



N.L. Olson & Associates, Inc.

Engineering, Planning & Land Surveying

MEMORANDUM

PROJECT: Dickey Road Sand Gravel Pit (Feasibility Study)

TO: Levi Holmes
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FROM: Wesley R. Johnson, P.E. *WRL
10/21/2019*

SUBJ: LIQUEFACTION POTENTIAL

DATE: May 3, 2019

Mr. Holmes,

This report summarizes our subsurface exploration program that involved test pits and borings. During our initial investigation that occurred in September 2018, N.L. Olson & Associates, Inc (NLO) verified fill at several test pits locations that extended below 22 feet. After review of the initial subsurface exploration program, NLO recommended that drilling operations should be implemented that occurred in January 2019.

The drilling operations were recommended to determine actual fill depths, ground water levels, soil types, relative soil density, and determine zones within the fill susceptible to liquefaction.

PURPOSE AND SCOPE OF SERVICE

NLO's scope of work included a site reconnaissance, review of available geologic site information, a subsurface exploration program that consisted of the excavation of four (4) borings and 27 test pits. Engineering analysis, and the preparation of this report that has provided design and construction recommendations for site development criterion for grading and structural fill placement, assessment for both liquefaction with mitigation measures, and general construction criteria. Our scope of services was performed in general accordance with NLO's Professional Services Agreement (PSA) and fee estimate that included the following:

- A field investigation consisting of excavating 27 test pits at the project site to evaluate the subsurface soil and groundwater conditions. The depths of the exploratory test pits ranged from 7 feet to 22 feet below existing site grades.
- A field investigation consisting of drilling four (4) exploratory borings at the project site and sampling to evaluate the subsurface soil and subsurface water conditions. The depths of the exploratory borings ranged from 20.5 feet to 46.5 feet below existing site grades.

- Performing laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.
- Preparation of this report summarizing the results, conclusions, recommendations, and findings of our investigation.

NLO did not provide recommendations for placement of reinforced concrete retaining walls, rock walls or mechanically stabilized earth walls. In addition, our scope of work did not include chemical testing of the soil or water or to perform slope stability analysis of the gradual slope that resides around the perimeter of the subject property.

SITE LOCATION

The subject property is located southeast of Apex Airport and between Willamette Meridian and Dickey Road approximately one (1) mile west of Silverdale, WA. The site is situated in sections 18 & 19, T25N, Range 1 East in Kitsap County Washington. The location of the property is shown on the Vicinity Map, Figure 1.

EXISTING CONDITIONS

The project area is roughly 100 acres and bounded to the west by Apex Property Owners IMP Association, airport, commercial development to the east by a undeveloped property and beyond by Dickey Road NW, to the north by a mix of commercial and residential development and to the south by Pyramid Material Holdings LLC. The subject area presently consists of a reclaimed pit area. The site has two (2) pond areas with the northern pond being roughly eight (8) acres and the south pond about four (4) acres. A large soil stock pile area that had a vertical height of about 20 feet and covered an area of about 4 acres. The screening pile/piles were observed roughly centered along the east side of the north pond. The site's existing conditions have been illustrated on the Site Plan, Figure 2.

PROPOSED

As presently conceived, the proposed reclaimed pit area has been proposed to be developed with residential development. The proposed development is pending the results of this investigation to determine future site improvements and grading plan.

FIELD INVESTIGATION

The site subsurface soil conditions were explored during September 17, 2018 to September 19, 2018 with 27 test pits and drilling four (4) borings on January 9 and 10, 2019. Advanced Drill Exploration, Inc., advanced the borings down to a maximum depth of 46.5 feet below ground surface (bgs) with the drilling operations performed with a D50 track mounted Drill Rig. Piezometers were placed in each of the borings. The test pits were excavated by Vet Industrial with a case CX240B excavator. The approximate boring and test pit locations have been shown on the attached Site Plan, Figure 2. The boring and test pit logs have been included in Appendix A of this report.

Site Soil Conditions

Fill soil conditions were encountered in the subsurface exploration that and down to a maximum depth of 40 feet. The fill was thickness along the north and east central portion of the subject property with the fill decreasing in thickness to the west and south sides of the subject property. The fill consisted predominantly very loose to medium dense silty sand (SM), screenings and sandy silt (ML). Advanced outwash and glacial

till underlay the fill. Glacial till and advanced outwash, colvos sands, had a relative density that ranged from dense to very dense. The glacial till ranged in thickness from about 10 feet to 18 feet in thickness.

Our review of geologic information provided for the pit indicated that a glacial till mantle overlay a deposit of advance outwash. The advanced outwash was the product the pit was mined, which required removal of the overburden, glacial till.

During pit mining activities operations, the advanced outwash material was product removed from the pit area. As a result of the mining activities, the over burden and screenings from the mining operations were later spread over the pit as part of the reclamation. Our subsurface exploration indicated that the overburden material primarily comprised of till fill was spread along the south, west and north sides of the pit. The screenings appeared, which appear to be the more liquefiable material on this site appear to have concentrated north and south of the screening pile locations along the east pond area.

Subsurface Water

In test pits TP-1, TP-24, TP- 25 and TP-26 ground water or wet soils were encountered 10 to 19 feet bgs. NLO summarized the piezometer reading observed through this winter in Table 1 below.

Piezometer Readings			
Table 1			
B1	B2	B3	B4
1/10/19/dry	1/10/19 (4.0 feet)	1/11/19 (dry)	1/11/19 (7.8 feet)
2/25/2019/dry	2/25/2019 (7.1 feet)	2/25/2019 (17.6 feet)	2/25/2019 (7.4 feet)
3/11/2019/dry	3/11/2019 (9.9 feet)	3/11/2019 (dry)	3/11/2019 (7.8 feet)

Laboratory Testing

To aid in classifying the soils and to determine general soil gradation, laboratory tests were performed on selected representative samples. Phoenix Soil Research in Kingston, Washington was retained to provide geotechnical laboratory analysis. The results of the laboratory testing have been presented in Appendix A.

AVAILABLE GEOLOGIC INFORMATION

Washington Division of Geology and Earth Resource

The Washington Division of Geology and Earth Resource (WDGER), Geologic Map of Washington – Northwest Quadrant, dated 2002, indicates that the site is mapped as Quaternary sediments, dominantly glacial drift and includes alluvium. Glacial till consists of an unsorted, unstratified, highly compacted mixture of clay, silt, sand, gravel and boulders deposited by glacial ice.

USDA Soil Conservation Service

The USDA Soil Conservation Service (SCS) classifies the site's native soils as (2) and (3) Alderwood very gravelly sandy loam, 6 to 15 and 15 to 30 percent slopes Permeability of this Alderwood soil is moderately rapid above the hardpan and very slow in the pan. The available water capacity is low. The effective rooting depth ranges from 20 to 40 inches for 6 to 15 percent slopes runoff is slow, and the hazard of water erosion is slight and 15 to 30 percent are indicated to have a medium runoff is medium, and the hazard of water erosion is moderate. We have provided the SCS mapping of the area on Figure 3.

Kitsap County Washington, Geologic Map Unit

The Kitsap County Washington, Geologic Map Unit, Washington State Department of Natural Resources, open file Report 2005-3 dated 2005 was utilized for our geologic review of the project area. Geologic Unit Quaternary Alluvium (Q_a), Geologic Age Quaternary, Quaternary unconsolidated or semi-consolidated alluvial clay, silt, sand, gravel, and (or) cobble deposits; locally includes peat, muck, and diatomite; locally includes beach, dune, lacustrine, estuarine, marsh, landslide, lahar, glacial, or colluvial deposits; locally includes volcanoclastic or tephra deposits; locally includes modified land and artificial fill.

SEISMIC

NLO has reviewed the IBC for seismic design criteria for the proposed construction. The site's ground acceleration was determined from the 2015 USGS Earthquake Hazard Program for the Conterminous 48 States. The PGA was based on the following location 47.64949 Latitude and -122.72721 Longitude. The interpolated probabilistic ground motion values (PGA) for Horizontal peak acceleration and spectral acceleration are as provided in Table 2.

Seismic Ground Shaking Summary			
Table 2			
Probability Of exceedance	Approximate Return Period (years)	Spectral Acceleration (g) Period (sec)	
		0.2 sec	1.0 sec
2% in 50 years	2,475	S _s = 1.398	S ₁ = 0.560

Seismic Design Ground Shaking Parameters IBC – 2015

NLO has reviewed the 2015 International Building Code (IBC) for seismic design criteria for the proposed construction. The IBC seismic design parameters for the subject site, include a seismic zone soil profile, **Type D**. Based on the encountered subsurface soil conditions, the recommended seismic design ground shaking parameters are the values in Seismic Parameter (2015 IBC) have been presented in Table 3.

Seismic Design Parameters (2015 IBC)	
Table 3	
Seismic Parameters	Values
Mapped Spectral Acceleration Short Period (S _s)	1.398
Mapped Spectral Acceleration For One Second (S ₁)	0.560
Site Class	D
Short period Site Coefficient (F _a)	1.000
1-second Site Coefficient (F _v)	1.500
MCE Spectral Response Acceleration for short period (S _{MS} =S _s ×F _a)	1.398
MCE Spectral Response Acceleration for one second (S _{M1} = S ₁ ×F _v)	0.840
Design Spectral Response Acceleration for Short Period (S _{DS} =2/3×S _{MS})	0.932
Design Spectral Response Acceleration for one second (S _{D1} =2/3×S _{M1})	0.560
Design Peak Ground Acceleration (DPA_D =SDS x 0.4)	<u>0.378</u>
The design level earthquake (DLE) utilized the Design Peak Ground Acceleration DPA _D =0.378 based on 2015 IBC Seismic Design Parameters.	

The seismic acceleration was also based on a near crustal one-in-100 year seismic event, with an assumed magnitude of 6.5 occurring below the site. The horizontal ground acceleration (K_h), $K_h=0.2$, was used to make a determination of the site's susceptibility to dynamic loading for an operating level earthquake (OLE).

The ground acceleration was determined from horizontal peak ground accelerations for glacial consolidated soils provided by Kitsap County's Ordinance Regarding Growth Management, Revisions to Title 19 Critical Areas, Seismic Information.

SEISMIC FAULT LINES REVIEW

NLO has reviewed the "Kitsap County, Washington, Fault Lines", dated 2017 and USGS geological mapping. Our review of the above referenced Fault Lines information indicates the following:

Hood Canal Fault

The Hood Canal fault resides roughly 15 miles west of the project area and parallels the Hood Canal in the north to south direction. At the time of this report, there is no information of prehistoric surface-rupturing or reoccurrence intervals to include anticipated magnitude for this fault.

Seattle Fault

The Seattle Fault resides roughly two (2) miles to the south. The Seattle Fault trends east to west from Hood Canal to the Cascades, passing below Bremerton along the Bremerton ship yard, through Manchester and Bainbridge Island into Seattle. This fault is capable of magnitude 7.1 seismic events with the most recent seismic event occurring roughly 1,100 years ago.

Southern Whidbey Island Fault

The Southern Whidbey Island Fault is located roughly 40 to 45 miles to the north of the project area. The fault is roughly as 25 to 30 miles wide and trends from the northwest to southeast along the Puget Sound above the northern tip of Kitsap County to the northern margins of Whidbey Island and trends between Duvall and Monroe. The southern Whidbey Island fault is considered capable of generating strong seismic events on par with the Seattle Fault with magnitude approaching magnitude 7.0 or greater and may have a similar return period.

SOIL LIQUEFACTION

NLO has reviewed Kitsap County Geologically Hazardous Map Seismic Hazards map published dated February 23, 2017. The referenced liquefaction mapping the pit has a high potential of liquefaction. The Seismic Hazards for liquefaction mapping has been provided on Figure 4.

To generate the necessary ground acceleration to initiate liquefaction, an earthquake of magnitude 5.0 or greater is typically needed and the liquefaction process is brought about by seismic waves passing through poorly draining saturated granular soil. As the seismic wave propagates through the stratum, the soil particles at the individual level are packed into a tighter arrangement decreasing the initial void space. Void space is the region between soil particles where the pore water resides. As a result of the decreased void space, the volume decrease has a corresponding water pressure increase also known as pore pressure increase. If the pore pressure is substantial, and cannot be dissipated, the soil fluidizes (or liquefies) and loses load carrying ability.

Liquefaction Assessment

The proposed development is located within a recently reclaimed pit area. Based on its previous use the area has been designated as a potentially liquefiable site per Kitsap County's geologic hazardous mapping. In order to assess the site's soil conditions, four (4) boring have been drilled at various locations within the subject area to determine ground water levels and subsurface conditions.

Beginning at a depth of approximately five feet below existing grades with the local groundwater level at a depth of approximately seven and one-half to nine and one-half feet below existing grades. The subsurface data obtained from our exploration program was utilized to perform a liquefaction analysis using LiquefyPro engineering software.

The results of the LiquefyPro analysis provides an understanding of the liquefaction susceptibility of the subject site as well as maximum anticipated liquefaction-induced settlements which could occur due to a design level earthquake (DLE) and operating level earthquake (OLE); the LiquefyPro results are provided in Table 4. The following are the results from the LiquefyPro analysis:

Liquefypro Analysis Result Table 4				
Boring B-1				
	PGA	Magnitude	GW_Depth(ft)	Settlement (in)
DLE	0.378	7.07	dry	1.06
OLE	0.200	6.50	dry	0.21
Boring B-2				
	PGA	Magnitude	GW_Depth(ft)	Settlement (in)
DLE	0.378	7.07	4	1.57
OLE	0.200	6.50	4	0.11
Boring B-3				
	PGA	Magnitude	GW_Depth(ft)	Settlement (in)
DLE	0.378	7.07	17.6	4.46
OLE	0.200	6.50	17.6	1.06
Boring B-4				
	PGA	Magnitude	GW_Depth(ft)	Settlement (in)
DLE	0.378	7.07	7.4	5.23
OLE	0.200	6.50	7.4	2.36

Note: In the area of boring B-3, the water level was observed at 17.6 feet bgs on one (1) occasion. On two other occasions that the piezometer subsurface water level readings, no groundwater was observed at this location. With no ground water, liquefaction settlement is substantially reduced.

CONCLUSIONS AND RECOMMENDATIONS

Following our review of Kitsap Counties Critical Areas Ordinance, Chapter 19.400 Geologic Hazardous Areas. It's NLO's opinion that the soils underlying the site could be susceptible to liquefaction during the design level seismic event. The liquefaction can be initiated by the underlying saturated loose fill sand deposits and relatively high groundwater tables as monitored through the winter undergoing the design

seismic event. In the areas of borings B-3 and B-4, a design level earthquake event could potentially experience settlements up to 4.5 inches 5.25 inches, respectively.

Note: In the area of boring B-3, the water level was observed at 17.6 feet bgs on one (1) occasion. On two other occasions that the piezometer subsurface water level readings, no groundwater was observed at this location. With no ground water, liquefaction settlement is substantially reduced.

As identified by borings B-1 and B-3, our subsurface exploration program encountered a dense roughly five feet thick surface layer of silty sand along the northern and southern portion of the subject site. In our opinion, this dense material should provide adequate foundation appeared suitable for foundation support if the continuous spread footings having isolated footings connected into a grade beam system below the residence. The goal of integrating the foundation elements is to minimize differential settlement during a design seismic event.

The drilling operations has also indicated the area of Boring B-4 was underlain by loose soils with a high liquefaction potential. Given the loose soil conditions encountered at this location, over excavation and backfill may be required to mitigate future settlement in conjunction with a 2 feet thick fill mat comprised with crushed rock underlain by a geogrid reinforcement. The structural fill mat as described later in this report could partially mitigate differential settlement and damage to the proposed structures. The structural fill mat will protect the building foundations from direct bearing loss and reduce liquefaction-induced differential settlements of up to two inches. In lieu the crushed rock matt underlain by geogrid reinforcement, pin piles could be an alternative for structural support in this area or a post-tensioned slab foundations also seem appropriate. Another option depending on present site grade modifications and grading operations could implement a preload/surcharge program.

In the area of B-2, the subsurface exploration encountered loose wet fill soils located along a slope area overlooking the pond area. In our opinion, this area may be susceptible to both slope instability and liquefaction. NLO recommends that this area should be field verified to the north and south to determine the extent of the loose wet fill with additional test pits to delineate the area and depth. To reduce the liquefaction and slope instability potential along this area, we are recommending that this area should be over excavated and backfilled with on-site fills benched into the hill side and compacted to the structural fill requirements provided in this report. Given the amount of subsurface water encountered at this location, NLO recommends that subsurface drainage system will need to be placed within the fill slope during installation.

This report is preliminary and developed to provide insight on the site's liquefaction potential. If portions of the ponds are being considered for development, Additional subsurface work could be necessary to determine the extent of liquefiable soils that may reside in these areas. NLO also recommends that the stock pile area should also be further investigated once site grades have been determined at that location.

This study has been prepared for specific application to this project only and in a manner consistent with that level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area for the exclusive use NLO and their representatives. No warranty, expressed or implied, is made. This study, in its entirety, should be included in the project contract documents for the information of the contractor.

SITE PREPARATION AND GRADING

All pavement, slab-on-grade, fill and/or building areas should be stripped of all organic soil, existing fill and debris. However, deeper excavations may be required to remove previously placed uncontrolled fill disclosed during proof roll operations. Deeper excavations may also be required to remove large tree root-balls, old foundations, "filled in basement area", septic tanks and associated drain fields. Stripped soils, contaminated with organics or debris, should be wasted off site or used in landscape areas.

After site stripping and previously placed unsuitable fill removed, NLO recommends the newly exposed subgrade should be proof rolled in parking lot areas. If necessary compaction may be necessary to achieve a firm, unyielding condition. As a preliminary guideline the equipment should be of appropriate size and type capable of developing a minimum dynamic compaction effort rating of at least 25,000 pounds with a static smooth drum weight of 13,000 pounds. Compaction of the stripped subgrade should be continued until field density tests indicate a minimum compaction of 95% of the maximum dry density, as determined by ASTM method D-1557, has been achieved in all fill, building, roadway, and parking areas. Soft or weaving areas disclosed during proof rolling shall be excavated and replaced with compacted structural fill. Areas, which are to be filled to bring the pavement grades up to the desired elevation, should be filled with compacted granular material free from roots, trash or other deleterious materials.

Native soils with a fine content greater than 5 percent passing the 200 sieve will degrade if exposed to excessive moisture, and compaction and grading of this material will be difficult or impossible if soil moisture significantly increases. If used, the on-site silt and clay soils utilized for structural fill should be moisture conditioned to within plus/minus 2 percent of the optimum moisture content, and compacted to 95 percent of the maximum dry density based on the Modified Proctor ASTM 1557. Additional fill layers shall not be placed until the previous lift meets the compaction requirements presented in this report. If compaction cannot be achieved structural fill may be required as discussed in the next section.

STRUCTURAL FILL

Structural fill is defined as compacted fill placed under buildings or pavements that consist of free draining gravelly sand having a maximum size of 1-1/2 inches and no more than 5.0% fines passing the No. 200 sieve. Soils with a fine content greater than 5 percent passing the 200 sieve will degrade if exposed to excessive moisture and will not meet recommended compaction requirements. All imported fill material should conform to the above recommendation regardless of the site's weather conditions. All structural fill should be placed on a firm, properly prepared subgrade in loose layers approximately 8 inches in thickness, conditioned to a moisture content suitable for compaction, and compacted to 95% of the maximum dry density as determined by ASTM D-1557 (Modified Proctor). All Structural fill material should be submitted for approval to the Geotechnical Engineer at least 48 hours prior to delivery to the site.

FOUNDATION

In general, building areas shall be stripped of all sod, organic soil, existing fill and debris. In most areas, a stripping depth or overexcavation depth of about half (1/2) foot to two (2) feet should be anticipated for the areas of Boring B-1 and B-3. However our investigation indicated that loose uncontrolled fill mixed or layered with topsoil and organics that ranged up to a maximum thickness to 20 feet as observed in boring B-2 feet as measured below present site grades. The thicker fills encountered in the general area of boring B-2 will require removal prior to structural fill placement. Following site stripping, and prior to the fill placement, the exposed building subgrade may require reworking the upper one to two feet of the subgrade to be compacted to a firm, unyielding condition.

For frost protections, footings should have a minimum embedment depth of 18 inches below adjacent grade. A base friction coefficient of 0.25 is considered appropriate for the expected foundations residing on structural fill. An ultimate passive equivalent fluid earth pressure for passive pressures, considering a horizontal ground surface, of 250 pcf is available to develop additional resistance to lateral pressures. Passive pressures should be ignored or appropriately reduced in areas where the ground slopes downward on the resisting side of the wall within 4 times the footing embedment depth of the wall. The upper two feet of soil should be neglected when calculating the passive resistance. A 1/3 increase in the above value may be used for short duration, wind, and seismic loads.

Compaction of the stripped subgrade should be continued until field density tests show that a minimum compaction of 95% of the maximum dry density, as determined by ASTM method D-1557, has been achieved in all fill, building, roadway, and parking areas, or NLO indicates a firm unyielding subgrade has been achieved.

For the building's continuous and column footing system bearing on properly compacted structural fill or dense undisturbed native granular soils an allowable bearing pressure of 1,500 pounds per square foot (psf) can be used.

NLO recommends field verification of the foundation subgrade areas prior to placement of concrete formwork or rebar. The field verification of the footing's foundation subgrade area is necessary to make certain that the foundation have been established on dense to very dense soil condition or on properly compacted crushed rock or structural fill. During our field verification, NLO's representative can also provide recommendations for over excavation and backfill.

Foundations Settlement

Based on an allowable soil bearing pressure of 1,500 psf, total settlement in the range of one inch is anticipated with differential settlement of about ½ inch over a span distance of 50 linear feet, which does not include liquefaction settlement.

Crushed Rock Pad

In the vicinity of Boring B-4, NLO recommends supporting the entire building pad area on a two feet minimum thickness of crushed rock with a particle size of about 2 inches similar to railroad ballast as measured below anticipated foundation level. The rock pad should extend two (2) feet beyond the furthest protrusion of the buildings perimeter foundation system. Prior to rock placement, the subsequent excavation shall be compacted to 95 percent of the ASTM 1557 - Modified Proctor. After compaction of the subsequent subgrade has been verified, the subgrade area can be overlain with a bi-direction geogrid reinforcement.

If the subgrade is prepared per the recommendations discussed in this report, the proposed single-family structures can be supported on conventional spread and continuous footings placed on the crushed rock base. The purpose of supporting the building footprint in this manner will provide a uniform support along the base of the structure is to mitigate differential settlement.

Provided the structure will be supported atop a crushed rock pad as described above (and below), the following parameters can be used for design of the new foundations:

- Allowable soil bearing capacity 1,500 psf
- Passive earth pressure 300 pcf (equivalent fluid) coefficient of friction, and
- A one-third increase in the allowable soil bearing capacity can be assumed for short-term wind seismic loading conditions.

With structural loading as expected, total settlement in the range of one inch is anticipated, with differential settlement of about one-half inch. The majority of the settlements should occur during construction, as dead loads are applied.

Building Pad and Footing Subgrade Preparation

As described above, we recommend supporting the proposed structure on a crushed rock base comprised of two (2) feet of crushed clean rock underlain by a bi-directional geogrid placed along the native subgrade soils. The process for crushed rock placement base should be prepared as follows:

- The building pad area shall be stripped of topsoil and organic laden soils two (2) feet beyond the anticipated building pad area to expose upper native silty soils.
- Place woven geotextile across entire building pad and footing subgrade area.
- Place two feet of crushed rock and compact with dual drum roller or similar compaction device until NLO representative determines the crushed rock has been properly seated.
- Construct footings and building slab directly atop the two feet of new structural fill and place additional structural fill to achieve footing and slab subgrade elevations, as necessary.
- NLO should be on-site to observe building pad and subgrade preparation activities.

SLAB-ON-GRADE

If slab-on-grade floors are utilized, it will be necessary to connect or structural support the floor slab into the strip and column foundations. A capillary break/drainage layer consisting of six inches of pea gravel, or clean crushed rock should be placed below the floor slab. The capillary break material should contain less than 1.0% material passing a U.S. No. 200 sieve and less than 4.0% material passing a U.S. No. 10 sieve. A visqueen vapor barrier having a minimum thickness of 6-mils should be placed between the capillary break and the floor slab. We understand that a sand cushion between the vapor barrier and the base of the slab may improve the curing of the slab concrete. If a sand cushion is placed between the capillary break material or the vapor barrier and the slab, it should not contain free moisture when the slab is constructed. Excess moisture in the cushion could cause impervious floor coverings to bubble.

SURFACE RUNOFF AND PERCHED GROUND WATER

Only minor storm water related problems are anticipated if site grading and preparation are undertaken during the normally drier portions of the year. If site work is undertaken during wet weather it should be

expected that the near surface silty and fine-grained soils would become over-saturated and unworkable. If the site work is undertaken during wet weather the contractor should be fully prepared to deal with soil and water problems normally encountered in these materials during wet weather work, including the filtering of runoff, as needed to prevent the siltation of down slope areas. To aid in minimizing potential erosion, it is recommended that the site not be stripped and left without erosion protection for an extended period of time prior to the actual start of construction and/or landscaping. Silt fencing and other erosion control devices and measures may be required to control water runoff over slope areas and sediment transport off the site.

EROSION

It is our experience that this risk of erosion can be mitigated through normal landscaping and the control of surface runoff. During construction and until fully surfaced and/or landscaped, the exposed site soils may be subject to some erosion. Erosion of the exposed soils would be most noticeable during periods of intense rainfall and may be controlled by the use of normal erosion control measures, i.e., silt fences, hay bales, mulching.

In a disturbed condition, the site soils may be eroded by channelized water or storm runoff from sheet flow. Therefore, it is recommended that all site preparation and excavation work be completed during the normally drier portion of the year. During periods of heavy rainfall, ditching should be used to divert water away from stripped areas and visqueen should be used to cover the slopes and soil stockpiles to aid in preventing excessive surface erosion. This covering also aids in preventing infiltration of water into the unprotected soils. All disturbed soil areas and slopes should be replanted with fast-growing, deep-rooted grass, shrubs and other ground cover as soon after final grading as possible. If the vegetation is not fully established prior to the onset of wet weather, the slopes should be covered with visqueen to aid in preventing excessive erosion and water infiltration.

TEMPORARY AND PERMANENT SLOPES

As a preliminary guideline for temporary cuts less than 10 feet in height not including footing subgrade areas, we recommend temporary slopes be made no steeper than 1H:1V for the dense granular soils and no steeper than 2H:1V in medium dense soils or structural fill placed and compacted as outlined above. For temporary cut slopes in existing fill, topsoil, or loose materials exceeding a vertical height of 10 feet, we recommend temporary slopes no steeper than 1 1/2H:1V for the full height of the cut. Temporary slopes or excavations should be benched as required by safety regulations in effect at the time of construction. These temporary slope recommendations are for native soils and fill materials; flatter slopes may be required in wet weather or if soil conditions other than those previously described are encountered. The contractor should be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations; e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. Such regulations are strictly enforced and, if not followed, the owner, the contractor, or the earthwork or utility subcontractors could be liable for substantial penalties. The contractor should be made responsible for the stability of all excavations and slopes during construction because they are continually on site and can observe the stability of the exposed soils. In addition, the contractor should be prepared to shore any unstable slope area and provide shoring as required by local, state, or federal laws or codes. The provision of shoring design recommendations is beyond the authorized scope of this report.

REPORT LIMITATIONS

This report has been prepared for the client regarding the subject property. Information presented in this report has been collected and interpreted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions, and in accordance with sound and generally accepted principles consistent with normal consulting practice. No other warranty, expressed or implied, including (but not limited to) any warranty or merchantability or fitness for a particular use has been made.

In the event that change in the nature, design, or location of the proposed construction is made, or any physical changes to the site occur, recommendations are not be considered valid unless the changes are reviewed by NLO and conclusions of this report are modified or verified in writing.

NLO should be retained to provide geotechnical services during construction. This is to observe compliance with the design concepts, specifications or recommendations and to allow design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. We do not accept responsibility for the performance of the foundation or earthwork unless we are retained to review the construction drawings and specifications, and to provide construction observation.

If we can be of further assistance or if you have any questions regarding this project, please contact our office.

Sincerely,


Wesley R. Johnson, P.E.
Geotechnical Division Manager



Attachments:

Pit Area	FIGURE 1
Outfall Area	FIGURE 2
SCS Soil Mapping	FIGURE 3
Seismic Mapping	FIGURE 4
Test Pit Logs	FIGURES 5 TO 35
Lab Results	FIGURES 36 TO 38

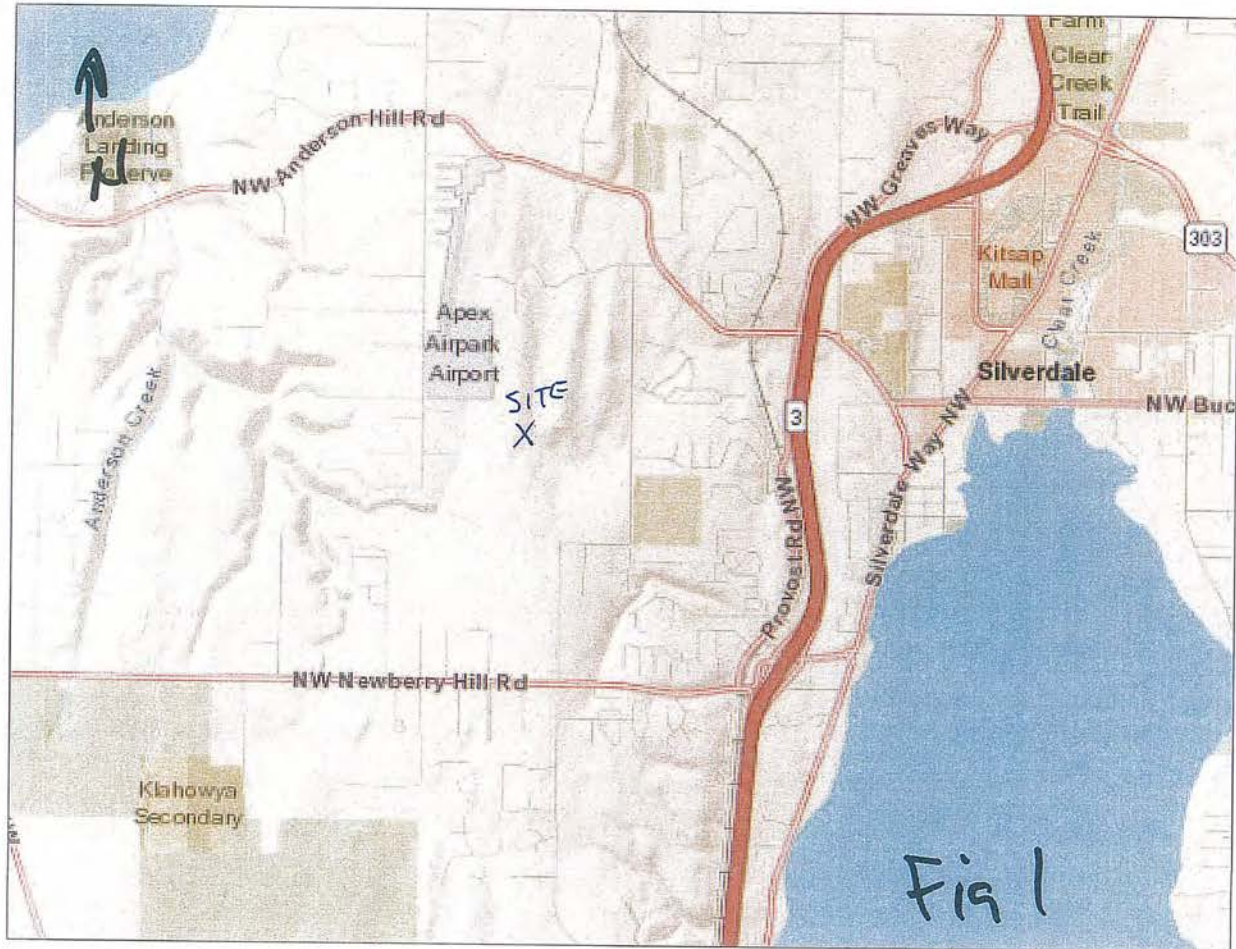
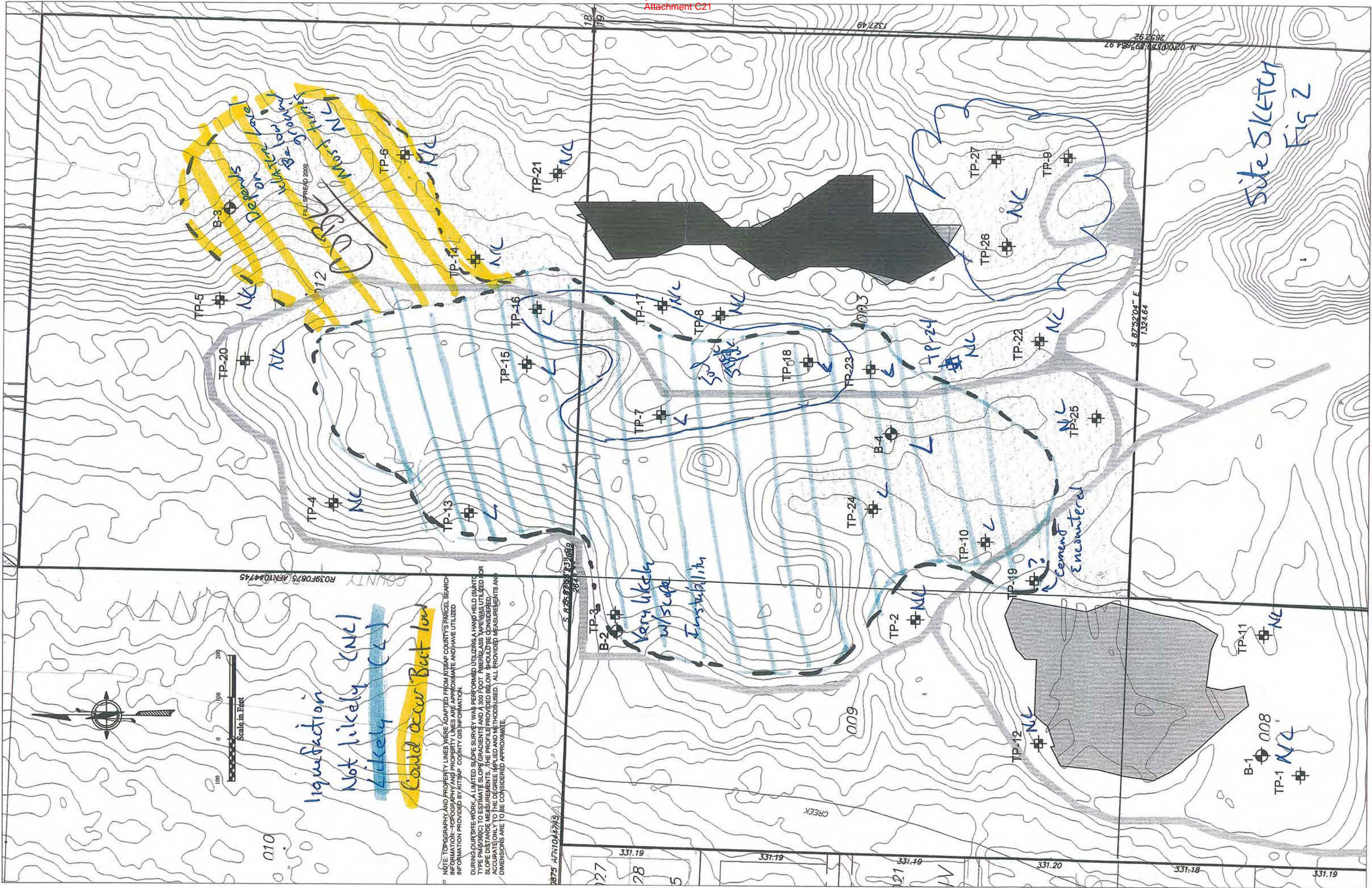


Fig 1
Vicinity MAP



Site Sketch
Fig 2

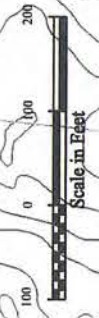
liquefaction
Not likely (NC)
Likely (L)
Could occur But low

Very likely
w/ slope
Instability

Cement
Encountered

Most of
fill spread
is on
level
Be low
water
table

NOTE: TOPOGRAPHY AND PROPERTY LINES WERE ADAPTED FROM KITSAP COUNTY'S PARCEL SEARCH INFORMATION - TOPOGRAPHY AND PROPERTY LINES ARE APPROXIMATE AND HAVE UTILIZED INFORMATION PROVIDED BY KITSAP COUNTY GIS INFORMATION.
DURING OUR SITE WORK, A LIMITED SLOPE SURVEY WAS PERFORMED UTILIZING A HAND HELD (SUNIC TYPE PA9360C) TO ESTIMATE SLOPE GRADIENTS AND A 300 FOOT FIBERGLASS TAPE WAS UTILIZED FOR SLOPE DISTANCE MEASUREMENTS. THE PROFILE PROVIDED BELOW SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED AND METHODS USED. ALL PROVIDED MEASUREMENTS AND DIMENSIONS ARE TO BE CONSIDERED APPROXIMATE.



039F0875 AR1044745

S. 85.8251 137.659

2875 AF1104745 AD

27 331.19

28 331.19

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1327.49

2632.92

N 02°03'39" E 2632.92

S 87°52'04" E 1324.64

TP-5

TP-20

TP-4

TP-13

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

B-3

TP-6

TP-21

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

TP-5

TP-20

TP-4

TP-13

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

B-3

TP-6

TP-21

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

TP-5

TP-20

TP-4

TP-13

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

B-3

TP-6

TP-21

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

TP-5

TP-20

TP-4

TP-13

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

B-3

TP-6

TP-21

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

TP-5

TP-20

TP-4

TP-13

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

B-3

TP-6

TP-21

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

TP-11

TP-12

TP-1

TP-11

TP-5

TP-20

TP-4

TP-13

TP-14

TP-15

TP-16

TP-17

TP-7

TP-8

TP-18

TP-23

TP-24

TP-25

TP-26

TP-27

TP-9

TP-22

TP-25

TP-10

TP-19

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TP-11

B-3

TP-6

TP-21

TP-14

TP-15

TP-16

TP-17

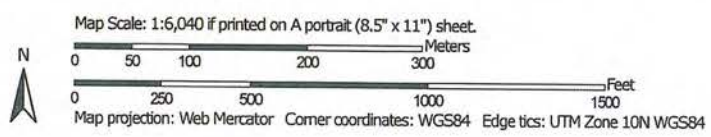
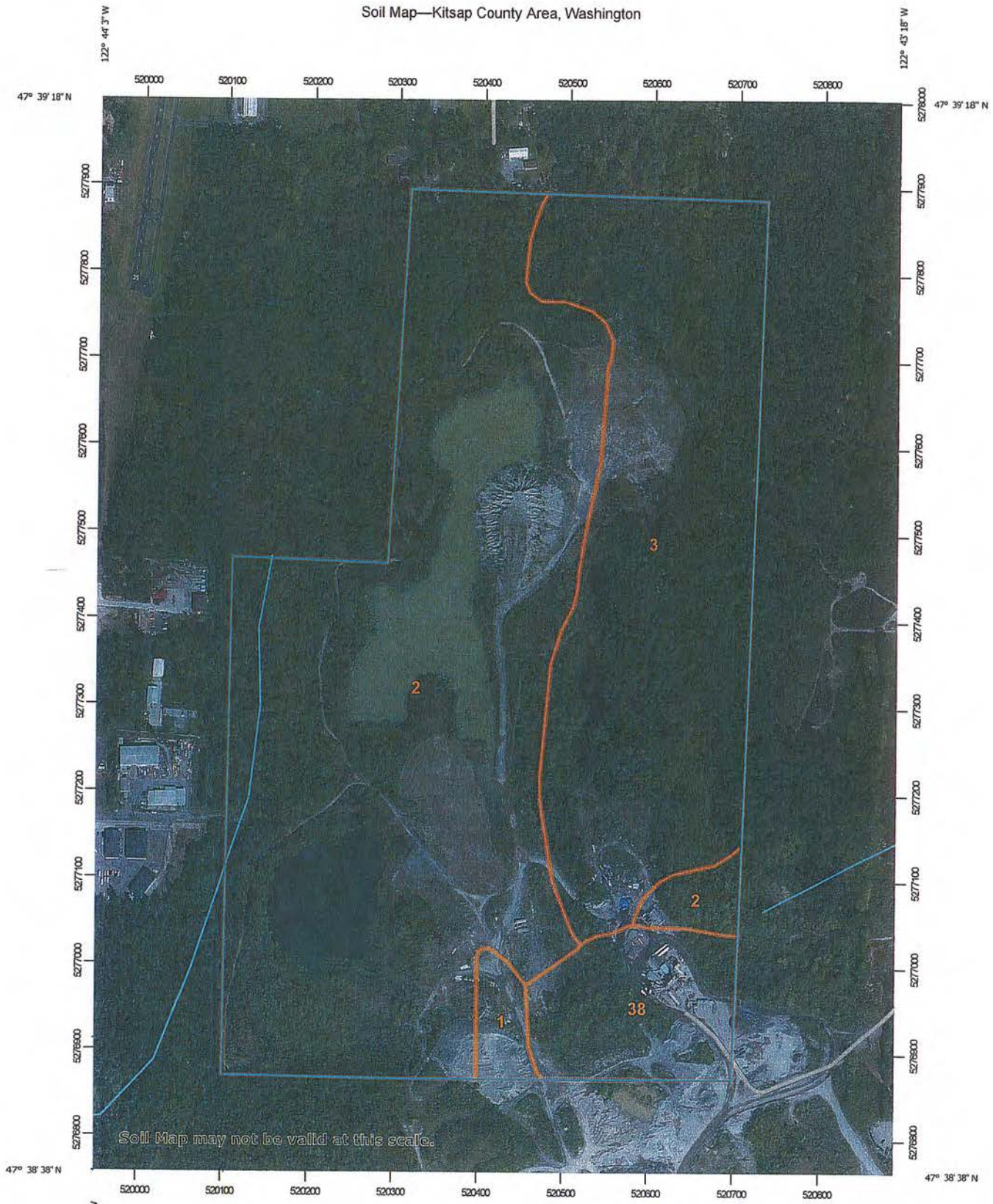
TP-7

TP-8

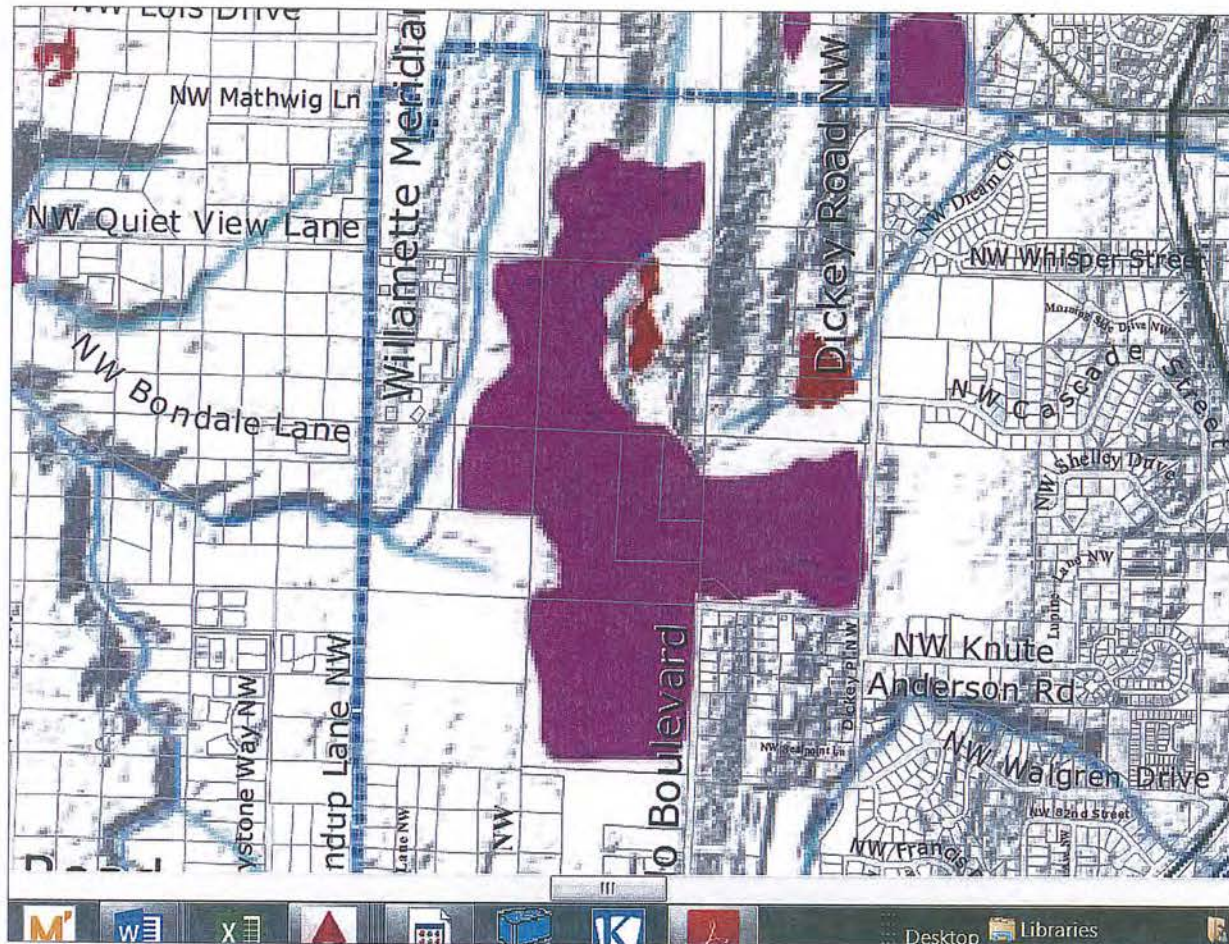
TP-18

TP-23

Soil Map—Kitsap County Area, Washington



SCS
Fig 3




Seismic Fig 4
MAP



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PORT ORCHARD, WASHINGTON 98366-0637

Test Pit Log
Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479	Logged By: SMC	Subsurface Exploration		Ground Surface Elevation 435	Test Pit Number TP-1	Page 1 of 1
		Start Date: Sept 17, 2018	End Date: Sept 19, 2018			

General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:
		TPSL			Topsoil 2" to 4"
2		SM	1		Fill: Brownish Gray Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded to Rounded Gravel and Cobbles - Trace to No gravel (fill) - Fine Grained Sand - Pocket Pen 3.5 - At 9', Areas of varying density from loose to medium dense - At 10', becomes Wet At 18', Becomes loose
			2		
			3		
			4		
			5		
			6		
7			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
18			17		
			18		
	19				
	20				
	21				
	22				
					End of Test Pit at 20 feet

Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab	Drawn By: SMC	Date Sept 19, 2018	Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Equipment Case CX240B Excavator	Groundwater Elevation Wet soil 10 feet		Checked By: WRJ	Date Month XX, 2017	
Notes: GPS Location: 47.64514 degrees N, 122.73182 W			Revision By: SMC	Date Month XX, 2017	

Fig 5



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration		Ground Surface Elevation 460	Test Pit Number TP-2	Page 1 of 1
				Start Date: Sept 17, 2018	End Date: Sept 19, 2018			
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Topsoil 2" to 4"			
4		SM	1 2 3 4 5 6 7 8 9 10		Native: Light Brown Silty SAND with Gravel, Dense to Very Dense, Moist - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded to Rounded Gravel and Cobbles			
10			11 12 13 14 15 16 17 18 19 20 21 22		End of Test Pit at 10.5 feet (Refusal)			
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC	Date Sept 19, 2018	
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected				Checked By: WRJ	Date Month XX, 2017	
Notes: GPS Location: 47.64816 degrees N, 122.73028 W						Revision By: SMC	Date Month XX, 2017	
						Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____		

Fig 6




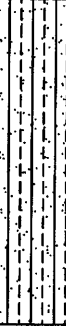
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PORT ORCHARD, WASHINGTON 98366-0637

Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 440	Test Pit Number TP-3	Page 1 of 1		
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:					
		TPSL			Topsoil 2" to 4"					
2		SM	1		Fill: Light Brown Silty SAND with Gravel, Medium Dense, Moist - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded to Rounded Gravel and Cobbles					
2										
3										
4										
5										
6										
					6		At 6', Wood Debris (Roots/Branches up to 6" diameter)			
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
12			17		Becomes loose to medium dense, Moist - Trace to No gravel - Fine Grained Sand - Silt Content Increases					
17		SP	18		Fill: Gray poorly Graded SAND with gravel, Loose to Medium Dense, Moist - Trace Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles					
18			19							
			20							
			21		End of Test Pit at 20 feet					
			22							
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC		Date Sept 19, 2018		
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected		Checked By: WRJ		Date Month XX, 2017		Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____		
Notes: GPS Location: 47.65014 degrees N, 122.73027 W		Revision By: SMC		Date Month XX, 2017						

 N.L. Olson & Associates, Inc. Engineering, Planning and Surveying 2453 BETHEL AVENUE P.O. BOX 637 PORT ORCHARD, WASHINGTON 98366-0637				<h2 style="margin: 0;">Test Pit Log</h2> <p style="margin: 0;">Dickey Pit 8857 Dickey Road. NW, Silverdale, WA</p>			
Job Number: 10479	Logged By: SMC	Subsurface Exploration		Ground Surface Elevation 445	Test Pit Number TP-4	Page 1 of 1	
		Start Date: Sept 17, 2018	End Date: Sept 19, 2018				
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:		
		TPSL			Topsoil 2" to 4"		
4		SM	1 2 3 4 5 6 7		Native: Light Brown Silty SAND with Gravel, Very Dense, Moist (Glacial Till) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles		
			8 9 10 11 12 13 14 15 16 17 18 19 20 21 22		End of Test Pit at 7 feet		
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC	
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected		Date Sept 19, 2018		Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____	
Notes: GPS Location: 47.65212 degrees N, 122.72925 W				Checked By: WRJ			Date Month XX, 2017
				Revision By: SMC			Date Month XX, 2017

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Test Pit Log
Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA


Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 450	Test Pit Number TP-5	Page 1 of 1		
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:					
		TPSL			Topsoil 2" to 4"					
1		SM	1		Fill: Light Brown Silty SAND with Gravel, Dense, Moist - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles					
			2							
			3							
			4							
			5							
5					6		becomes loose to medium dense - Trace to No gravel - Fine Grained Sand - Pocket Pen 2.5 tsf - May contain sandy silt fill layers between 6 to 22 feet			
			7							
			8							
			9							
			10							
			11							
			12							
			13							
			14							
			15							
10					16		Organics content (Roots), less than 5% to 14'			
			17							
			18							
			19							
			20							
			21							
End of Test Pit at 22 feet										
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC	Date Sept 19, 2018			
Equipment Case CX240B Excavator			Groundwater Elevation No Water Detected			Checked By: WRJ	Date Month XX, 2017			
Notes: GPS Location: 47.65212 degrees N, 122.72925 W					Revision By: SMC	Date Month XX, 2017				
<div style="float:right;"> <p>Test Pit Completion</p> <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ </div>										

Fig 9



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479	Logged By: SMC	Subsurface Exploration		Ground Surface Elevation 430	Test Pit Number TP-6	Page 1 of 1
		Start Date: Sept 17, 2018	End Date: Sept 19, 2018			

General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:
		TPSL			Topsoil 1" to 3"
3		SM	1		Fill: Light Brown Silty SAND with Gravel, Dense, Moist - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles Contains Gray Sandy SILT fill layers , loose to medium dense - Trace to No gravel - Fine Grained Sand - Organics to 9.5' (roots) - Fine Grained Sand - Pocket Pen 1.5 <i>e = f</i> Brownish Gray Silty SAND, Dense, Moist (<i>fill</i>) - Fine Grained Sand End of Test Pit at 20 feet
			2		
			3		
			4		
			5		
			6		
			7		
7			8		
			9		
			10		
			11		
			12		
			13		
15			14		
			15		
			16		
			17		
			18		
19			19		
	20				
	21				
	22				

Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab	Drawn By: SMC	Date Sept 19, 2018	Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Equipment Case CX240B Excavator	Groundwater Elevation No Water Detected		Checked By: WRJ	Date Month XX, 2017	
Notes: GPS Location: 47.65115 degrees N, 122.72579 W			Revision By: SMC	Date Month XX, 2017	



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 445	Test Pit Number TP-7	Page 1 of 1
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Topsoil 1" to 3"			
		SM	1-		Light Brown Silty SAND with Gravel, Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles			
			2-					
			3-					
			4-					
4		SM	5-		Gray Sandy SILT/LAYERS <i>LOOSE TO medium dense Moist</i> - Trace to No gravel - Fine Grained Sand - Organics to 9.5' (roots)			
			6-					
			7-					
			8-					
			9-					
			10-					
			11-					
			12-					
			13-					
			14-					
14			15-					
		16-						
		17-						
		18-						
		19-						
		20-						
			21-	End of Test Pit at 20 feet				
			22-					
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC	Date Sept 19, 2018	
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected				Checked By: WRJ	Date Month XX, 2017	
Notes:					Revision By: SMC		Date Month XX, 2017	
					<p>Test Pit Completion</p> <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____			

Fig 11



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 440	Test Pit Number TP-8	Page 1 of 1
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Topsoil 2" to 4"			
4		SM	1		Light Brown Silty SAND with Gravel, Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles			
			2					
			3					
			4		Contains Gray Sandy SILT fill layers			
			5		- Trace to No gravel			
			6		- Fine Grained Sand			
			7		- At 7', Gray/Brown Mottled			
			8		- Organics Less Than 5% between 7'-10'			
			9					
			10					
			11					
			12					
			13					
			14		Organics (Roots, Tree Debris) from 14'-17'			
			15					
			16					
			17					
18								
19								
20		End of Test Pit at 20 feet						
21								
22								
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC		Date Sept 19, 2018
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected		Checked By: WRJ		Date Month XX, 2017		Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Notes: GPS Location: 47.64949 degrees N, 122.72721 W				Revision By: SMC		Date Month XX, 2017		




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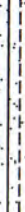
Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 445	Test Pit Number TP-10	Page 1 of 1	
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:				
		TPSL			Topsoil 2" to 4"				
3		SM	1-		Light Brown Silty SAND with Gravel, Dense to Very Dense, Moist (Till Fill)				
6			2-		- Fine Grained Sand				
7			3-		- Trace Gravel and Cobbles				
			4-		- Subrounded Gravel and Cobbles				
			5-		- Bcomes Very Dense at 3'				
			6-						
			7-		Contains Gray Sandy SILT fill layers between 6.5 to 12 feet				
			8-		- Trace to No gravel				
			9-		- Fine Grained Sand				
			10-		- Density Increases at Depth Starting at 12'				
12			11-						
13			12-		<i>Gravelly</i> Brown Silty SAND, Soft to Medium Stiff, Wet (Fill)				
			13-		- Trace to No gravel				
			14-		- Fine Grained Sand				
			15-						
			16-						
			17-						
			18-						
			19-						
			20-		End of Test Pit at 20 feet				
	21-								
	22-								
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC		Date Sept 19, 2018	
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected <i>12</i>		Checked By: WRJ		Date Month XX, 2017		Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____	
Notes: GPS Location: 47.63744 degrees N, 122.72905 W				Revision By: SMC		Date Month XX, 2017			

 N.L. Olson & Associates, Inc. Engineering, Planning and Surveying 2453 BETHEL AVENUE P.O. BOX 637 PORT ORCHARD, WASHINGTON 98366-0637	<h2 style="margin:0;">Test Pit Log</h2> Dickey Pit 8857 Dickey Road. NW, Silverdale, WA
--	---

Job Number: 10479	Logged By: SMC	Subsurface Exploration		Ground Surface Elevation 480	Test Pit Number TP-12	Page 1 of 1
		Start Date: Sept 17, 2018	End Date: Sept 19, 2018			

General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:
		TPSL			Topsoil 2" to 4"
3			1 2 3 4 5 6 7 8		Light Brown Silty SAND with Gravel, Dense to Very Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles - Bcomes Very Dense at 3'
10		SM	9 10 11 12 13 14 15 16 17 18 19		At 10', Becomes Brown, Density Increases to Medium Dense to Dense, Organics (Wood Debris) from 10'-13'
16			20 21 22		End of Test Pit at 20 feet

Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab	Drawn By: SMC	Date Sept 19, 2018	Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected	Checked By: WRJ	Date Month XX, 2017	
Notes: GPS Location: 47.64740 degrees N, 122.73139 W			Revision By: SMC	Date Month XX, 2017	




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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 465	Test Pit Number TP-13	Page 1 of 1
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Topsoil 2" to 4"			
3		SM	1		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles Organics (Roots and Tree Debris) to 6'			
7			2					
			3					
			4					
			5					
			6					
			7					
			8					
			9		Contains Gray Sandy SILT fill layers - Trace Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles - Pocket Pen 0.5			
			10					
			11					
			12					
			13					
			14					
			15					
			16					
			17					
			18					
19			19					
			20	End of Test Pit at 20 feet				
	21							
	22							
Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab		Drawn By: SMC	Date Sept 19, 2018		Test Pit Completion	
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected		Checked By: WRJ	Date Month XX, 2017		<input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____	
Notes: GPS Location: 47.65080 degrees N, 122.72944 W				Revision By: SMC	Date Month XX, 2017			

 N.L. Olson & Associates, Inc. Engineering, Planning and Surveying 2453 BETHEL AVENUE P.O. BOX 637 PORT ORCHARD, WASHINGTON 98366-0637	<h2 style="margin:0;">Test Pit Log</h2> Dickey Pit 8857 Dickey Road. NW, Silverdale, WA
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Job Number: 10479	Logged By: SMC	Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018	Ground Surface Elevation 435	Test Pit Number TP-14	Page 1 of 1
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General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:
		TPSL			Topsoil 2" to 4"
3	[Symbol]		1 2 3 4		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles Organics (Roots and Tree Debris) to 6'
7	[Symbol]	SM	5 6 7 8 9 10 11 12 13 14 15 16 17		Contains Gray Sandy SILT fill layers - Trace Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles - Pocket Pen 0.5 At 14', Caving
19	[Symbol]		18 19		At 18', Increased Density
			20 21 22		End of Test Pit at 20 feet

Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab	Drawn By: SMC	Date Sept 19, 2018	Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected	Checked By: WRJ	Date Month XX, 2017	
Notes: GPS Location: 47.65176 degrees N, 122.72685 W			Revision By: SMC	Date Month XX, 2017	

Fig 18



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 425	Test Pit Number TP-15	Page 1 of 1
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Sandy Gravel (Stockpile Wash)			
2		SM	1		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill)			
			2		- Fine Grained Sand			
			3		- Trace Gravel and Cobbles			
			4		- Subrounded Gravel and Cobbles			
			5		Organics (Roots and Tree Debris) to 6'			
			6					
			7					
			8		Contains Gray Sandy SILT fill layers			
			9		- Trace Cobbles			
			10		- Fine Grained Sand			
			11		- Subrounded to Rounded Gravel and Cobbles			
			12		- Pocket Pen 0.5			
			13					
			14		At 14', Caving			
			15					
			16					
			17					
18			18		At 18', Increased Density			
			19					
			20		End of Test Pit at 20 feet			
	21							
	22							
Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab	Drawn By: SMC	Date Sept 19, 2018	Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____			
Equipment Case CX240B Excavator	Groundwater Elevation No Water Detected		Checked By: WRJ	Date Month XX, 2017				
Notes: GPS Location: 47.65112 degrees N, 122.72798 W		Revision By: SMC	Date Month XX, 2017					



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration		Ground Surface Elevation	Test Pit Number	Page	
				Start Date: Sept 17, 2018	End Date: Sept 19, 2018	440	TP-16	1 of 1	
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:				
		TPSL			Sandy Gravel (Stockpile Wash)				
3		SM	1		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles				
			2						
			3						
			4			Gray Sandy SILT/CLAY with Gravel, Soft to Medium Stiff, Moist - Trace Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles - Pocket Pen 1.5			
5				5					
			6						
			7						
			8						
			9						
			10						
			11						
			12						
			13						
			14						
			15						
			16						
			17						
			18						
			19						
			20		End of Test Pit at 20 feet				
			21						
			22						
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC	Date Sept 19, 2018		
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected		Checked By: WRJ		Date Month XX, 2017			
Notes: GPS Location: 47.65106 degrees N, 122.72689 W				Revision By: SMC		Date Month XX, 2017			
<p>Test Pit Completion</p> <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____									

Fig 20



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479	Logged By: SMC	Subsurface Exploration		Ground Surface Elevation 435	Test Pit Number TP-17	Page 1 of 1
		Start Date: Sept 17, 2018	End Date: Sept 19, 2018			

General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:
		TPSL			Top Soil 2" to 4"
3		SM	1		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles Gray Sandy SILT' <i>LAYERS LOOSE to medium dense Moist</i> - Trace Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles - Pocket Pen 1.5 - Organics (Tree Debris) from 16'-20' From 16'-18, Organics (Tree Debris)
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
			22		End of Test Pit at 21 feet

Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab	Drawn By: SMC	Date Sept 19, 2018	Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Equipment Case CX240B Excavator	Groundwater Elevation No Water Detected		Checked By: WRJ	Date Month XX, 2017	
Notes: GPS Location: 47.65017 degrees N, 122.72734 W			Revision By: SMC	Date Month XX, 2017	

Fig 21



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration		Ground Surface Elevation 435	Test Pit Number TP-18	Page 1 of 1
				Start Date: Sept 17, 2018	End Date: Sept 19, 2018			
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Top Soil 2" to 4"			
4		SM	1		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles			
			2					
			3					
			4					
			5					
			6					
			7					
			8					
			9					
			10					
10					10		At 10', Increase in Density	
			11		End of Test Pit at 11 feet (Refusal)			
			12					
			13					
			14					
			15					
			16					
			17					
			18					
			19					
			20					
			21					
			22					
Contractor Vet Industrial	Operators Name Shannon		Sampling Method Grab		Drawn By: SMC	Date Sept 19, 2018		
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected			Checked By: WRJ	Date Month XX, 2017		
Notes: GPS Location: 47.64875 degrees N, 122.72774 W					Revision By: SMC	Date Month XX, 2017		
					Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____			

Fig 22



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration		Ground Surface Elevation	Test Pit Number	Page
				Start Date: Sept 17, 2018	End Date: Sept 19, 2018	440	TP-19	1 of 1
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Top Soil/ Fill 6"			
			1		Concrete			
			2		End of Test Pit at 1 foot			
			3					
			4					
			5					
			6					
			7					
			8					
			9					
			10					
			11					
			12					
			13					
			14					
			15					
			16					
			17					
			18					
			19					
			20					
			21					
			22					
Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab			Drawn By: SMC	Date Sept 19, 2018		
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected			Checked By: WRJ	Date Month XX, 2017		
Notes: GPS Location: 47.64706 degrees N, 122.72985 W					Revision By: SMC	Date Month XX, 2017		
					Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____			

Fig 23

 N.L. Olson & Associates, Inc. Engineering, Planning and Surveying 2453 BETHEL AVENUE P.O. BOX 637 PORT ORCHARD, WASHINGTON 98366-0637	<h2 style="margin:0;">Test Pit Log</h2> Dickey Pit 8857 Dickey Road. NW, Silverdale, WA
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Job Number: 10479	Logged By: SMC	Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018	Ground Surface Elevation 450	Test Pit Number TP-20	Page 1 of 1
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General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:
		TPSL			Top Soil 1" to 3"
1	[Symbol]	SM	1 2 3 4		Native: Light Brown Silty SAND with Gravel, Very Dense, Moist (Glacial Till) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles
			5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22		End of Test Pit at 4 feet

Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab	Drawn By: SMC	Date Sept 19, 2018	Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected	Checked By: WRJ	Date Month XX, 2017	
Notes: GPS Location: 47.65238 degrees N, 122.72753 W			Revision By: SMC	Date Month XX, 2017	

Fig 24



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479	Logged By: SMC	Subsurface Exploration		Ground Surface Elevation 445	Test Pit Number TP-22	Page 1 of 1
		Start Date: Sept 17, 2018	End Date: Sept 19, 2018			

General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:
		TPSL			Top Soil 1" to 3"
5		SM	1 2 3 4 5 6 7 8 9 10		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles
11			11 12 13 14 15 16 17 18 19 20		Contains Gray Sandy SILT fill layers - Trace Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles - Minor Caving
			20		End of Test Pit at 20 feet
			21		
			22		

Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab	Drawn By: SMC	Date Sept 19, 2018	Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Equipment Case CX240B Excavator	Groundwater Elevation No Water Detected		Checked By: WRJ	Date Month XX, 2017	
Notes: GPS Location: 47.64764 degrees N, 122.72787 W			Revision By: SMC	Date Month XX, 2017	

Fig 26



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Test Pit Log

Dickey Pit
8857 Dickey Road, NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 445	Test Pit Number TP-23	Page 1 of 1
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Top Soil 1" to 3"			
3			1		Light Brown Silty SAND with Gravel, Loose to Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles - Minor Caving at 5'			
			2					
			3					
			4					
			5					
			6					
			7					
			8					
			9					
			10					
			11					
			12					
			13					
			14					
			15					
			16					
			17					
11		SM	18					
			19					
			20					
18			21		End of Test Pit at 20 feet			
			22					
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC		Date Sept 19, 2018
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected		Checked By: WRJ		Date Month XX, 2017		Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Notes: GPS Location: 47.64828 degrees N, 122.72788 W				Revision By: SMC		Date Month XX, 2017		

Fig 27



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Test Pit Log



Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 450	Test Pit Number TP-24	Page 1 of 1
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Top Soil 1" to 3"			
3		SM	1		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill)			
			2		- Fine Grained Sand			
			3		- Trace Gravel and Cobbles			
			4		- Subrounded Gravel and Cobbles			
5			5		Contains Gray Sandy SILT fill layers			
			6		- Trace Cobbles			
			7		- Fine Grained Sand			
			8		- Subrounded to Rounded Gravel and Cobbles			
			9		- Severe Caving at starting at 5-7'			
			10		- Organics (Roots) Less Than 5% to ~7'			
			11					
			12					
			13		At 13', Water Seepage on East side of pit			
			14					
			15					
			16					
17			17		Gray Well Graded SAND with Gravel, Medium Dense, Wet			
	18		- Trace Silt and Cobbles					
	19		- Subrounded to Rounded Gravel and Cobbles					
	20		End of Test Pit at 18 feet					
	21							
	22							
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC		Date Sept 19, 2018
Equipment Case CX240B Excavator		Groundwater Elevation Water Seepage at 13'		Checked By: WRJ		Date Month XX, 2017		Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Notes: GPS Location: 47.64764 degrees N, 122.72787 W				Revision By: SMC		Date Month XX, 2017		

F 29 28

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Job Number: 10479	Logged By: SMC	Subsurface Exploration		Ground Surface Elevation XXX'	Test Pit Number TP-25	Page 1 of 1
		Start Date: Sept 17, 2018	End Date: Sept 19, 2018			

General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:
		TPSL			Top Soil 2" to 4"
4		SM	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles Contains Gray Sandy SILT fill layers - Trace Gravel and Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles - Severe Caving Starting at 7'
19		SW	19 20 21 22		Gray Well Graded SAND with Gravel, Medium Dense, Wet - Trace Silt and Cobbles - Subrounded to Rounded Gravel and Cobbles End of Test Pit at 20 feet

Contractor Vet Industrial	Operators Name Shannon	Sampling Method Grab	Drawn By: SMC	Date Sept 19, 2018	Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected 19'	Checked By: WRJ	Date Month XX, 2017	
Notes: GPS Location: 47.64715 degrees N, 122.72815 W			Revision By: SMC	Date Month XX, 2017	



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration		Ground Surface Elevation 410	Test Pit Number TP-26	Page 1 of 1
				Start Date: Sept 17, 2018	End Date: Sept 19, 2018			
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:			
		TPSL			Top Soil 1" to 3"			
4		SM	1- 2- 3- 4-		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles			
9			5- 6- 7- 8- 9- 10- 11-		Contains Gray Sandy SILT fill layers - Trace Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles - Pocket Pen 1.0 - From 7' to 9', Organics (Tree Debris)			
17			12- 13- 14- 15- 16- 17-		Becomes Wet at 17'			
19			18- 19-		At 19', Moderate Water Seepage on North side			
			20- 21- 22-		End of Test Pit at 20 feet			
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC	Date Sept 19, 2018	
Equipment Case CX240B Excavator		Groundwater Elevation Water Seepage at 19'		Checked By: WRJ	Date Month XX, 2017		Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____	
Notes: GPS Location: 47.64780 degrees N, 122.72611 W				Revision By: SMC	Date Month XX, 2017			

F 19 30



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Test Pit Log

Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number: 10479		Logged By: SMC		Subsurface Exploration Start Date: Sept 17, 2018 End Date: Sept 19, 2018		Ground Surface Elevation 405	Test Pit Number TP-27	Page 1 of 1			
General Notes SAMPLE COLLECTION DEPTH (FT)	Graphic Symbol	USCS SYMBOL	Depth (ft)	Moisture Content (%)	Surface Conditions:						
		TPSL			Top Soil 1" to 3"						
3		SM	1		Light Brown Silty SAND with Gravel, Medium Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded Gravel and Cobbles						
			2								
			3								
					4		Contains Gray Sandy SILT fill layers - Trace Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles - Pocket Pen 1.0 - Organics Less Than 5%				
			5								
			6								
			7								
7			8								
			9								
			10								
			11								
			12								
			13								
			14								
			15								
			16								
			17								
18			18								
19			19								
			20		Gray Silt SAND with Gravel, Very Dense, Moist (Glacial Till) - Trace Cobbles - Fine Grained Sand - Subrounded to Rounded Gravel and Cobbles						
			21								
			22								
End of Test Pit at 19.5 feet											
Contractor Vet Industrial		Operators Name Shannon		Sampling Method Grab		Drawn By: SMC		Date Sept 19, 2018			
Equipment Case CX240B Excavator		Groundwater Elevation No Water Detected		Checked By: WRJ		Date Month XX, 2017		Test Pit Completion <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____			
Notes: GPS Location: 47.64783 degrees N, 122.72582 W						Revision By: SMC				Date Month XX, 2017	



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Boring Log

JWJ Group Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number 10479	Logged By SMC	Subsurface Exploration Drilling		Ground Surface Elevation 440'	Boring: B - 1	Page 1 of 2
		Start Date JAN 9, 2019	End Date JAN 9, 2019			

General Notes	Graphic Symbol	USCS SYMBOL	Recovery (in)	Depth (ft)	Blow per (ft) (N-Value)	Surface Conditions:	Moisture Content (%)
B1, 2.5 ft		SM		1		Fill: Brownish Gray Silty SAND with Gravel, Medium Dense, Moist to Damp (Till Fill) - Fine Grained Sand - Trace Gravel and Cobbles - Subrounded to Rounded Gravel and Cobbles	
				2			
				3	20		
				4	13		
				5	10		
B1, 5.0 ft				6	6		
				7	13		
				8	18		
B1, 7.5 ft				9	8		
				10	12		
				11	17		
B1, 10.0 ft				12	12		
	13	14					
	14	20					
	15						
B1, 12.5 ft	ML			13	10	Brownish Gray Sandy SILT/CLAY, Stiff, Moist - Trace Gravel - Fine Grained Sand	
				14	8		
				15	9		
B1, 15.0 ft				16	15		
				17	36		
				18	17		
B1, 20.0 ft	19						
	20						

Monitoring Well installed

Continued on Page 2

Start Time 0930	End Time 1020	Hammer Type 140 lb Manual with cats head	Drawn By: SMC	Date Jan 11, 2019	Hole Completion <input type="checkbox"/> Monitoring Well <input checked="" type="checkbox"/> Piezometer <input type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> Inclinator Sampling Method Standard Split Spoon I California Sampler II
Drilling Contractor Advanced Drill	Operators Name Wade Bellaf	Drilling and sampling Method Standard Split Spoon	Checked By: WRJ	Date Jan 24, 2019	
Equipment d50 tracked drill rig	Groundwater Elevation No Water Encountered		Revision By: SMC	Date Jan 25, 2019	
Job Location					
Remarks: Near Test Pit 11 24-hr Piezometer Check: Dry					

F 1 9 32



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Job Number 10479	Job Name Dickey Pit	Logged By SMC	Boring: B - 1
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Page
2 of 2

Moisture
Content
(%)

General Notes	Graphic Symbol	USCS SYMBOL	Recovery (ft)	Depth (ft)	Blow per (ft) (N-Value)	Description	Moisture Content (%)
B1, 20.0 ft		ML	5'	20	3	Gray Sandy SILT/CLAY, Medium Stiff, Moist - Trace Gravel - Fine Grained Sand	
			1	3			
			2				
			3				
			4				
			5				
			6				
			7				
			8				
			9				
B1, 25.0 ft		ML	7'	25	2	Becomes Soft, Moist	
			6	2			
			5	1			
			4				
			3				
			2				
			1				
			0				
			30				
			30				
B1, 30.0 ft		SP-SM	12'	30	50	Native: Gray Poorly Graded SAND with Silt, Stiff, Moist (Advanced Outwash) - Trace Gravel - Medium To Coarse Grained Sand - Gravel 29.6%, Sand 62.7% and Fine 7.7%	4
			1	50			
			2				
			3				
			4				
			5				
			6				
			7				
			8				
			9				
B1, 35.0 ft		SP-SM	13'	35	50	End of boring at 36.5 ft bgs	
			6	50			
			7				
			8				
			9				
			10				
			11				
			12				
			13				
			14				
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
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	45						
	46						
	47						
	48						
	49						
	50						



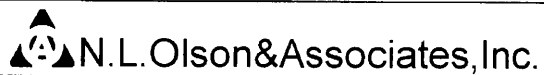
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Boring Log
JWJ Group Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number 10479	Logged By SMC	Subsurface Exploration Drilling		Ground Surface Elevation 450'	Boring: B - 2	Page 1 of 2
		Start Date JAN 9, 2019	End Date JAN 9, 2019			

General Notes	Graphic Symbol	USCS SYMBOL	Recovery (in)	Depth (ft)	Blow per (ft) (N-Value)	Surface Conditions:	Moisture Content (%)
B2, 2.5 ft				1		Fill: Light Brown Silty SAND with Gravel, Very Loose, Wet - Fine Grained Sand - Trace Gravel and Cobbles	
				2			
			18"	3	18		
				4	19/		
B2, 5.0 ft			18"	5	1		
				6	6		
				7			
B2, 7.5 ft			18"	8	2		
				9	7		
				10			
B2, 10.0 ft			18"	11	6	- Gravel 19.2%, Sand 54.9% and Fine 25.9%	
				12	9		
B2, 12.5 ft		SM	12"	13	22	Native: Brownish Gray Silty SAND, Dense to Very Dense, Moist - Trace Gravel - Fine to Medium Grained Sand	
				14	72		
				15			
B2, 15.0 ft			18"	16	50	Gray Poorly Graded SAND with Silt, Stiff, Moist (Advanced Outwash) - Trace Gravel - Medium To Coarse Grained Sand - Gravel 35.2%, Sand 58.3% and Fine 6.5%	
				17	50/6"		
				18			
				19			
B2, 20.0 ft				20		Continued on Page 2	

Start Time 1155	End Time 1220	Hammer Type 140 lb Manual with cats head	Drawn By: SMC	Date Jan 11, 2019	Hole Completion <input type="checkbox"/> Monitoring Well <input checked="" type="checkbox"/> Piezometer <input type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> Inclinator Fig 33 Sampling Method Standard Split Spoon I California Sampler II
Drilling Contractor Advanced Drill	Operators Name Wade Bellaf	Drilling and sampling Method Standard Split Spoon	Checked By: WRJ	Date Jan 24, 2019	
Equipment d50 tracked drill rig	Groundwater Elevation Wet Soils encountered at 2.5'	Revision By: SMC	Date Jan 25, 2019		
Job Location	Remarks: Near Test Pit 3 24-hr Piezometer Check: 3.9'				



General Notes	Graphic Symbol	USCS SYMBOL	Recovery (ft)	Depth (ft)	Blow per (ft) (N-Value)	N.L. Olson & Associates, Inc.				Page 2 of 2	Moisture Content (%)
						Job Number 10479	Job Name Dickey Pit	Logged By SMC	Boring: B - 2		
B2, 20.0 ft		SM	50	20	50	Brownish Gray Sity SAND, Very Dense, Moist - Fine to Medium Grained Sand					
				1	50/5"	End of boring at 20.5 ft bgs					
				2							
				3							
				4							
				25							
				6							
				7							
				8							
				9							
				30							
				1		End of boring at 20.5 ft bgs					
				2							
				3							
				4							
				35							
				6							
				7							
				8							
				9							
				40							
				1		End of boring at 20.5 ft bgs					
				2							
				3							
				4							
				45							
				6							
				7							
				8							
				9							
				50							

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Boring Log
JWJ Group Dickey Pit
8857 Dickey Road, NW,
Silverdale, WA

Job Number 10479	Logged By SMC	Subsurface Exploration Drilling		Ground Surface Elevation 440'	Boring: B - 3	Page 1 of 2
		Start Date Jan 9, 2019	End Date JAN 10, 2019			

General Notes	Graphic Symbol	USCS SYMBOL	Recovery (in)	Depth (ft)	Blow per (ft) (N-Value)	Surface Conditions:	Moisture Content (%)												
B3, 2.5 ft		XX	16"	1	10	Fill: Light Brown Silty SAND with Gravel, Loose, Moist (Till Fill) - Fine Grained Sand - Trace Gravel													
				2															
				3															
				4															
B3, 5.0 ft				5				18"	12	Brown Gray Sandy SILT/CLAY, Soft, Moist - Trace Gravel - Fine Grained Sand									
				6															
				7															
B3, 7.5 ft				8							18"	19							
				9															
				10															
B3, 10.0 ft				11									18"	22	Monitoring Well installed				
				12															
				13															
B3, 12.5 ft				14												13"	8		
				15															
				16															
B3, 15.0 ft				17														18"	9
				18															
				19															
B3, 20.0 ft				20															

Continued on Page 2

Start Time 1345/0835	End Time 1425/0900	Hammer Type 140 lb Manual with cats head	Drawn By: SMC	Date Jan 11, 2019	Hole Completion <input type="checkbox"/> Monitoring Well <input checked="" type="checkbox"/> Piezometer <input type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> Inclinator
Drilling Contractor Advanced Drill	Operators Name Wade Bellaf	Drilling and sampling Method Standard Split Spoon	Checked By: WRJ	Date Jan 24, 2019	
Equipment d50 tracked drill rig	Groundwater Elevation No Water Encountered		Revision By: SMC	Date Jan 25, 2019	
Job Location 47.65147 degrees North, 122.72656 degrees West					
Remarks: Near Test Pit 5 24-hr Peizometer Check: Dry					Sampling Method Standard Split Spoon I California Sampler II

Fig 34



N.L. Olson & Associates, Inc.

Job Number
10479

Job Name
Dickey Pit

Logged By
SMC

Boring:
B - 3

Page
2 of 2

Moisture
Content
(%)

General Notes	Graphic Symbol	USCS SYMBOL	Recovery (ft)	Depth (ft)	Blow per (ft) (N-Value)	Soil Description	Moisture Content (%)		
B3, 20.0 ft			18"	20 13	32	Fill: Brown Gray Silty SAND, dense, Moist - Trace Gravel - Fine Grained Sand - Gravel 19.2%, Sand 54.9% and Fine 25.9%	6		
			1	15					
			1	17					
			2						
			3						
			4						
B3, 25.0 ft			25	12				24	- Becomes medium dense
			6	15					
			6	9					
			7						
	8								
	9								
B3, 30.0 ft	30	2	5	- Becomes loose					
	1	2							
	1	3							
	2								
	3								
	4								
B3, 35.0 ft	35	1			10	- Grades to Brown increase increase in Sand content			
	6	3							
	6	7							
	7								
	8								
	9								
B3, 40.0 ft	40	20	67	Native: Brown Silty SAND with Gravel, Very Dense, Moist - Fine to Medium Sand					
	1	30							
	1	37							
	2								
	3								
	4								
B3, 45.0 ft	45	19			72	Grades to Gray Brown			
	6	27							
	6	45							
	7								
	8								
	9								
	50								
				End of boring at 46.5 ft bgs					



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Boring Log

JWJ Group Dickey Pit
8857 Dickey Road. NW,
Silverdale, WA

Job Number 10479	Logged By SMC	Subsurface Exploration Drilling		Ground Surface Elevation 435'	Boring: B - 4	Page 1 of 2
		Start Date Jan 10, 2019	End Date JAN 10, 2019			

General Notes	Graphic Symbol	USCS SYMBOL	Recovery (in)	Depth (ft)	Blow per (ft) (N-Value)	Surface Conditions:	Moisture Content (%)
B4, 2.5 ft		SM	14"	1 2 3 4	11 11 11 22	Fill: Brown Silty SAND with Gravel, Dense, Moist (Till Fill) - Fine Grained Sand - Trace Gravel	
B4, 5.0 ft			16"	5 6 7	10 8 4 12	Gray Brown Sandy SILT/CLAY, Soft to Medium Stiff, Moist to Damp - Trace to No gravel - Medium to Coarse Grained Sand	
B4, 7.5 ft			18"	8 9	3 4 4 8		
B4, 10.0 ft			18"	10 11 12	2 1 1 2	Becomes Wet, Becomes Very Soft <u>Monitoring Well installed</u>	
B4, 12.5 ft			13"	13 14	1 1 1 2	Decrease in Sand content - Gravel 25.1%, Sand 53.9% and Fine 21%	11
B4, 15.0 ft			18"	15 16 17 18 19 20	0 0 0 0 0 0 0 0	- Gravel 22.6%, Sand 55.6% and Fine 21.8%	12
B4, 20.0 ft						Continued on Page 2	

Start Time 1030	End Time 1115	Hammer Type 140 lb Manual with cats head	Drawn By: SMC	Date Jan 11, 2019	Hole Completion <input type="checkbox"/> Monitoring Well <input checked="" type="checkbox"/> Piezometer <input type="checkbox"/> Abandoned and backfilled <input type="checkbox"/> Inclinator
Drilling Contractor Advanced Drill	Operators Name Wade Bellaf	Drilling and sampling Method Standard Split Spoon	Checked By: WRJ	Date Jan 24, 2019	
Equipment d50 tracked drill rig	Groundwater Elevation Water Encountered ~10'		Revision By: SMC	Date Jan 25, 2019	
Job Location 47.64819 degrees North, 122.72842 degrees West					

Remarks: Near Test Pit 7 24-hr Piezometer Check: 7.7'	Sampling Method Standard Split Spoon I California Sampler II	
	Fig 35	

General Notes	Graphic Symbol	USCS SYMBOL	Recovery (ft)	Depth (ft)	Blow per (ft) (N-Value)	N.L. Olson & Associates, Inc.				Page 2 of 2	Moisture Content (%)
						Job Number 10479	Job Name Dickey Pit	Logged By SMC	Boring: B - 4		
B4, 20.0 ft			18"	20 14 1 15 17	32	Native: Brown Silty SAND, Very Dense, Moist - Trace Gravel - Medium to Coarse Sand					
B4, 25.0 ft			18"	25 50 6	50/5"	Grades to Grayish Brown and becomes Very Dense, - Gravel 14.5%, Sand 52.7% and Fine 32.8%				11	
B4, 30.0 ft			18"	30 36 50 1	50/4"						
				2 3 4 35 6 7 8 9 40 1 2 3 4 45 6 7 8 9 50		End of boring at 31.5 ft bgs					

N.L. Olson & Associates
Dicken Pit
10475

Moisture Contents
ASTM D-2216
Table 1

Sample Number	Depth(ft)	Moisture Content %
B-1	10	8
B-1	30	4
B-2	10	10
B-2	15	11
B-3	20	6
B-4	12.5	11
B-4	15	12
B-4	25	11

Fig 3d

Comparison of Allowed Uses

Sources:

KCC 17.410.042
KCC 17.410.044

Key

P	Permitted Use
ACUP	Administrative Conditional Use Permit
C	Hearing Examiner Conditional Use Permit
--	Prohibited Use

Change in zoning would allow (+) or not allow (-) the use	Change in zoning would increase (+) or decrease (-) public participation in permitting	Categorical Use	Current Zones		Proposed Zones		
			MRO	IND (32)(42) (101)	UL (19)(48) (101)	NC (19)(30) (48)(57) (101)	
RESIDENTIAL USES							
+		100	Accessory dwelling units (1)	--	--	P	--
+		102	Accessory living quarters (1)	--	--	P	--
		104	Accessory use or structure (1)(18)(51)	P	P	P	P
		106	Adult family home	--	ACUP P (41)	ACUP P (41)	--
+		108	Bed and breakfast house or vacation rental	--	--	ACUP C (34)	ACUP C (34)
+		109	Boarding house (102)	--	--	ACUP (98)	P (99)
	+	110	Caretaker's dwelling	--	P	--	ACUP
+		112	Convalescent home or congregate care facility (97)	--	--	C	C
+		114	Cottage housing developments	--	--	ACUP	--
+		116	Dwelling, duplex	--	--	P (3)	P
		118	Dwelling, existing	P	P	P	P
+		120	Dwelling, multifamily	--	--	C	P
+		122	Dwelling, single-family attached	--	--	P	P
+		124	Dwelling, single-family detached (includes manufactured homes)	--	--	P (43)	P

Change in zoning would allow (+) or not allow (-) the use	Change in zoning would increase (+) or decrease (-) public participation in permitting	Categorical Use		Current Zones		Proposed Zones	
				MRO	IND (32)(42) (101)	UL (19)(48) (101)	NC (19)(30) (48)(57) (101)
+		126	Guest house (1)	--	--	P	--
-		127	High-risk secured facility (1)	--	C	--	--
+		128	Home business (1)(53)	--	--	P	ACUP
+		130	Hotel/motel (1)(52)	--	--	--	C
	+	132	Mobile homes	P	--	C (24)(43)	--
+		134	Residential care facility	--	--	ACUP	--
COMMERCIAL/BUSINESS USES							
		200	Accessory use or structure (1)(51)	P	P	P	P
-		202	Adult entertainment (1)	--	C	--	--
	+	204	Ambulance service	--	ACUP	--	C
-		206	Auction house	--	P	--	--
+		208	Auto parts and accessory stores	--	--	--	P
+		210	Automobile rentals	--	--	--	P (56)
	+	212	Automobile repair and car washes	--	P (33)	--	ACUP (54)
	+	214	Automobile service station (6)	--	P (33)	--	ACUP
+		216	Automobile, recreational vehicle or boat sales	--	ACUP (35)	--	--
+		218	Nonmotorized recreation rentals (95)	--	--	--	P
		220	Boat/marine supply stores	--	--	--	--
		222	Brew pubs	--	ACUP	--	ACUP
	-	224	Clinic, medical	--	C	--	ACUP
+		226	Conference center	--	--	P	--
+		228	Custom art and craft stores	--	--	--	P (54)
	+	230	Day-care center (14)	--	P (33)	C	P (54)

Change in zoning would allow (+) or not allow (-) the use	Change in zoning would increase (+) or decrease (-) public participation in permitting	Categorical Use		Current Zones		Proposed Zones	
				MRO	IND (32)(42) (101)	UL (19)(48) (101)	NC (19)(30) (48)(57) (101)
+		232	Day-care center, family (14)	--	--	P	ACUP (54)
+		234	Drinking establishments	--	--	--	C
		236	Engineering and construction offices	--	P (33)	--	P (54)
		238	Espresso stands (58)	--	P (33)	--	P
-		240	Equipment rentals	--	P	--	--
		242	Farm and garden equipment and sales	--	--	--	--
	-	244	Financial, banking, mortgage and title institutions	--	ACUP (33)	--	P (54)
-		245	Fitness center	--	P (100)	--	--
		246	General office and management services – less than 4,000 s.f.	--	P (33)	--	P
+		248	General office and management services – 4,000 to 9,999 s.f.	--	--	--	ACUP
		250	General office and management services – 10,000 s.f. or greater	--	--	--	--
	-	252	General retail merchandise stores – less than 4,000 s.f.	--	ACUP (33)	--	P
+		254	General retail merchandise stores – 4,000 to 9,999 s.f.	--	--	--	ACUP
		256	General retail merchandise stores – 10,000 to 15,000 s.f.	--	--	--	--
		258	General retail merchandise stores – 15,001 to 24,999 s.f.	--	--	--	--
		260	General retail merchandise stores – 25,000 s.f. or greater	--	--	--	--
	+	262	Kennels or pet day-cares (1)	--	ACUP	--	C
+		264	Kennels, hobby	--	--	P	P
	-	266	Laundromats and laundry services	--	ACUP	--	P (54)

Change in zoning would allow (+) or not allow (-) the use	Change in zoning would increase (+) or decrease (-) public participation in permitting	Categorical Use		Current Zones		Proposed Zones	
				MRO	IND (32)(42) (101)	UL (19)(48) (101)	NC (19)(30) (48)(57) (101)
-		268	Lumber and bulky building material sales	--	P	--	--
		270	Mobile home sales	--	--	--	--
+		272	Nursery, retail	--	--	--	ACUP
+		274	Nursery, wholesale	--	--	--	ACUP
+		276	Off-street private parking facilities	--	--	--	ACUP
+		278	Personal services – skin care, massage, manicures, hairdresser/barber	--	--	--	P (54)
+		280	Pet shop – retail and grooming	--	--	--	ACUP
-		282	Research laboratory	--	P	--	--
	-	284	Restaurants	--	ACUP (33)	--	P (54)
	+	286	Restaurants, high-turnover	--	P	--	C
-		288	Recreational vehicle rental	--	ACUP	--	--
+		290	Temporary offices and model homes (27)	--	--	P	--
	-	292	Tourism facilities, including outfitter and guide facilities	--	ACUP	--	P
		294	Tourism facilities, including seaplane and tour boat terminals	--	--	--	--
	+	296	Transportation terminals	--	ACUP	--	C
		298	Veterinary clinics/animal hospitals	--	ACUP	--	ACUP
RECREATIONAL/CULTURAL USES							
		300	Accessory use or structure (1)(51)	P	P	P	P
		302	Amusement centers	--	C (11)	--	C
	+	304	Carnival or circus	--	ACUP (11)	--	C
		306	Club, civic or social (12)	C (12)	ACUP	C	ACUP

Change in zoning would allow (+) or not allow (-) the use	Change in zoning would increase (+) or decrease (-) public participation in permitting	Categorical Use		Current Zones		Proposed Zones	
				MRO	IND (32)(42) (101)	UL (19)(48) (101)	NC (19)(30) (48)(57) (101)
+		308	Golf courses	--	--	C	ACUP
		310	Marinas	--	C	C	ACUP
+		312	Movie/performance theaters, indoor	--	--	--	ACUP
		314	Movie/performance theaters, outdoor	--	--	--	--
+		316	Museum, galleries, aquarium, historic or cultural exhibits	--	--	--	ACUP
		318	Parks and open space	P	P	P	P
-		320	Race track, major	--	C	--	--
-		322	Race track, minor	C (12)	C	--	--
		324	Recreational facilities, private	--	C	C	ACUP
		326	Recreational facilities, public	--	C	P	ACUP
+		328	Recreational vehicle camping parks	--	--	C	C
		330	Zoo	--	--	--	--
INSTITUTIONAL USES							
		400	Accessory use or structure (1)(51)	P	P	P	P
	+	402	Government/public structures	--	P	ACUP	ACUP
-		404	Hospital	--	C	--	--
		406	Places of worship (12)	--	C	C	C
	+	408	Private or public schools (20)	--	ACUP	C	C
		410	Public facilities and electric power and natural gas utility facilities, substations, ferry terminals, and commuter park-and-ride lots (16)	C	ACUP	C	ACUP
INDUSTRIAL USES							
		500	Accessory use or structure (1)(51)	P	P	P	P
-		502	Air pilot training schools	--	P	--	--

Change in zoning would allow (+) or not allow (-) the use	Change in zoning would increase (+) or decrease (-) public participation in permitting	Categorical Use		Current Zones		Proposed Zones	
				MRO	IND (32)(42) (101)	UL (19)(48) (101)	NC (19)(30) (48)(57) (101)
-		504	Assembly and packaging operations	--	ACUP	--	--
-		506	Boat yard	--	ACUP	--	--
	+	508	Cemeteries, mortuaries, and crematoriums (10)	--	ACUP	C	C
-		510	Cold storage facilities	--	P	--	--
-		512	Contractor's storage yard (21)	ACUP	P	--	--
-		514	Food production, brewery or distillery	--	C	--	--
-		516	Fuel distributors	--	C	--	--
-		518	Helicopter pads (13)	--	ACUP	--	--
-		520	Manufacturing and fabrication, light	--	P	--	--
-		522	Manufacturing and fabrication, medium	--	P	--	--
-		524	Manufacturing and fabrication, heavy	--	ACUP	--	--
-		526	Manufacturing and fabrication, hazardous	--	C	--	--
-		528	Recycling centers	--	ACUP	--	--
-		530	Rock crushing	ACUP	C	--	--
-		532	Slaughterhouse or animal processing	--	C	--	--
-		534	Storage, hazardous materials	--	C	--	--
-		536	Storage, indoor	--	P	--	--
-		538	Storage, outdoor	--	P	--	--
	+	540	Storage, self-service	--	P	C (40)	C
-		542	Storage, vehicle and equipment (1)	--	P	--	--
-		544	Top soil production, stump grinding	C	ACUP	--	--

Change in zoning would allow (+) or not allow (-) the use	Change in zoning would increase (+) or decrease (-) public participation in permitting	Categorical Use		Current Zones		Proposed Zones	
				MRO	IND (32)(42) (101)	UL (19)(48) (101)	NC (19)(30) (48)(57) (101)
-		546	Transshipment facilities, including docks, wharves, marine rails, cranes, and barge facilities	P	C	--	--
-		548	Uses necessary for airport operation such as runways, hangars, fuel storage facilities, control towers, etc. (13)	--	C	--	--
-		550	Warehousing and distribution	--	P	--	--
-		552	Wrecking yards and junk yards (1)	--	C	--	--
RESOURCE LAND USES							
		600	Accessory use or structure (1)(51)	P	P	P	P
-		602	Aggregate extractions sites	C	C	--	--
		606	Aquaculture practices	--	C	C	C
		608	Forestry	P	P	P	P
-		610	Shellfish/fish hatcheries and processing facilities	--	C	--	--

Footnotes:

Source: KCC 17.410.050

1. Where applicable subject to Section 17.410.060, Provisions applying to special uses.
3. When located within urban growth areas (except UR), duplexes shall require five thousand square feet of minimum lot area. Duplexes located in the UR zone or outside of urban growth areas shall require double the minimum lot area required for the zone.
6. Where permitted, automobile service stations shall comply with the following provisions:
 - a. Sale of merchandise shall be conducted within a building, except for items used for the maintenance and servicing of automotive vehicles;
 - b. No automotive repairs other than incidental minor repairs or battery or tire changing shall be allowed;
 - c. The station shall not directly abut a residential zone; and
 - d. All lighting shall be of such illumination, direction, and color as not to create a nuisance on adjoining property or a traffic hazard.
10. A cemetery, crematorium, mausoleum, or columbarium shall have its principal access on a county roadway with ingress and egress so designed as to minimize traffic congestion, and shall provide required off-street parking spaces. No mortuary or crematorium in conjunction with a cemetery is permitted within two hundred feet of a lot in a residential zone.

11. A circus, carnival, animal display, or amusement ride may be allowed through a Type I administrative review in all industrial zones and any commercial zones, except neighborhood commercial (NC), Keyport village commercial (KVC), or Manchester village commercial (MVC) for a term not to exceed ninety days, with a written approval of the director. The director may condition such approval as appropriate to the site. The director's decision may be appealed to the hearing examiner.
12. All buildings and activities shall be set back a minimum of fifty feet in FRL, MRO, RW, RP, RR, RCO, RI or parks zones and thirty-five feet in all other zones from a side or rear lot line. All such uses shall access directly to a county right-of-way determined to be adequate by the county engineer, and be able to provide access without causing traffic congestion on local residential streets. Any such use shall not be materially detrimental to any adjacent (existing or future) residential development due to excessive traffic generation, noise, light or other circumstances. The director may increase setback, buffer and landscaping standards or impose other conditions to address potential impacts.
13. Heliports for the purpose of medical emergency facilities may be permitted in certain zones subject to a conditional use permit. All private landing strips, runways, and heliports shall be so designed and oriented that the incidences of aircraft passing directly over dwellings during their landing or taking off patterns are minimized. They shall be located so that traffic shall not constitute a nuisance to neighboring uses. The proponents shall show that adequate controls or measures will be taken to prevent offensive noise, vibrations, dust, or bright lights.
14. In those zones that prohibit residential uses, family day-care centers are only allowed in existing residential structures. Day-care centers shall have a minimum site size of ten thousand square feet and shall provide and thereafter maintain outdoor play areas with a minimum area of seventy-five square feet per child of total capacity. A sight-obscuring fence of at least four feet in height shall be provided, separating the play area from abutting lots. Adequate off-street parking and loading space shall be provided.
16. The erection, construction, alteration, or maintenance of overhead or underground utilities by a public utility, municipality, governmental agency, or other approved party shall be permitted in any zone; provided, that any permanent above-ground structures not located within a right-of-way or easement shall be subject to the review of the director. Utility transmission and distribution lines and poles may exceed the height limits otherwise provided for in this title. Water towers which exceed thirty-five feet in height, solid waste collection, transfer and/or handling sites in any zone shall be subject to a conditional use permit. These provisions do not apply to wireless communication facilities, which are specifically addressed in Chapter 17.530.
18. One piece of heavy equipment may be stored in any single-family zone; provided, that it is either enclosed within a permitted structure, or screened to the satisfaction of the director.
19. *(Note: Not applicable to this site.)*
20. Site plans for public schools shall include an area identified and set aside for the future placement of a minimum of four portable classroom units. The area set aside may not be counted towards meeting required landscaping or parking requirements.
21. Outdoor contractors' storage yards accessory to a primary residence shall be limited to not more than ten heavy equipment vehicles or heavy construction equipment. The use shall be contained outside of required setbacks within a contained yard or storage building. The storage yard and/or building shall be screened from adjacent properties with a screening buffer a minimum of twenty-five feet in width and capable of providing functional screening of the use. Minimum lot size shall be one hundred thousand square feet.
24. Mobile homes are prohibited, except in approved mobile home parks.
27. Subject to the temporary permit provisions of Chapter 17.105.
30. *(Note: Not applicable to this site.)*
32. *(Note: Not applicable to this site.)*
33. Must be located and designed to serve adjacent area.
34. Bed and breakfast houses or vacation rentals with one to four rooms require an administrative conditional use permit; bed and breakfast houses with five or more rooms require a hearing examiner conditional use permit. Bed

- and breakfast houses serving meals to patrons other than overnight guests require a hearing examiner conditional use permit.
35. The use shall be accessory and shall not occupy more than twenty-five percent of the project area.
 40. Self-storage facilities must be accessory to the predominant residential use of the property, sized consistently for the number of lots/units being served and may serve only the residents of the single-family plat or multifamily project.
 41. Adult family homes serving one to six residents (excluding proprietors) are permitted uses. Adult family homes serving more than six applicable residents (excluding proprietors) require an administrative conditional use permit (ACUP).
 42. All business, service repair, processing, storage, or merchandise display on property abutting or across the street from a lot in any residential zone shall be conducted wholly within an enclosed building unless screened from the residential zone by a sight-obscuring fence or wall.
 43. Where a family member is in need of special, frequent and routine care and assistance by reason of advanced age or ill health, a manufactured home or mobile home may be placed upon the same lot as a single-family dwelling for occupancy by the individual requiring or providing such special care subject to the following limitations:
 - a. Not more than two individuals shall be the recipients of special care;
 - b. No rent, fee, payment or charge in lieu thereof may be made for use of the single-family dwelling or manufactured/mobile home as between the recipients or providers of special care;
 - c. The manufactured/mobile home must meet the setback requirements of the zone in which it is situated;
 - d. A permit must be obtained from the director authorizing such special care manufactured/mobile home. Such permit shall remain in effect for one year and may, upon application, be extended for one-year periods, provided there has been compliance with the requirements of this section;
 - e. The manufactured/mobile home must be removed when the need for special care ceases; and
 - f. Placement of the manufactured/mobile home is subject to applicable health district standards for water service and sewage disposal.
 48. Within urban growth areas, all new residential subdivisions, single-family or multifamily developments are required to provide an urban level of sanitary sewer service for all proposed dwelling units unless exemptions identified in Section 17.460.020 allow for the implementation of a dry sewer.
 51. Storage of shipping containers is prohibited unless allowed as part of a land use permit and/or approval. Placement of storage containers allowed only with an approved temporary permit subject to the provisions of Section 17.105.090(I).
 52. Aggregate production and processing only. Allowed only if directly connected to an approved surface mining permit approved by the Washington State Department of Natural Resources (DNR).
 53. Commercial or industrial uses otherwise prohibited in the zone may be allowed as a component of a home business subject to the requirements of Section 17.410.060(B).
 54. The gross floor area shall not exceed four thousand square feet.
 56. There shall be no more than six rental vehicles kept on site.
 57. Unless the permit application is a Type III quasi-judicial action, when a component of development located within a commercial or industrial zone involves the conversion of previously undeveloped land, land developed with a residential use, or land developed with a less intensive use which abuts a residential zone, it shall be treated as a Type II administrative decision.
 58. In addition to the other standards set forth in the Kitsap County Code, espresso stands are subject to the following conditions:
 - a. Drive aisles/stacking lanes shall be designed to accommodate a minimum of three vehicles per service window/door (i.e., eight and one-half feet in width and sixty feet in length) with direct access to the service window. The drive aisles/stacking lanes shall be designed to prevent any vehicles from interfering with public or private roadways, pedestrian circulation, traffic circulation, parking areas or other required development amenities.

- b. Subject to provisions set forth in Chapter 17.490, drive aisles and parking areas must also be paved in urban growth areas and include, at minimum, hard compacted surfaces in rural areas. Such surfaces must be addressed with required drainage facilities. A joint parking agreement shall be required if parking cannot be accommodated on site.
 - c. All structures must be permanently secured to the ground.
 - d. Restroom facilities must be available for employees. Portable or temporary restroom facilities shall not be used to meet this requirement.
95. Allowed on all port district owned property.
97. Cottage housing is an allowed use in conjunction with congregate care facilities and shall be reviewed under the congregate care facility permit review process.
98. Number of individual boarding rooms may not exceed the maximum density for the zone or six boarding rooms, whichever is greater.
99. The number of individual boarding rooms must meet the minimum density for the zone or equal six boarding rooms, whichever is greater.
100. Allowed only as micro-gyms less than five thousand square feet in size. All other fitness centers are prohibited.
101. Transitory accommodations allowed only pursuant to Chapter 17.505.
102. Boarding houses must have health district approval prior to occupancy.