	0.0572	72.5	73.1	1	25.0-126			0.825	35
Methoxychlor	0.0782	ND	0.0555	0.0555	71.0	71.0	1	10.0-159			0.000	40
(S) Decachlorobiphenyl					*65.6*	*67.6*		*10.0-135*				
(S) Tetrachloro-m-xylene					*72.4*	*73.4*		*10.0-139*				

Method Blank (MB)

(MB) R3370599-3 12/21/18 00:00

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Aldrin	U		0.00135	0.0200
Alpha BHC	U		0.00136	0.0200
Beta BHC	U		0.00160	0.0200
Delta BHC	U		0.00143	0.0200
Gamma BHC	U		0.00145	0.0200
4,4-DDD	U		0.00156	0.0200
4,4-DDE	U		0.00154	0.0200
4,4-DDT	U		0.00200	0.0200
Dieldrin	U		0.00152	0.0200
Endosulfan I	U		0.00149	0.0200
Endosulfan II	U		0.00160	0.0200
Endosulfan sulfate	U		0.00151	0.0200
Endrin	U		0.00157	0.0200
Endrin aldehyde	U		0.00129	0.0200
Endrin ketone	U		0.00165	0.0200
Heptachlor	U		0.00154	0.0200
Heptachlor epoxide	U		0.00161	0.0200
Hexachlorobenzene	U		0.00124	0.0200
Methoxychlor	U		0.00178	0.0200
Chlordane	U		0.0390	0.200
Toxaphene	U		0.0360	0.400
(S) Decachlorobiphenyl	*63.2*			*10.0-135*
(S) Tetrachloro-m-xylene	*64.7*			*10.0-139*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3370599-1 12/20/18 23:30 • (LCSD) R3370599-2 12/20/18 23:45

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aldrin	0.0666	0.0471	0.0428	70.7	64.3	34.0-136			9.57	38
Alpha BHC	0.0666	0.0516	0.0471	77.5	70.7	34.0-139			9.12	38
Beta BHC	0.0666	0.0470	0.0437	70.6	65.6	34.0-133			7.28	37
Delta BHC	0.0666	0.0489	0.0445	73.4	66.8	34.0-135			9.42	38
Gamma BHC	0.0666	0.0507	0.0465	76.1	69.8	34.0-136			8.64	38
4,4-DDD	0.0666	0.0458	0.0415	68.8	62.3	33.0-141			9.85	39
4,4-DDE	0.0666	0.0461	0.0421	69.2	63.2	34.0-134			9.07	38
4,4-DDT	0.0666	0.0501	0.0454	75.2	68.2	30.0-143			9.84	40
Dieldrin	0.0666	0.0473	0.0430	71.0	64.6	35.0-137			9.52	37
Endosulfan I	0.0666	0.0444	0.0409	66.7	61.4	34.0-134			8.21	37

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3370599-1 12/20/18 23:30 • (LCSD) R3370599-2 12/20/18 23:45

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Endosulfan II	0.0666	0.0421	0.0383	63.2	57.5	35.0-132			9.45	38
Endosulfan sulfate	0.0666	0.0464	0.0423	69.7	63.5	35.0-132			9.24	37
Endrin	0.0666	0.0503	0.0455	75.5	68.3	34.0-137			10.0	37
Endrin aldehyde	0.0666	0.0427	0.0392	64.1	58.9	23.0-121			8.55	39
Endrin ketone	0.0666	0.0445	0.0407	66.8	61.1	35.0-144			8.92	37
Heptachlor	0.0666	0.0532	0.0479	79.9	71.9	36.0-141			10.5	37
Heptachlor epoxide	0.0666	0.0464	0.0428	69.7	64.3	36.0-134			8.07	37
Hexachlorobenzene	0.0666	0.0480	0.0456	72.1	68.5	33.0-129			5.13	37
Methoxychlor	0.0666	0.0484	0.0439	72.7	65.9	28.0-150			9.75	38
(S) Decachlorobiphenyl				*69.5*	*66.5*	*10.0-135*				
(S) Tetrachloro-m-xylene				*71.6*	*68.2*	*10.0-139*				

L1053387-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1053387-12 12/21/18 00:15 • (MS) R3370599-4 12/21/18 00:30 • (MSD) R3370599-5 12/21/18 00:45

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aldrin	0.0829	ND	0.0572	0.0600	69.1	72.4	1	20.0-135			4.67	37
Alpha BHC	0.0829	ND	0.0621	0.0655	74.9	79.0	1	27.0-140			5.27	35
Beta BHC	0.0829	ND	0.0556	0.0590	67.1	71.2	1	23.0-141			5.86	37
Delta BHC	0.0829	ND	0.0559	0.0584	67.4	70.4	1	21.0-138			4.36	35
Gamma BHC	0.0829	ND	0.0591	0.0633	71.3	76.4	1	27.0-137			6.91	36
4,4-DDD	0.0829	ND	0.0565	0.0589	68.2	71.0	1	15.0-152			4.10	39
4,4-DDE	0.0829	ND	0.0563	0.0590	67.9	71.2	1	10.0-152			4.75	40
4,4-DDT	0.0829	ND	0.0612	0.0632	73.9	76.3	1	10.0-151			3.20	40
Dieldrin	0.0829	ND	0.0591	0.0614	71.3	74.0	1	17.0-145			3.72	37
Endosulfan I	0.0829	ND	0.0548	0.0572	66.1	69.1	1	20.0-137			4.44	36
Endosulfan II	0.0829	ND	0.0512	0.0524	61.7	63.2	1	15.0-141			2.40	37
Endosulfan sulfate	0.0829	ND	0.0559	0.0566	67.4	68.3	1	15.0-143			1.33	38
Endrin	0.0829	ND	0.0635	0.0656	76.6	79.1	1	19.0-143			3.28	37
Endrin aldehyde	0.0829	ND	0.0509	0.0514	61.4	62.0	1	10.0-139			0.973	40
Endrin ketone	0.0829	ND	0.0539	0.0551	65.0	66.5	1	17.0-149			2.28	38
Heptachlor	0.0829	ND	0.0660	0.0680	79.6	82.0	1	22.0-138			2.97	37
Heptachlor epoxide	0.0829	ND	0.0596	0.0621	71.9	74.9	1	22.0-138			4.09	36
Hexachlorobenzene	0.0829	ND	0.0584	0.0616	70.4	74.3	1	25.0-126			5.39	35
Methoxychlor	0.0829	ND	0.0622	0.0625	75.1	75.4	1	10.0-159			0.399	40
(S) Decachlorobiphenyl					*61.0*	*64.1*		*10.0-135*				
(S) Tetrachloro-m-xylene					*65.6*	*69.1*		*10.0-139*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
RDL (dry)	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.

PBS Engineering & Env.- WA

00 Bradley Blvd
uite 106
ichland WA 99352

Report to:
ngela McGuire

Billing Information:
Accounts Payable- Stephanie Price
400 Bradley Blvd., Ste. 300
Richland, WA 99352

Email To: angela.mcguire@pbsusa.com

Project
Description: Richland Orchards

City/State Collected: Richland WA

Phone: 509-942-1600
Fax:

Client Project # 66150

Lab Project # PBSENGRWA-66150

Collected by (print): Angela McGuire

Site/Facility ID # —

P.O. # —

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day Standard

Quote # —

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	As Pb 6010 4ozClr-NoPres	OCPs (SV8081) 4ozClr-NoPres	Remarks	Sample # (lab only)
SS-1-6	Grab	SS	0.5'	12/12/18	10:11	2	X	X		-01
SS-2-6		SS			10:44		X	X		-02
SS-3-6		SS			11:10		X	X		-03
SS-4-6		SS			11:25		X	X		-04
SS-5-6		SS			11:37		X	X		-05
SS-6-6		SS			11:48		X	X		-06
SS-7-6		SS			12:43		X	X		-07
SS-8-6		SS			12:51		X	X		-08
SS-9-6		SS			13:03		X	X		-09
SS-10-6		SS			13:17		X	X		-10

Matrix:
S - Soil AIR - Air F - Filter
W - Groundwater B - Bioassay
WW - WasteWater
W - Drinking Water
T - Other ___

Remarks:

pH ___ Temp ___

Flow ___ Other ___

Samples returned via:
___ UPS ___ FedEx ___ Courier ___

Tracking #

Relinquished by: (Signature) Angela McGuire PBS
Date: 12/13/18 Time: 15:00
Received by: (Signature) FedEx 4168616470 3047

Relinquished by: (Signature)
Date: Time:
Received by: (Signature)

Relinquished by: (Signature)
Date: Time:
Received for lab by: (Signature)

Trip Blank Received: Yes / (NO)
HCL / MeoH
TBR

Temp: +0.3 °C Bottles Received:
1.4 1.7 2nd 40 40z

Date: 12/14/18 Time: 0830

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Sample Receipt Checklist
COC Seal Present/Intact: ___NP ___Y ___N
COC Signed/Accurate: ___Y ___N
Bottles arrive intact: ___Y ___N
Correct bottles used: ___Y ___N
Sufficient volume sent: ___Y ___N
If Applicable
VOA Zero Headspace: ___Y ___N
Preservation Correct/Checked: ___Y ___N
RAD SCREEN: <0.5 mR/hr

Chain of Custody Page ___ of ___

Pace Analytical
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1053387

D101

Acctnum: PBSENGRWA
Template: T143625
Prelogin: P683272
TSR: 110 - Brian Ford
PB:
Shipped Via:

BS Engineering & Env.- WA

30 Bradley Blvd
uite 106
ichland, WA 99352

eport to:
ngela McGuire

Billing Information:
Accounts Payable- Stephanie Price
400 Bradley Blvd., Ste. 300
Richland, WA 99352

Email To: angela.mcguire@pbsusa.com

oject
escription: Richland Orchards

City/State Collected: Richland WA

hone: 509-942-1600
ax:

Client Project # 66150

Lab Project # PBSENGRWA-66150

ollected by (print): Angela McGuire

Site/Facility ID # —

P.O. # —

ollected by (signature):

nmediately
acked on ice N___ Y___

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day Standard

Quote # —

Date Results Needed

Pres Chk

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	As Pb 6010 4ozClr-NoPres	OCPs (SV8081) 4ozClr-NoPres								Remarks	Sample # (lab only)
SS-11-6	Grab	SS	0.5'	12/12/18	1327	2	X	X									-11
SS-12-6		SS		12/12/18	1338		X	X									-12
SS-13-6		SS		12/12/18	1418		X	X									-13
SS-14-6		SS		12/12/18	1428		X	X									-14
SS-15-6		SS		12/12/18	1438		X	X									-15
SS-16-6		SS		12/12/18	1450		X	X									-16
SS-17-6		SS		12/12/18	1501		X	X									-17
SS-18-6		SS		12/12/18	1508		X	X									-18
SS-19-6		SS		12/13/18	1023		X	X									-19
SS-20-6		SS		12/13/18	1046		X	X									-20

Matrix:
S - Soil AIR - Air F - Filter
W - Groundwater B - Bioassay
WW - WasteWater
W - Drinking Water
T - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking #

Chain of Custody Page ___ of ___

Pace Analytical
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1053387

Table #

Acctnum: PBSENGRWA
Template: T143625
Prelogin: P683272
TSR: 110 - Brian Ford
PB:

Shipped Via:

Sample Receipt Checklist
COC Seal Present/Intact: ___NP ___Y ___N
COC Signed/Accurate: ___Y ___N
Bottles arrive intact: ___Y ___N
Correct bottles used: ___Y ___N
Sufficient volume sent: ___Y ___N
If Applicable
VOA Zero Headspace: ___Y ___N
Preservation Correct/Checked: ___Y ___N
RAD SCREEN: <0.5 mR/hr

Relinquished by : (Signature) PBS — Date: 12/13/18 — Time: 15:00 — Received by: (Signature) FedEx 4686 6470 3047

Relinquished by : (Signature) — Date: — Time: — Received by: (Signature)

Relinquished by : (Signature) — Date: — Time: — Received for lab by: (Signature)

Trip Blank Received: Yes / (No) HCL / MeoH TBR

Temp: 0.3 °C Bottles Received: 1.4 / 1.7% 40 4oz

Date: 12/14/18 Time: 0830

If preservation required by Login: Date/Time

Hold: Condition: NCF / OK