PRELIMINARY GEOTECHNICAL ENGINEERING EVALUATION

Kroger (Fred Meyer) Chehalis Property Distribution Center Complex

Jackson Highway & Rush Road

Chehalis, Washington

Prepared for:

The Kroger Company
10170 Linn Station Road, Suite 520
Louisville, Kentucky 40223

Prepared by:

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11810 North Creek Parkway North
Bothell, Washington 98011
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March 1, 2017

Project No. 2424-17-005.01

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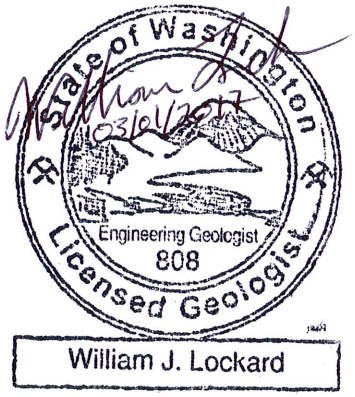

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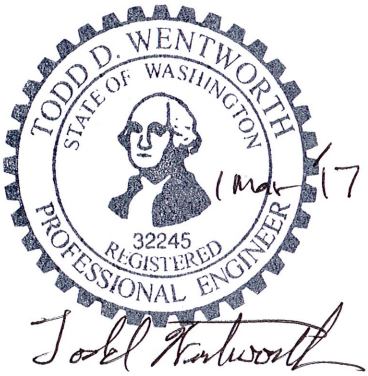

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EXECUTIVE SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc., performed a preliminary geotechnical engineering evaluation of the three parcels being considered for purchase and development by The Kroger Company for a new Chehalis Distribution Center Complex. This summary of project geotechnical engineering considerations is presented for introductory purposes and should be used only in conjunction with the full text of this report.

Project Description: The three parcels being studied are located near the existing Fred Meyer Distribution Center located at 222 Maurin Road within the Port of Chehalis Business & Industrial park, located in the south industrial area of Chehalis, Washington. The three parcels are:

- the Chehalis Industrial Commission property (37 acres), located south of the existing Fred Meyer Distribution Center,
- the Port of Chehalis property (34 acres), located immediately east of Rush Road, and
- the Puget Western, Inc., property (69 acres) located to the east and immediately adjacent the Port of Chehalis Property.

Exploratory Methods: We explored the subsurface conditions over the course of 5 days beginning January 30, 2017 extending to February 3, 2017. Our field work consisted of drilling 3 borings on each parcel, for a total of nine borings. The borings were advanced to depths of 15 to 21 feet below existing grades. The borings were supplemented with a total of 22 test pits spread across the three parcels. The test pits were advanced to depths ranging from 7 to 9.5 feet below existing grades.

Soil Conditions: The subsurface soil conditions are somewhat uniform across the three parcels with only minor variations noted. Our explorations encountered a 2-inch thick sod layer with a root mat which extended from 4 to 6 inches below the surface, underlain by approximately 1 foot of topsoil. Below the organic topsoil layer, a 2- to 4-foot thick layer of soft to medium stiff clay varying to clay with some sand was encountered. Below the clay layer, at depth varying from 4 to 7 feet, medium dense to dense gravelly sand was observed, extending to the full depths explored. The depth to the gravelly sand was generally shallower on the Chehalis Industrial Commission property and somewhat deeper on the Puget Western Inc. property.

Groundwater Conditions: Groundwater was encountered in nearly all of the explorations on all three parcels. The test pits disclosed a near surface, perched groundwater table that extended from the

topsoil horizon down to a depth of approximately 3 feet. Rapid water seepage was noted in many of the test pit locations from the upper perched groundwater. Below the clay layer at depths varying from 6 to 8 feet below grade, groundwater seepage was encountered within the granular deposits of the soil borings. Other studies within the project vicinity indicate groundwater levels on the order of 6 to 7 feet below ground surface.

Recommended Parcel(s): All three parcels were found to have similar soil and groundwater conditions. Thus, from a geotechnical standpoint, there's no significant distinction between the parcels and all could feasibly be developed with the same approximate level of effort.

Site Preparation Considerations: Development of any of the three parcels will require remedial measures to provide adequate subgrade support for the anticipated structures and associated improvements as discussed below. Stripping depths on the order of 1-foot across areas to be developed will be necessary. Also, based on our site observations during wet weather, aggressive measures will be needed to control surface water runoff during construction.

Ground Improvement: Each of the three parcels are underlain by soft to medium stiff soils that extend to depths of 4 to 7 feet below existing grades which would not provide suitable subgrade support for buildings. To adequately support the anticipated structures, the foundations will require ground improvement. Either over-excavation with construction of bearing pads, or installation of aggregate piers is recommended to provide subgrade support for the proposed foundations. Over-excavation may be more cost effective on the Chehalis Industrial Commission property due to generally shallower depths to the gravelly sands whereas on the Puget Western property, it may be more cost effective to use aggregate piers because of the generally greater depths to the gravelly sands.

Foundation Support: Once the ground is improved as described above, typical, shallow spread footings could be used to support the structures.

Floors: Slab-on-grade floors appear feasible. However, the subgrade soils would require improvement consisting of either; over-excavation and replacement with granular structural fill, chemical stabilization (lime or cement), or aggregate piers. The use of aggregate piers may be more cost effective on the Puget Western property. Due to shallow groundwater conditions and fine-grained soils, the floor section should include a minimum 6 inch layer of pea gravel or other clean, uniform gravel as a capillary break and a vapor barrier placed on top of the capillary break layer.

Pavement Considerations: The soft subgrade soils will provide poor support for the anticipated pavement sections for truck traffic. Ground improvement for these areas should be considered. The most cost-effective method for subgrade improvement will likely consist of chemical stabilization.

On-site Soil Considerations: Because the upper 5 to 6 feet of the soils on all three parcels have a high fines (silt and clay) content and moisture contents of the on-site soils are generally wet of the optimum moisture content, it will be extremely difficult to re-use the site soils for structural fill. Thus, a contingency should be made for importing structural fill for use during construction activities. Prepared subgrades will need to be protected once completed.

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PRELIMINARY GEOTECHNICAL ENGINEERING EVALUATION

Chehalis Property Distribution Complex Center
Chehalis, Washington

1.0 SITE AND PROJECT DESCRIPTION

We understand three separate parcels are being considered for purchase and development, all of which are immediately the existing Fred Meyer Distribution Center located at 222 Maurin Road within the Port of Chehalis Business & Industrial Park, located in the south industrial area of Chehalis, Washington as shown on Figure 1, Site Location Map. Each parcel is described subsequently, ordered from west to east and are depicted on Figure 2, Site and Exploration Plan.

Chehalis Industrial Commission Property consists of approximately 37 acres located adjacent to the southeast corner of the Fred Meyer Distribution Center. The site is a roughly square parcel bounded to the north by the existing distribution center, to the east by Rush Road, to the southeast by Berwick Creek beyond which are residential parcels partially developed with single-family residences and pastures, and to the west by a 520 megawatt, natural gas-fired electrical generation plant.

Port of Chehalis Property is comprised of 34 acres located adjacent the east side of Rush Road, extending from Jackson Highway on the north approximately 3,900 feet to Bishop Road to the south. The rectangular parcel extends east approximately 650 feet. The site is bounded to the north by Jackson Highway, to the east by farm land (Puget Western Inc. Property) and to the south by a wetland mitigation site for the Port of Chehalis which is bounded to the south by Berwick Creek.

Puget Western Inc. Property this irregularly shaped parcel encompasses approximately 69 acres and is fronted by Jackson Highway along the northern edge of the parcel, to the west by farm land (Parcel 2 described above) and to the south and east by a William Natural Gas pipeline easement and Berwick Creek beyond.

Preliminary development plans, as indicated to us by the Kroger Company (Kroger) call for potentially purchasing one or more of the parcels for development of a new distribution center. The distribution center building is anticipated to encompass approximately 500,000 square feet. While a conceptual layout has not been prepared, we anticipate that associated development will include, access drives for truck traffic, parking areas and a truck fueling facility.

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), has prepared this Preliminary Geotechnical Engineering Evaluation on behalf of Kroger in support of the proposed development of the Chehalis Property Distribution Center Complex. The purpose of this report is to document the results of our subsurface investigations conducted at each property and provide geotechnical considerations regarding development of each property as part of the due diligence process. Specifically, we will identify any development costs beyond those typically encountered for similar projects. Preliminary geotechnical engineering recommendations concerning site preparation, foundation support, floors, drainage, retaining walls, pavement sections, and structural fill will also be discussed.

2.0 EXPLORATORY METHODS

Amec Foster Wheeler explored surface and subsurface conditions at the project site from January 30 through February 3, 2017. Our exploration and testing program comprised the following elements:

- A visual surface reconnaissance of the site;
- Nine borings (designated AB-1 through AB-9) with Standard Penetration Tests advanced at strategic locations across the three sites;
- Twenty-two test pits (designated TP-1 through TP-22) advanced at strategic locations across the three sites;
- Laboratory testing consisting of eight grain size analysis, five minus 200 washes, six Atterberg Limits determinations, two organic content determinations and 19 moisture content determinations performed on selected soil samples obtained from the explorations across the three parcels;
- Review of the geotechnical reports: *Soils Investigation Report, Fred Meyer's Retail Service Center, Chehalis Washington,* prepared by Materials Testing Corporation, (Dated June 8, 1993) and *Geotechnical Study Report, Kroger Chehalis Site, Chehalis, Lewis County, Washington,* prepared by GN Northern, Inc. (dated January 13, 2003); and,
- A review of published geologic maps and seismic information for the site vicinity.

Appendix A describes our field exploration procedures along with descriptions of the specific soil conditions encountered at each exploration location, as presented within the exploration logs, and Figure 2 depicts the locations of these explorations. Appendix B describes laboratory testing procedures and the results of the laboratory testing.

The specific number, locations, and depths of our explorations were selected by Amec Foster Wheeler relative to the existing site features, under the constraints of surface access, underground utility conflicts, and budget. We determined the approximate location and elevation of each exploration by utilizing a GPS application running on an Android based mobile phone. These readings were subsequently plotted on to a base map survey prepared by Barghausen Consulting Engineers, Inc. Consequently, the locations depicted on Figure 2 should be considered accurate only to the degree permitted by our data sources and implied by our measuring methods.

3.0 SITE CONDITIONS

This section presents our observations, measurements, findings, and interpretations regarding existing site development, surface, soil, groundwater, and seismic conditions at the project site.

3.1 Development Conditions

The Chehalis Industrial Commission property and Port of Chehalis property were both utilized as feed crop fields, with the only development consisting of fencing around portions of the perimeter and drainage ditches cut across the site to promote surface water drainage. While the western portions of the Puget Western property were also used to grow feed crops, the northeastern portion of the site was occupied by a single-family residence with an attached carport, a separate shop building - reportedly used as a butcher shop, and several barns. Numerous wire fences were present across the eastern portion of the site, for segregating pastures used for cattle grazing. Scattered pieces of farm equipment and implements were also observed. Drainage ditches were also present across the site. Figure 2 illustrates the locations of these existing facilities and features.

3.2 Surface Conditions

The Chehalis Industrial Commission Property topography is gently undulating across the parcel, with a general slope down to the southwest with an approximate elevation of 250 feet. A small drainage swale bisects the parcel in a NE-SW direction. Surface water was present in the southwest and east-central portions of the site, while surface water flow was noted within the drainage swale flowing towards the southwest corner of the site. The majority of the parcel is utilized for feed crop production (grass hay); however, the eastern edge and southeastern portion of the parcel is vegetated with field grasses and deciduous trees and shrubs.

The Port of Chehalis property is generally flat with a slight slope down to the southwest. Two, large drainage ditches cut across the site, having been recently constructed in conjunction with the extension of Rush Road. Similar to the other two parcels being studied, the majority of the Port of Chehalis property has been used to produce hay. Other vegetation includes; scattered small trees and brush found along the east property line. To the south, the wetland mitigation area and areas adjacent Berwick Creek were vegetated with field grasses, shrubs and deciduous trees. Surface water was present within the drainage ditches at the time of our field work, flowing to the west. Additionally, several large areas of ponded water had been recently present (after very heavy rains) as noted by Amec Foster Wheeler representatives performing wetland and environmental studies.

Conditions on the Puget Western Inc. property were somewhat different as it was noted to have the most topographic relief, rising up to the northeast approximately 10 feet above the majority of the site

to the southwest. Numerous drainage ditches cross the site, varying in size and depth. Site vegetation consisted primarily of field grasses with the western two-thirds of the site utilized as feed crop fields, with the remainder divided up into several fenced pastures for grazing. As with the Port of Chehalis property, surface water was primarily confined to the drainage ditches crossing the site, with flow toward the west. Standing water was noted in several low-lying areas in the central portion of the parcel.

3.3 Soil Conditions

The subsurface conditions, as detailed by published geologic maps indicate the three parcels are primarily underlain by terrace deposits described as alluvial sediments consisting of sand and gravel emplaced by the Newaukum River (Schasse, 1987). Immediately south of the properties, site soils are mapped as alluvium comprised of silts and sands typical of low-energy deposition.

Our explorations encountered generally similar soil conditions across all three parcels that confirmed the mapped stratigraphy of quaternary alluvium mantling older quaternary terrace deposits. The strata observed in the explorations borings are described below.

- Topsoil: All explorations encountered a sod layer that extended approximately 2 to 3-inches below the surface, with rootlets extending to approximately 6 inches into the underlying topsoil. The topsoil horizon generally extended from the sod layer to a depth of 1-foot and was comprised of soft, wet to saturated, dark gray silt with some fine sand. The organic content of the topsoil was found to vary from 1- to 5-percent.
- Existing Fill: Fill was encountered within only two explorations, Test Pit TP-2 excavated at the southeast area of the Puget Western property and Test Pit TP-19 excavated at the northwest corner of the Chehalis Industrial Commission parcel. The fill encountered at TP-2 consisted of wood shavings, likely used as bedding material for the livestock barns that extended less than 1 foot below the surface and appeared to be of limited horizontal extent based on the surface expression of the material. The fill encountered within Test Pit TP-19 was found to extend from immediately below the topsoil horizon at a depth of 1 to 3.5 feet below grade. The fill was comprised of loose to medium dense gravelly sand with some boulders. The fill was interpreted to have been likely placed during construction of the nearby underground natural gas pipe which ran parallel with the property line of the parcel.
- Quaternary Alluvium (Qa): The alluvium was moderate to high plasticity clay with some sand that become a low plasticity clay with depth. The consistency of the alluvium graded from soft to medium stiff from depths of 1 to 4 feet, becoming stiff to very stiff at depths ranging from 3 to 7 feet.

- Terrace deposits (Qoh): Below the cohesive alluvium deposits, medium dense to dense gravelly sand with cobbles was encountered at depths ranging from 4 to 7 feet across all three sites. Geologic maps describe the material as terrace deposits which have been included within the Hayden Creek Drift, outwash deposits. These are described as sand and gravel deposited as terraces by the Newaukum River. Oxidation of the unit typically extends 6 to 10 feet from the top of the unit.

The exploration logs included in Appendix A provide a detailed description of the soil strata encountered in our subsurface explorations.

Geotechnical laboratory tests disclosed that the topsoil encountered below the sod layer had an organic content varying from 1 to 5 percent. The upper cohesive soils (alluvium) were found to have a high fines (silt and clay) content, ranging from 34 to 82 percent, while the outwash terrace deposits had a fines content on the order of 1 to 5 percent. The soil moisture content ranged from 23 to 40 percent. We interpret that both the alluvial and outwash terrace soils to be at or above their optimum moisture content for compaction, and the cohesive alluvial soils to be highly sensitive to moisture content variations. The laboratory testing sheets presented in Appendix B graphically present the laboratory test results.

3.4 Groundwater Conditions

At the time of Amec Foster Wheeler's exploration (February 2017), groundwater and seepage was encountered in the nearly all the explorations across all three parcels. Our borings generally encountered groundwater at depths of 6 to 8 feet, as evidenced by wetted rods noted during drilling. The test pit explorations disclosed the surficial topsoil to generally be wet to saturated with seepage emanating at the contact of the topsoil down to approximate 3 feet, where the stiff to very stiff clay horizon was encountered. This seepage was noted to be moderate to rapid in nearly all test pits. Groundwater in the form of seepage was also noted within the upper portion of the granular, terrace deposits encountered beneath the alluvial clay deposits. Research of nearby borings indicate the groundwater table is more than 30 feet below ground surface. Because our explorations were performed during an extended period of wet weather, groundwater conditions present may represent the yearly high level; lower levels probably occur during the summer and early fall months. Throughout the year, groundwater levels would likely fluctuate in response to changing precipitation patterns, construction activities, and site utilization.

3.5 Infiltration Conditions

Due to shallow groundwater levels and the presence of cohesive alluvial soils to depths on the order of 5 to 7 feet, the potential for stormwater infiltration at any of the three parcels is believed to be poor. Limited infiltration may be possible within the terrace deposits found below the alluvial clay deposits

during the dry season, when groundwater levels may drop, but during the wet season, infiltration does not appear feasible. Further monitoring would be required to evaluate the seasonal variation in groundwater levels to make a definitive statement concerning infiltration within the drier summer months.

3.6 Seismic Conditions

Liquefaction is a sudden increase in porewater pressure and a sudden loss of soil shear strength caused by shear strains, as could result from an earthquake. Research has shown that saturated, loose sands with a fines silt and clay content less than about 25 percent are most susceptible to liquefaction. Although other soil types are generally considered to have a low susceptibility, liquefaction may still occur during a strong earthquake. Our on-site subsurface explorations did not reveal saturated (or potentially saturated), loose, silty sand layers or lenses. Instead, the soils beneath all three sites consist of cohesive soils within the upper 5 to 7 feet, ranging in consistency from soft to very stiff. The granular terrace deposits encountered below the cohesive soils where found to be medium dense to very dense. Thus it is our opinion neither of these soils are likely to liquefy during an earthquake, due to the high silt and clay content of the near surface soils and the density of the underlying granular soils. The soils would be classified as Site Class D by the International Building Code (IBC).

4.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents our preliminary geotechnical engineering conclusions and recommendations concerning site preparation, foundations, floors, drainage systems, walls, utilities, pavements, and structural fill. ASTM International (ASTM) specification codes cited herein refer to the most current applicable ASTM manual. Washington State Department of Transportation (WSDOT) specification codes cited herein refer to the current WSDOT publication M41-10, *Standard Specifications for Road, Bridge, and Municipal Construction*.

4.1 Site Preparation Considerations

The following preparation considerations could have a cost impact on development which may be somewhat higher than typical for similar projects in other locations. As all three parcels were found to have similar site conditions.

Surface Water Control: During the wet winter months, significant volumes of surface water are currently being diverted across the site via drainage ditches. Development of the site will need to address the seasonal presence of this water. Construction during wet weather, will need to be a prepared for collecting and diverting the surface water runoff.

Clearing and Stripping: A minimum stripping depth of 1 foot will be required within proposed construction areas for any of the three parcels. These soils would not be suitable for use as structural fill due to their organic content.

Backfill Soils: The on-site soils will be difficult to compact as backfill unless the moisture content is kept within a narrow range of the optimum moisture content. During the wet season or during rainy periods, backfill soil used for utility trenches and other excavations may need to consist of clean, well-graded granular soils, such as “Gravel Borrow” per WSDOT Standard Specification 9-03.14, except with less than 5 percent passing the U.S. No. 200 sieve. Controlled-density fill (CDF) could be used as a more convenient, but also more expensive, alternative to backfill soil in any weather conditions.

4.2 Site Excavations

We anticipate that site excavations for utility trenches or deeper vaults will likely be encountering moderate to rapid seepage unless surface and groundwater sources are controlled. Moderate to severe caving was also noted. Vaults or tanks which extend below the water table will need to be designed for buoyancy due to hydrostatic forces.

4.3 Foundations

In our opinion, conventional spread footings will provide adequate support for the anticipated structures if the subgrades are properly prepared. Either over-excavation with construction of bearing pads or installation of aggregate piers is recommended to provide subgrade support for the proposed foundation elements. In areas where the dense terrace deposits are relatively shallow; e.g., the Chehalis Industrial Commission property, it may be more cost-effective to over-excavate the soft to medium stiff cohesive soils and construct bearing pads for the footings, whereas in areas of thicker alluvial soils as found on the Puget Western property, aggregate piers could be more cost-effective.

4.4 Slab-on-Grade Floors

In our opinion, soil-supported slab-on-grade floors could be used for the proposed building. However, all three sites would require subgrade improvements be performed to limit differential settlement. We offer the following comments and recommendations concerning slab-on-grade floors.

Floor Subbase: Soil-supported slab-on-grade floors should be underlain by a bearing pad of structural fill which extends to the medium stiff to stiff alluvium found at depths of approximately 3 feet below existing grades. Other potential alternatives such as chemical stabilization of the soft to medium stiff soils or installation of aggregate piers could be used for slab support which may be a cost-effective alternative that warrants consideration.

Capillary Break: To reduce the upward wicking of groundwater beneath the floor slab, we recommend a capillary break be placed over the subbase. This capillary break should consist of a 6-inch-thick layer of pea gravel or other clean, uniform gravel.

4.5 Pavements

We anticipate both a standard pavement section and a heavy duty section will be required for the sites. As the subgrade soils at all three parcels would provide poor subgrade support, remedial actions to improve the support characteristics would be required. Either over-excavation and replacement with imported granular fill subbase, or chemical stabilization would be required for pavement subgrade improvement to support trucks.

4.6 Structural Fill

The term “structural fill” refers to any materials used for building pads, as well as materials placed under foundations, slab-on-grade floors, sidewalks, and pavements; under and behind retaining walls; and for permanent fill slopes.

Soil Moisture Considerations: The suitability of soils used for structural fill depends primarily on their grain-size distribution and moisture content when they are placed. As the "fines" content (the soil fraction passing the U.S. No. 200 Sieve) increases, soils become more sensitive to small changes in moisture content. Soils containing more than about 5 percent fines (by weight) cannot be consistently compacted to a firm, unyielding condition when the moisture content is more than 2 percentage points above or below optimum.

On-site Soils: The upper 4 to 7 feet of the site soils for all three parcels consist primarily of a clay. These clayey soils are moisture sensitive and tend to lose strength if they become wet or saturated during construction activities. Since most of the soils are cohesive and have a fines (silt and clay) content ranging from 30 to 80 percent, these soils may not be suitable for use except in a narrow range of weather conditions. In wet or cold weather they may become difficult or impossible to compact. The soils will likely require aerating activities to be performed in order to reduce the moisture content to acceptable levels for compaction as structural fill. During dry weather, water may need to be added to achieve proper compaction. Due to the difficulties of using the near surface, cohesive soils mantling the site, it may be more cost effective to use imported structural fill for site grading and backfilling. Alternately, it may be possible to use chemically modified site soils (lime or cement admixed with the native soils) as structural fill. The native granular soils encountered in our explorations would perform well as structural fill, provided they are at or near their optimum moisture content.

Wet-Weather Fill: The project specifications should include provisions for using imported, clean, granular fill in case site filling must proceed during wet weather. For general structural fill purposes, we recommend using a well-graded sand and gravel, such as "Ballast" or "Gravel Borrow" per WSDOT Standard Specification 9-03.9(1) and 9-03.14(1), respectively, except that the percent passing the U.S. No. 200 Sieve should be less than 5 percent.

4.7 Recommended Additional Studies

It should be emphasized that our preliminary study does not meet the Kroger requirements for a design level geotechnical evaluation for any of the parcels. Once a conceptual layout has been determined and the design team has defined the type and location of the civil and structural features, additional explorations, testing, and analyses would be recommended.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of The Kroger Company and their consultants for specific application to this project, in accordance with generally accepted geotechnical engineering practice. The conclusions, recommendations, and opinions presented in this report are based, in part, on the explorations Amec Foster Wheeler performed and used for this study and on information provided for the proposed project. Geotechnical information obtained from borings and test pits represent conditions at specific locations at the time of the explorations and may not reflect conditions at other locations. If variations in subgrade conditions are observed at a later time, additional explorations may be needed and we may need to modify this report to reflect those changes. We are available to provide geotechnical engineering throughout the design process and to perform monitoring services throughout construction.

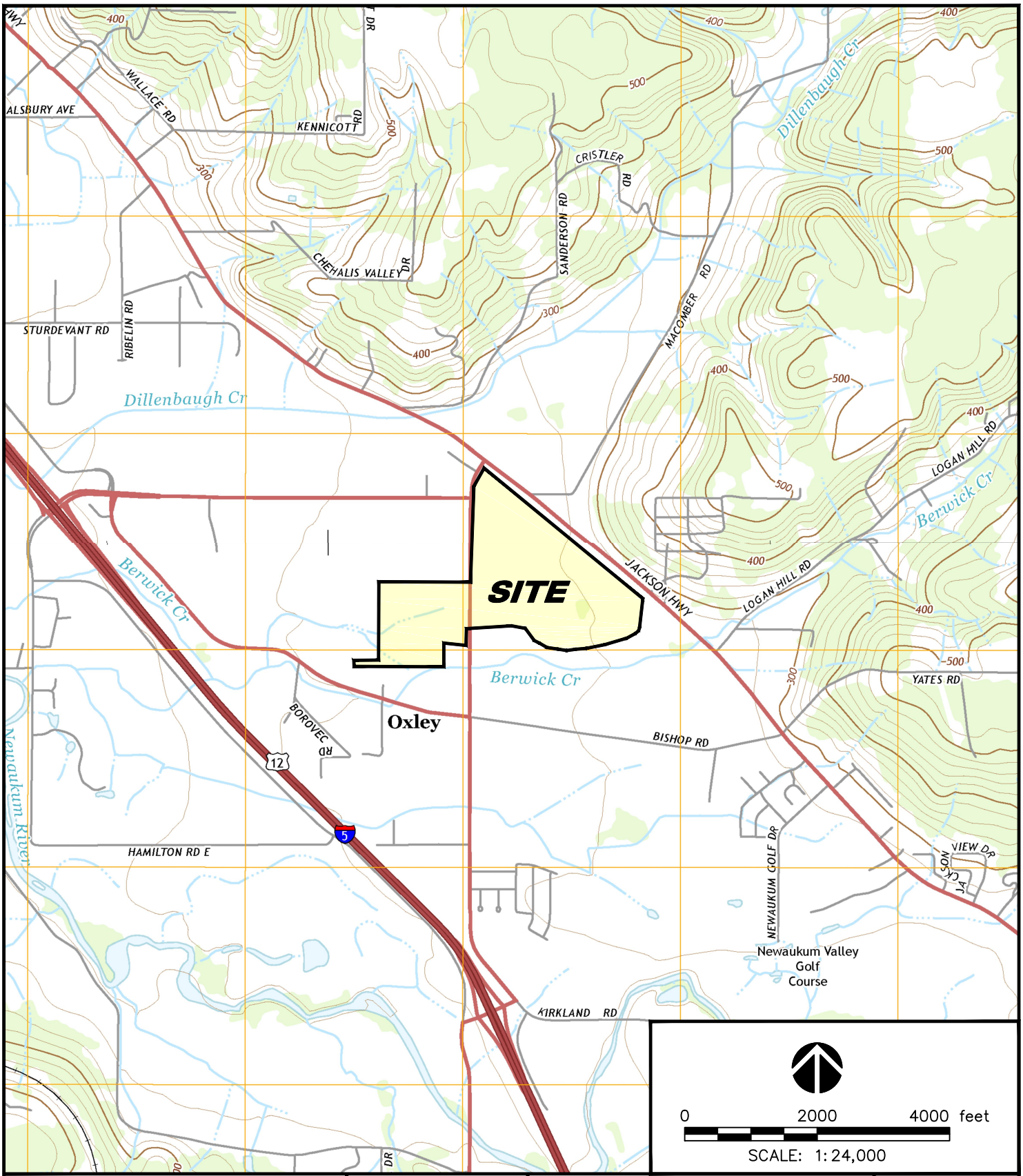
6.0 REFERENCES

Schasse, H.W., 1987, Geologic map of the Centralia Quadrangle, Washington, Washington Division of Geology and Earth Resources, Open File Report 87-11, Washington State Department of Natural Resources, scale 1:100,000

Washington State Department of Transportation (WSDOT). 2016. *Standard Specifications for Road, Bridge, and Municipal Construction 2012.* Publication M41-10.

amec
foster
wheeler

FIGURES



THE KROGER COMPANY

CHEHALIS DISTRIBUTION CENTER

Chehalis, Washington

SITE LOCATION MAP

DATE: FEBRUARY 2017

SCALE: 1" = 2,000'

PROJECT NO.: 242417005

FIGURE: 1

Amec Foster Wheeler
Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, WA 98011

amec foster wheeler

DRAWN BY: JRS CHECKED BY: WJL

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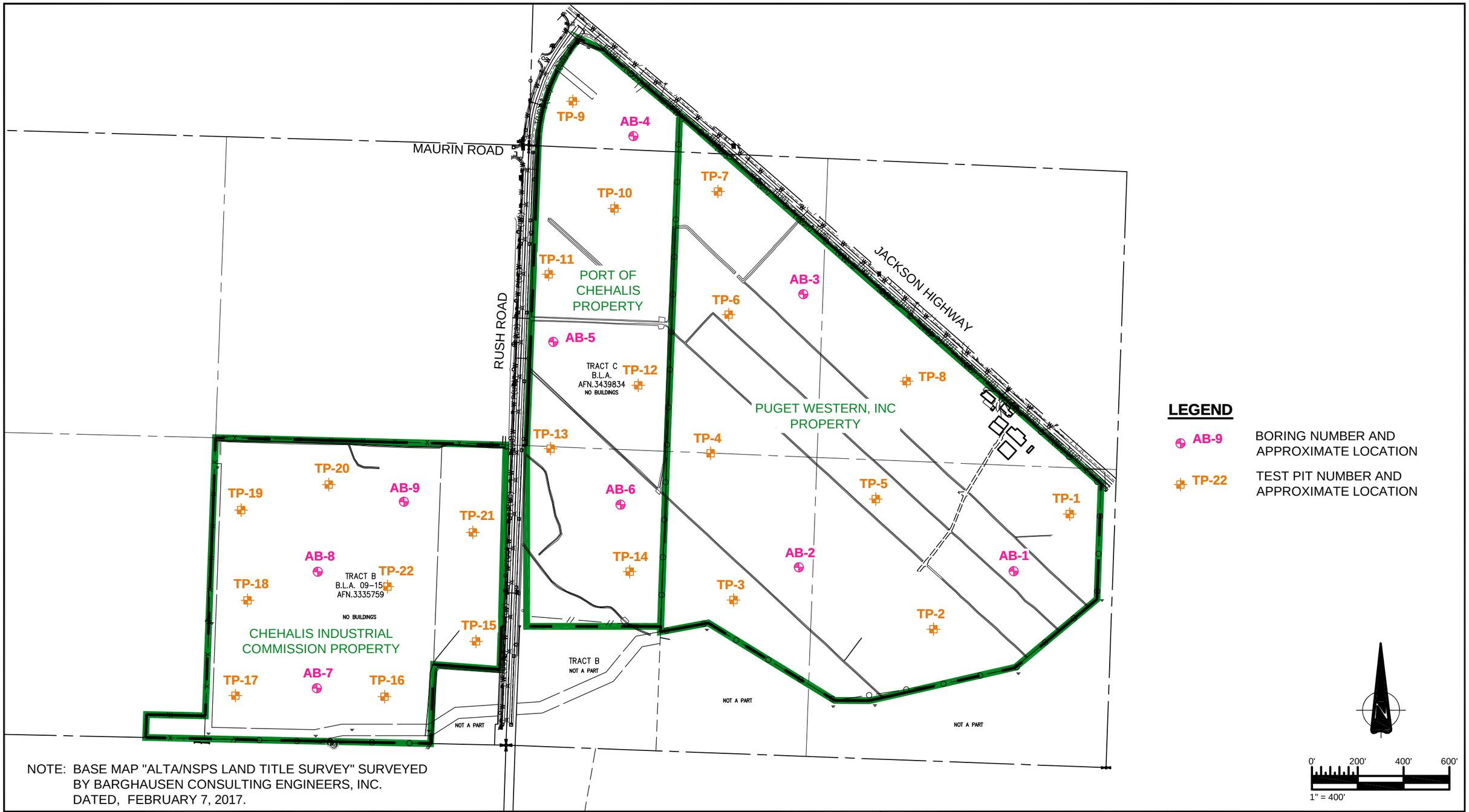

NOTE: BASE MAP "ALTA/NSPS LAND TITLE SURVEY" SURVEYED BY BARGHAUSEN CONSULTING ENGINEERS, INC. DATED, FEBRUARY 7, 2017.

NOTE:
AMEC FOSTER WHEELER ESTIMATED THE RELATIVE LOCATION OF EACH EXPLORATION BY MEASURING FROM EXISTING FEATURES AND SCALING THESE MEASUREMENTS ONTO A LAYOUT PLAN SUPPLIED TO US. THE LOCATIONS DEPICTED ON THIS FIGURE SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE PERMITTED BY OUR DATA SOURCES AND IMPLIED BY OUR MEASURING METHODS.

THE KROGER COMPANY

Amec Foster Wheeler
Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, WA 98011

amec foster wheeler

CHEHALIS DISTRIBUTION CENTER

Chehalis, Washington

SITE AND EXPLORATION PLAN

DATE	FEBRUARY 2017
SCALE	1" = 400'
PROJECT NO.	242417005
FIGURE	2

DRAWN BY: JRS CHECKED BY: ___

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APPENDIX A

Field Exploration Procedures and Logs

APPENDIX A
Field Exploration Procedures and Logs
Project No. 2424-17-005

The following paragraphs describe the procedures used for field explorations and field tests that Amec Foster Wheeler conducted for this project. Descriptive logs of our explorations are enclosed in this appendix.

AUGER BORING PROCEDURES

Exploratory borings were advanced with a hollow-stem auger, using a track-mounted drill rig operated by an independent drilling firm working under subcontract to Amec Foster Wheeler. An engineering geologist from Amec Foster Wheeler continuously observed the borings, logged the subsurface conditions, and collected representative soil samples. All samples were stored in watertight containers and later transported to the laboratory for further visual examination and testing. After each boring was completed, the borehole was backfilled with a mixture of bentonite chips and soil cuttings.

Throughout the drilling operation, soil samples were obtained at 2.5- or 5-foot depth intervals by means of the Standard Penetration Test (SPT) per ASTM D-1586. This testing and sampling procedure consists of driving a standard 2-inch-diameter steel split-spoon sampler 18 inches into the soil with a 140-pound hammer free-falling 30 inches. The number of blows required to drive the sampler through each 6-inch interval was counted, and the total number of blows struck during the final 12 inches was recorded as the Standard Penetration Resistance, or “SPT blow count.” If a total of 50 blows were struck within any 6-inch interval, the driving was stopped and the blow count was recorded as 50 blows for the actual penetration distance. The resulting Standard Penetration Resistance values indicate the relative density of granular soils and the relative consistency of cohesive soils.

The enclosed boring logs describe the vertical sequence of soils and materials encountered in each boring, based primarily on field classifications and supported by subsequent laboratory examination and testing. Where a soil contact was observed to be gradational, boring logs indicate the average contact depth. Where a soil type changed between sample intervals, we inferred the contact depth. The boring logs also graphically indicate the blow count, sample type, sample number, and approximate depth of each soil sample obtained from the borings, as well as any laboratory tests performed on these soil samples. If any groundwater was encountered in a borehole, the approximate groundwater depth is depicted on the boring log. Estimates of depth to groundwater, if encountered, are typically based on

the moisture content of soil samples, the wetted height on the drilling rods, and the water level measured in the borehole after the auger has been extracted.

TEST PIT PROCEDURES

Our exploratory test pits were excavated with a small trackhoe operated by an independent firm working under subcontract to Amec Foster Wheeler. An engineering geologist from Amec Foster Wheeler continuously observed the test pit excavations, logged the subsurface conditions, and obtained representative soil samples. All samples were stored in watertight containers and later transported to our laboratory for further visual examination and testing. After we logged each test pit, the hoe operator backfilled it with excavated soils and tamped the surface.

The enclosed Test Pit Logs indicate the vertical sequence of soils and materials encountered in each test pit, based primarily on our field classifications and supported by our subsequent laboratory examination and testing. Where a soil contact was observed to be gradational or undulating, our logs indicate the average contact depth. We estimated the relative density and consistency of the in-situ soils by means of the excavation characteristics and the stability of the test pit sidewalls. Our logs also indicate the approximate depths of any sidewall caving or groundwater seepage observed in the test pits, as well as all sample numbers and sampling locations.

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LESS THAN 5% FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (GREATER THAN 12% FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50 OF COARSE FRACTION PASSING NO. 4 SIEVE)	CLEAN SANDS (LESS THAN 5% FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (GREATER THAN 12% FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)	INORGANIC		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		ORGANIC		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)	INORGANIC		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
		ORGANIC		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
FILL SOILS				FILL (AF)	HUMAN ALTERED SOIL OR MODIFIED LAND

NOTES:

1. SOIL DESCRIPTIONS ARE BASED ON THE GENERAL APPROACH PRESENTED IN THE STANDARD PRACTICE FOR DESCRIPTION AND IDENTIFICATION OF SOILS (VISUAL-MANUAL PROCEDURE), AS OUTLINED IN ASTM D 2488. WHERE LABORATORY INDEX TESTING HAS BEEN CONDUCTED, SOIL CLASSIFICATIONS ARE BASED ON THE STANDARD TEST METHOD FOR CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES, AS OUTLINED IN ASTM D 2487.

2. SOIL DESCRIPTION TERMINOLOGY IS BASED ON VISUAL ESTIMATES (IN THE ABSENCE OF LABORATORY TEST DATA) OF THE PERCENTAGES OF EACH SOIL TYPE AND IS DEFINED AS DESCRIBED BELOW:

3. DUAL SYMBOLS (E.G. SP-SM, OR GP-GM) ARE USED TO INDICATE A SOIL WITH AN ESTIMATED 5-12% FINES.

   PRIMARY CONSTITUENT: >50% - "GRAVEL", "SAND", "SILT", "CLAY", etc.
   SECONDARY CONSTITUENTS: >12% and ≤50% - "gravelly", "sandy", "silty", etc.
   ADDITIONAL CONSTITUENTS: >5% and ≤12% - "some gravel", "some sand", "some silt", etc.
   ≤5% - "trace gravel", "trace sand", "trace silt" etc. or not noted.

4. RELATIVE DENSITY OF SOIL IS BASED ON STANDARD TEST METHOD FOR PENETRATION TEST (SPT) AND SPLIT-BARREL SAMPLING OF SOILS ASTM D 1586 OR CORRELATIONS FOR OTHER SIMPLER TYPES AND METHODS FOR SPT SAMPLING, THE FOLLOWING BLOW COUNT CORRELATION APPLIES.

   A. RELATIVE DENSITY OF COARSE GRAINED SOILS (N = BLOWS/FOOT SPT METHOD)
   - VERY LOOSE: N = ≤4
   - LOOSE: N = >4 AND ≤10
   - MEDIUM DENSE: N = >10 AND ≤30
   - DENSE: N = >30 AND ≤50
   - VERY DENSE: N = >50

   B. RELATIVE CONSISTENCY OF FINE GRAINED SOILS (N = BLOWS/FOOT SPT METHOD)
   - VERY SOFT: N = <2
   - SOFT: N = ≥2 AND ≤4
   - MEDIUM STIFF: N = >4 AND ≤8
   - STIFF: N = >8 AND ≤15
   - VERY STIFF: N = >15 AND ≤30
   - HARD: N = >30

AMEC Environment & Infrastructure
11810 North Creek Parkway North
Bothell, WA, U.S.A. 98011-8201

amec foster wheeler

CLIENT LOGO

CLIENT

PROJECT

DWN BY: JRS

DATUM:

DATE: NOVEMBER 2014

TITLE

SOIL CLASSIFICATION CHART / KEY

CHK'D BY: JD

REV. NO.:

PROJECT NO:

PROJECTION:

SCALE: NOT TO SCALE

FIGURE No. A-1

PROJECT: *Chehalis Distribution Center* JOB No. *242417005* BORING No. *AB-1*

Location: SE Quadrant Puget Western Parcel
Approximate ground surface elevation:

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Grass sod and topsoil.				
	Stiff, wet, gray SILT with some fine sand.			S-1A	
	Medium dense, wet, mottled orange gray, gravelly SAND with trace silt.			S-1B	
5	Becomes dense, moist, heavily iron-stained.		50%	S-2	
	Dense, saturated, mottled orange/reddish brown, silty, sandy GRAVEL.			S-3	ATD
10	Hard, gravelly drilling.		100%	S-4	
	Blow counts overstated due to cobbles		100%	S-5	
15	Blow counts overstated due to cobbles		NR%	S-6	
	Practical rig refusal at 15' due to cobbles.				
	Boring terminated at approximately 15.5 feet				
20					
25					

PENETRATION RESISTANCE
Standard ▲ Blows over inches ## Other △
Blows per foot
0 10 20 30 40 50

Page 1 of 1

TESTING

29
43
41
40
50/6"
50/3"

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler
No Recovery
Groundwater level at time of drilling
Grain Size Analysis (% fines shown)

amec foster wheeler

11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *January 31, 2017* Logged By: *WJL*

Drilled by: *Environmental Drilling*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 W/O CHEHALISDISTRIBUTIONBORINGS.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 3/3/17

PROJECT: *Chehalis Distribution Center* JOB No. *242417005* BORING No. *AB-2*

Location: SW Quadrant Puget Western Parcel
Approximate ground surface elevation:

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	2" sod over topsoil.				
	Medium dense, wet, dark brown, silty SAND with scattered organics.		90%	S-1	
5	Stiff, wet, orange/gray, fine to medium sandy SILT with trace gravel.		50%	S-2	ATD
	Dense, saturated, mottled orange, SAND with some gravel.		40%	S-3	
10	Grades to silty SAND with some gravel.		90%	S-4	
15	Medium stiff, wet, light gray CLAY with some sand.			S-5A S-5B	
20	Very dense, saturated, gray/olive/black, gravelly SAND/sandy GRAVEL with 4" layer of dark gray silty SAND.			S-6	
25	Boring terminated at approximately 21 feet				

PENETRATION RESISTANCE
Standard ▲ Blows over inches ## Other △
Blows per foot
0 10 20 30 40 50
13, 47, 31, 43, 8, 50/5"

Page 1 of 1

TESTING
34
1

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND
- 2.00-inch OD split-spoon sampler
- No Recovery
- Groundwater level at time of drilling (ATD)
- 200 Wash (% fines shown)
- Grain Size Analysis (% fines shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *January 31, 2017* Logged By: *WJL*

Drilled by: *Environmental Drilling*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 W/O CHEHALISDISTRIBUTIONBORINGS.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 3/3/17

PROJECT: *Chehalis Distribution Center* JOB No. *242417005* BORING No. *AB-3*

Location: NW Quadrant Puget Western Parcel
Approximate ground surface elevation:

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Grass sod over topsoil.				
	Soft, wet, dark brown, silty CLAY with scattered organics.		100%	S-1	
	Stiff, wet, mottled orange/gray, sandy SILT with 6-inch gravelly SAND lense at upper contact.				
5	Gravel lense from drilling.		40%	S-2	
	Becomes very stiff.		100%	S-3	ATD
10	Dense, wet to saturated, mottled orange/gray/tan, fine to medium SAND with some gravel and trace silt.		90%	S-4	
15	Grades to gravelly SAND and becomes very dense.		100%	S-5	
20	Very dense, saturated, mottled olive gray/purple, sandy GRAVEL with trace to some silt.		90%	S-6	
25	Boring terminated at approximately 21.5 feet				

PENETRATION RESISTANCE
▲ Standard ##/## Blows over inches △ Other
Blows per foot
0 10 20 30 40 50

14
12
16
41
55
79

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

Page 1 of 1

TESTING

LEGEND

2.00-inch OD split-spoon sampler

ATD Groundwater level at time of drilling

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 W/O CHEHALISDISTRIBUTIONBORINGS.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 3/3/17

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *January 31, 2017* Logged By: *WJL*

Drilled by: *Environmental Drilling*

PROJECT: *Chehalis Distribution Center* JOB No. *242417005* BORING No. *AB-4*

Location: North End Port of Chehalis Parcel
Approximate ground surface elevation:

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Blows per foot)	TESTING
0	2" sod over topsoil.						
	Very stiff, wet, mottled tan/orange/gray, sandy CLAY.		95%	S-1		16	59
5	Medium dense, moist to wet, mottled tan/orange/gray, silty fine to medium SAND.		100%	S-2		21	
	Dense, moist, mottled tan/orange, SAND with some gravel and silt.		25%	S-3	ATD	35	
10	Stiff, wet, light gray with orange mottling, CLAY with trace sand.		100%	S-4		11	
	Medium dense, wet, mottled olive gray/purple/dark gray, fine to medium SAND with trace silt.		90%	S-5		28	
15	Very stiff, wet, dark gray SILT.						
20	Dense, saturated dark gray, silty SAND with some gravel.		90%	S-6		46	
	Boring terminated at approximately 21.5 feet						
25							

PENETRATION RESISTANCE: ▲ Standard; [##] Blows over inches; △ Other; Blows per foot; 0 10 20 30 40 50

0 20 40 60 80 100
Plastic Limit — MOISTURE CONTENT — Liquid Limit

Page 1 of 1

LEGEND

- 2.00-inch OD split-spoon sampler
- ATD Groundwater level at time of drilling
- 200 Wash (% fines shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *January 31, 2017* Logged By: *WJL*

Drilled by: *Environmental Drilling*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 W/O CHEHALISDISTRIBUTIONBORINGS.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 3/3/17

PROJECT: *Chehalis Distribution Center* JOB No. *242417005* BORING No. *AB-5*

Location: Central Area Port of Chehalis Parcel
Approximate ground surface elevation:

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	2-3" sod over ~1' topsoil.				
	Soft, wet, dark brown CLAY with scattered rootlets/organics.				
	Medium stiff, wet, heavily rust mottled tan, CLAY with some sand.		100%	S-1	ATD
5	Becomes medium stiff.		90%	S-2	
	Medium dense, wet, dark olive gray, silty SAND.				
	Grades to gravelly silty SAND.				
	Dense, wet, mottled orange/tan, SAND with some gravel and silt.		60%	S-3	
10	Dense, wet, mottled olive gray, orange, gray, gravelly SAND with some cobbles and some silt.		60%	S-4	
15	Hard drilling due to cobbles.		50%	S-5	
	Practical refusal at 19 feet.			S-6	
20	Boring terminated at approximately 19.1 feet				
25					

PENETRATION RESISTANCE
▲ Standard ##/## Blows over inches △ Other
Blows per foot
0 10 20 30 40 50

Page 1 of 1

TESTING

9
12
36
46
46
50/1"

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler

No Recovery

ATD Groundwater level at time of drilling

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *January 31, 2017* Logged By: *WJL*

Drilled by: *Environmental Drilling*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 W/O CHEHALISDISTRIBUTIONBORINGS.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 3/3/17

PROJECT: *Chehalis Distribution Center* JOB No. *242417005* BORING No. *AB-6*

Location: South End Port of Chehalis Parcel
Approximate ground surface elevation:

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard ▲, Blows over inches ##, Other △; Blows per foot)	TESTING
0	2" sod over topsoil. Brown SILT with organics. Rootlets to 2'.						
	Stiff, moist to wet, mottled light tan/orange, CLAY with some sand.		80%	S-1	ATD	14	
5			50%	S-2		14	10
	Dense, wet, mottled dark red, orange, tan, silty SAND with some gravel.		80%	S-3		47	
10	Very stiff, wet, light tan with rust mottling, CLAY.		100%	S-4		14	
15	Becomes stiff and light gray.		80%	S-5		11	
	Very dense, saturated, gray, sandy GRAVEL with some silt.						
20	Overstated.		30%	S-6		53	
	Boring terminated at approximately 21.5 feet						
25							

Page 1 of 1

0 20 40 60 80 100
Plastic Limit — MOISTURE CONTENT — Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler

Groundwater level at time of drilling (ATD)

Atterberg Test (PI shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *February 01, 2017* Logged By: *WJL*

Drilled by: *Environmental Drilling*

PROJECT: *Chehalis Distribution Center* JOB No. *242417005* BORING No. *AB-7*

Location: Southern End CIC Parcel
Approximate ground surface elevation:

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	2" of sod over topsoil.				
	Stiff, wet, mottled tan/orange, sandy CLAY with some gravel.		60%	S-1	
5	Medium dense, wet, mottled gray/orange, gravelly SAND with trace silt.		60%	S-2	
	Dense, wet, mottled orange/tan, silty, sandy GRAVEL with some cobbles.		30%	S-3	
10	Dense, wet, mottled orange/tan/dark gray, silty, gravelly SAND.		60%	S-4	
	Grades to some cobbles.				ATD
15	Very dense, saturated, mottled tan/purple/dark gray, gravelly SAND with some cobbles and silt; 6' cobble at 15 feet.		90%	S-5	
	Practical rig refusal at 17.5 feet.		100%	S-6	
20	Boring terminated at approximately 18.5 feet				
25					

PENETRATION RESISTANCE
▲ Standard ##/## Blows over inches △ Other
Blows per foot
0 10 20 30 40 50

13
18
38
34
50/5"
50/5"

TESTING
3

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

Page 1 of 1

LEGEND
2.00-inch OD split-spoon sampler
ATD Groundwater level at time of drilling
Grain Size Analysis (% fines shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *February 01, 2017* Logged By: *WJL*

Drilled by: *Environmental Drilling*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 W/O CHEHALISDISTRIBUTIONBORINGS.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 3/3/17

PROJECT: *Chehalis Distribution Center* JOB No. *242417005* BORING No. *AB-8*

Location: Central Portion CIC Parcel
Approximate ground surface elevation:

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Grass sod over dark brown Topsoil.				
	Very stiff, wet, dark gray mottled tan, CLAY with scattered organics (rootlets to 3').		80%	S-1	
5			60%	S-2	
	Medium dense, saturated, black/orange/tan, silty sandy GRAVEL with some highly weathered cobbles.		60%	S-3	ATD
10	Medium dense, saturated, tan, silty SAND with some gravel.		60%	S-4	
15	Very dense, saturated, tan, gravelly SAND with some silt.		80%	S-5	
20	Becomes reddish tan, fine to medium SAND with some silt		50%	S-6	
	Blow counts overstated				
25	Boring terminated at approximately 21 feet				

PENETRATION RESISTANCE
▲ Standard ##/## Blows over inches △ Other
Blows per foot
0 10 20 30 40 50

25
27
16
22
50/5"
50/5"

Page 1 of 1

TESTING

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler

ATD Groundwater level at time of drilling

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *February 01, 2017* Logged By: *WJL*

Drilled by: *Environmental Drilling*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 W/O CHEHALISDISTRIBUTIONBORINGS.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 3/3/17

PROJECT: *Chehalis Distribution Center* JOB No. *242417005* BORING No. *AB-9*

Location: NE Corner CIC Parcel
Approximate ground surface elevation:

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Grass sod over wet, dark gray, topsoil.				
	Medium stiff, wet, orange mottled tan, CLAY.		80%	S-1	
5	Medium dense, wet, mottled tan/orange/gray, silty SAND with some gravel.		60%	S-2	
			30%	S-3	ATD
	Becomes dense, saturated SAND with some gravel and cobbles, and trace silt.				
10	Becomes medium dense, fine to medium SAND with some silt and trace gravel		90%	S-4	
	Becomes very dense.				
15	Gravel lense from 15-16		100%	S-5	
20				S-6	
	Boring terminated at approximately 21 feet				
25					

PENETRATION RESISTANCE
Standard ▲ Blows over inches ## Other △
Blows per foot
0 10 20 30 40 50

14
17
35
19
50/4"
50/6"

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

Page 1 of 1

TESTING

LEGEND

2.00-inch OD split-spoon sampler

No Recovery

ATD Groundwater level at time of drilling

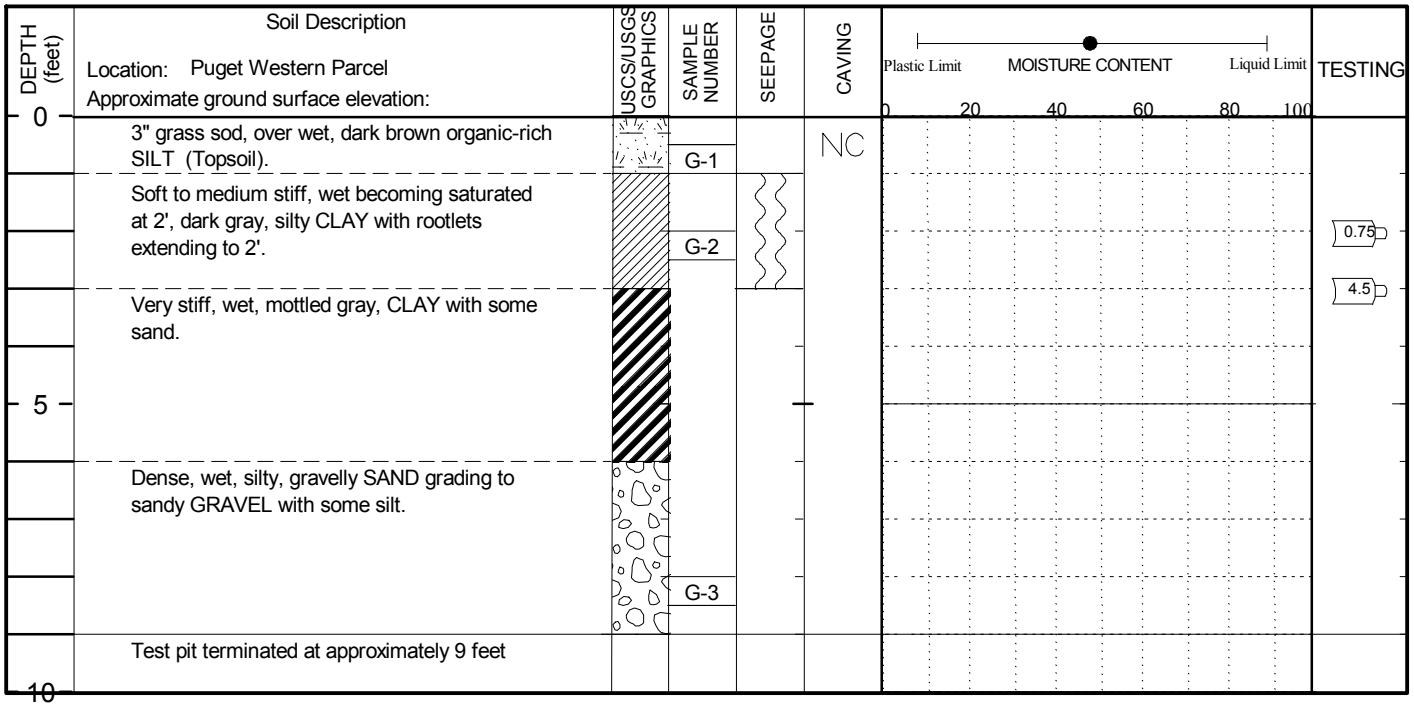
BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 W/O CHEHALISDISTRIBUTIONBORINGS.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 3/3/17

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

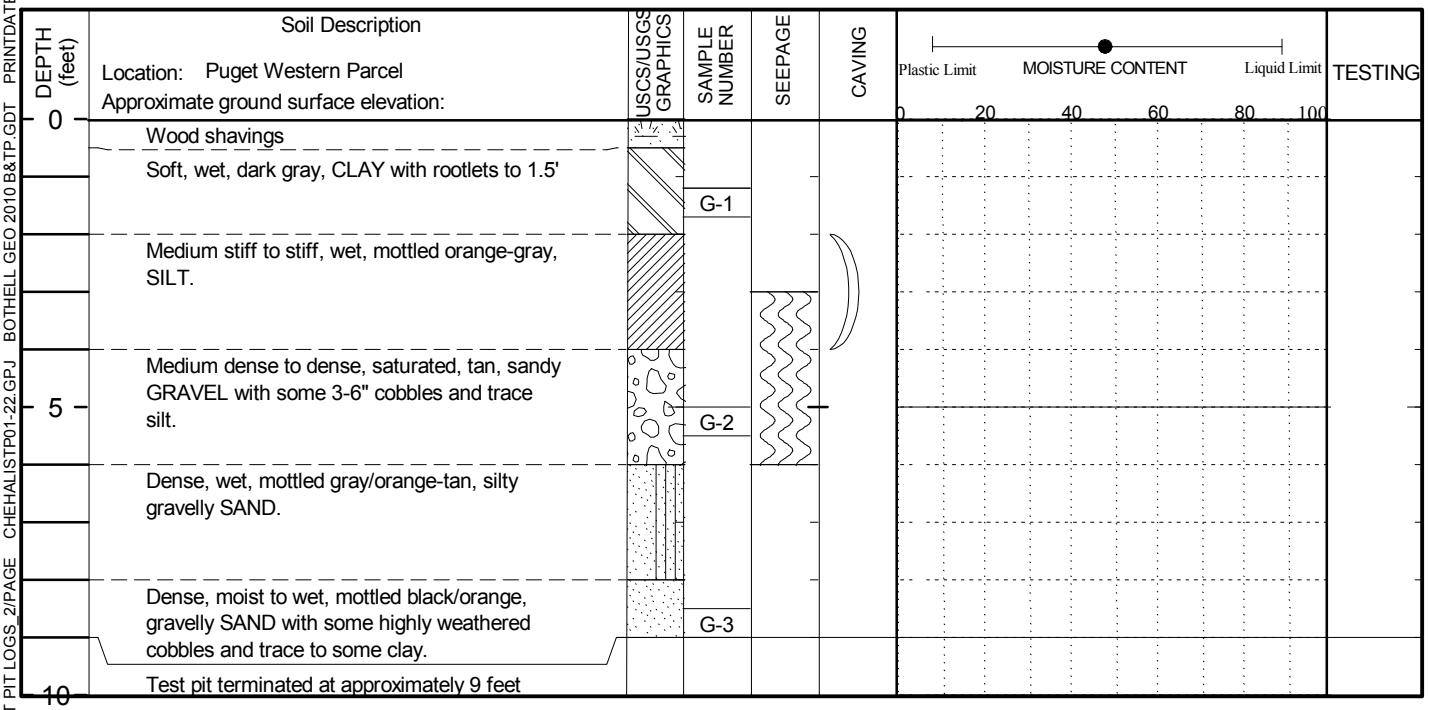
Drilling Method: HSA Hammer Type: Cathead Date drilled: *February 01, 2017* Logged By: *WJL*

Drilled by: *Environmental Drilling*

Test Pit No.: TP-01



Test Pit No.: TP-02



LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

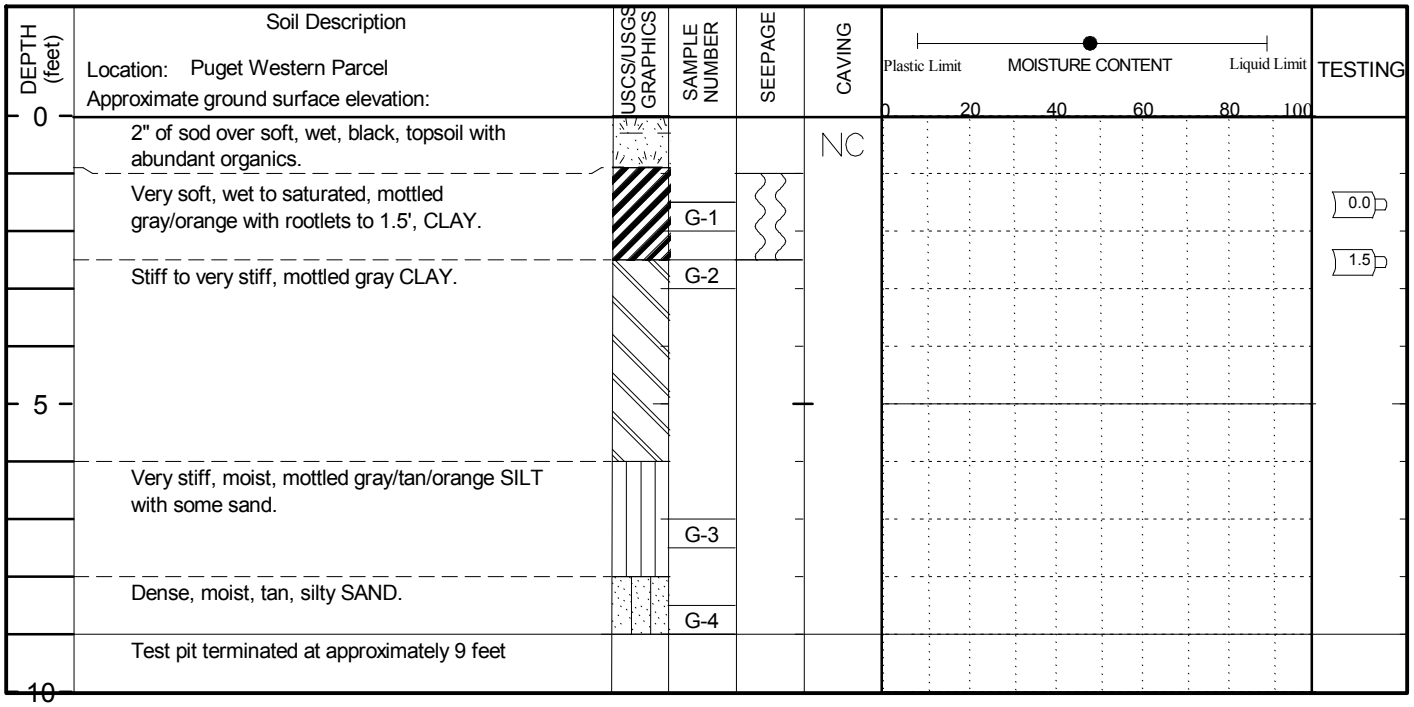
Excavation Method: Trackhoe

Date Excavated: *February 02, 2017*

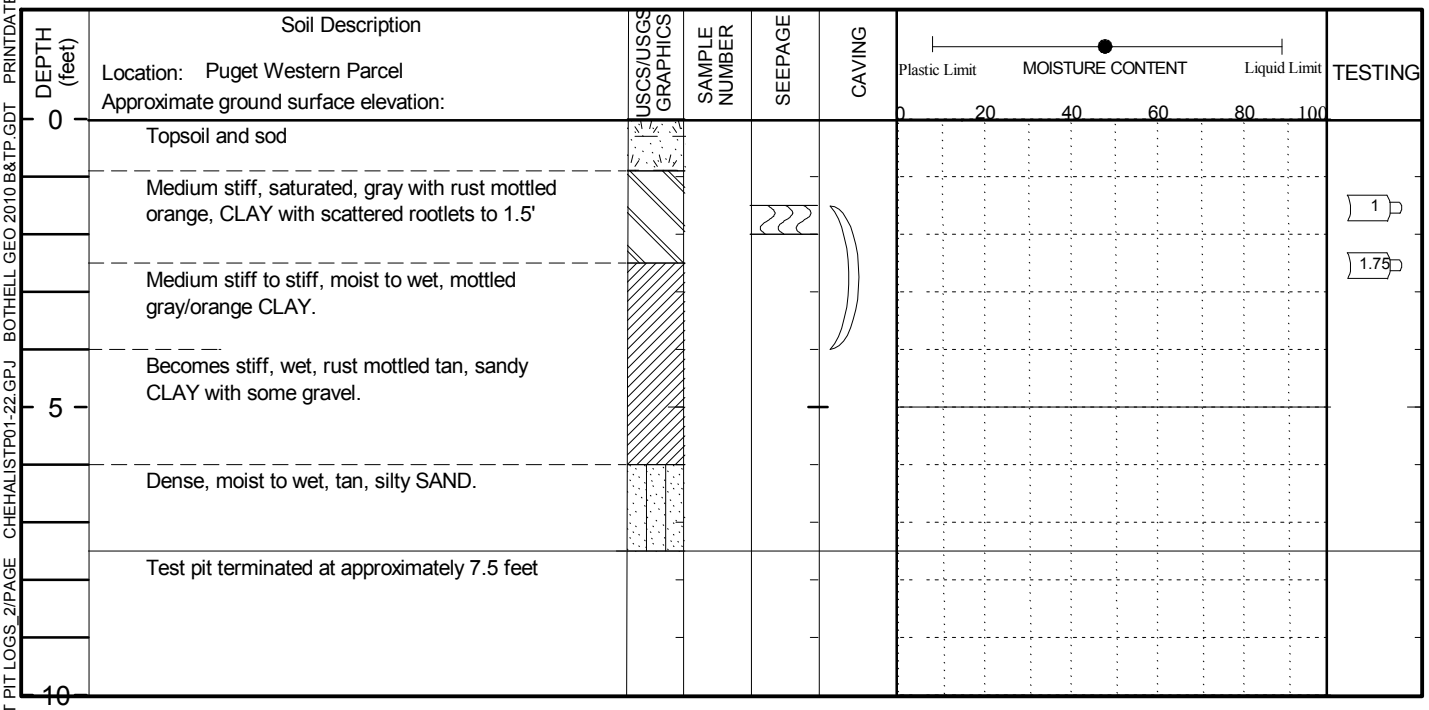
Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-03



Test Pit No.: TP-04



LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

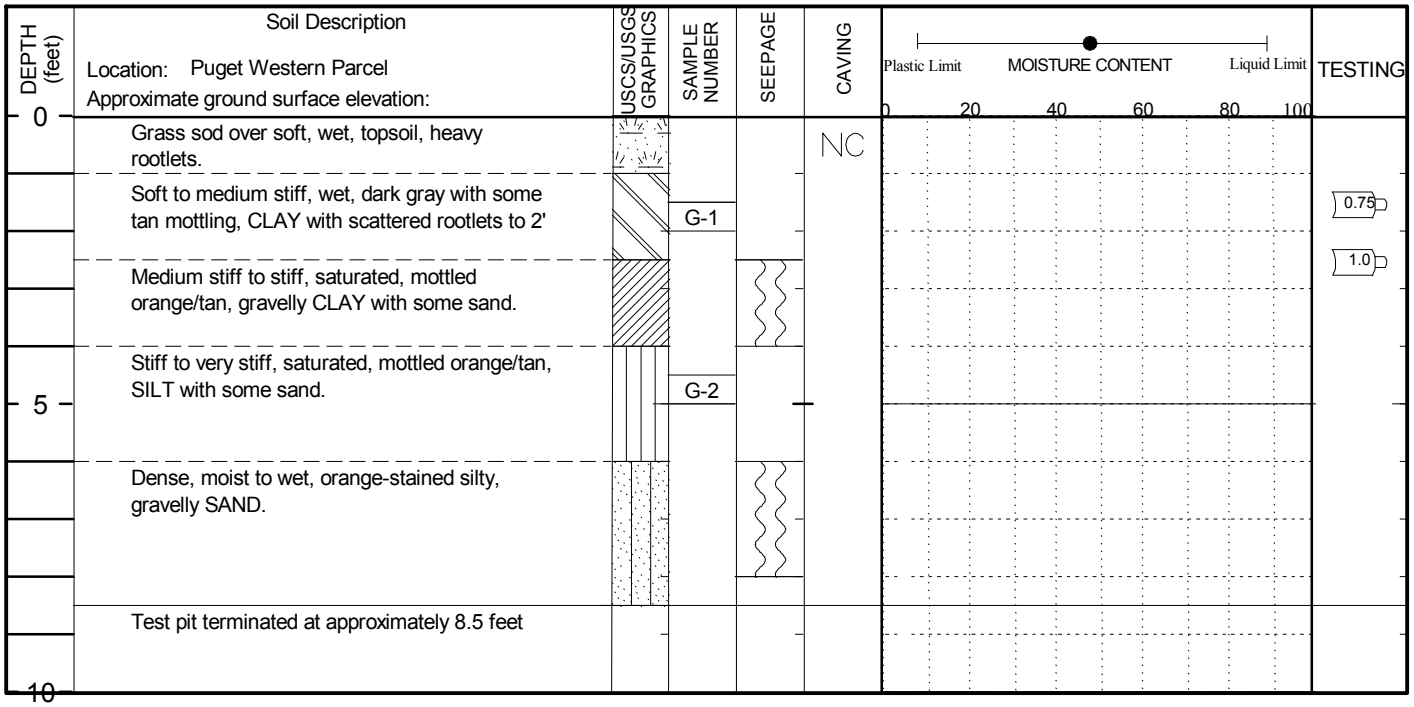
Excavation Method: Trackhoe

Date Excavated: *February 02, 2017*

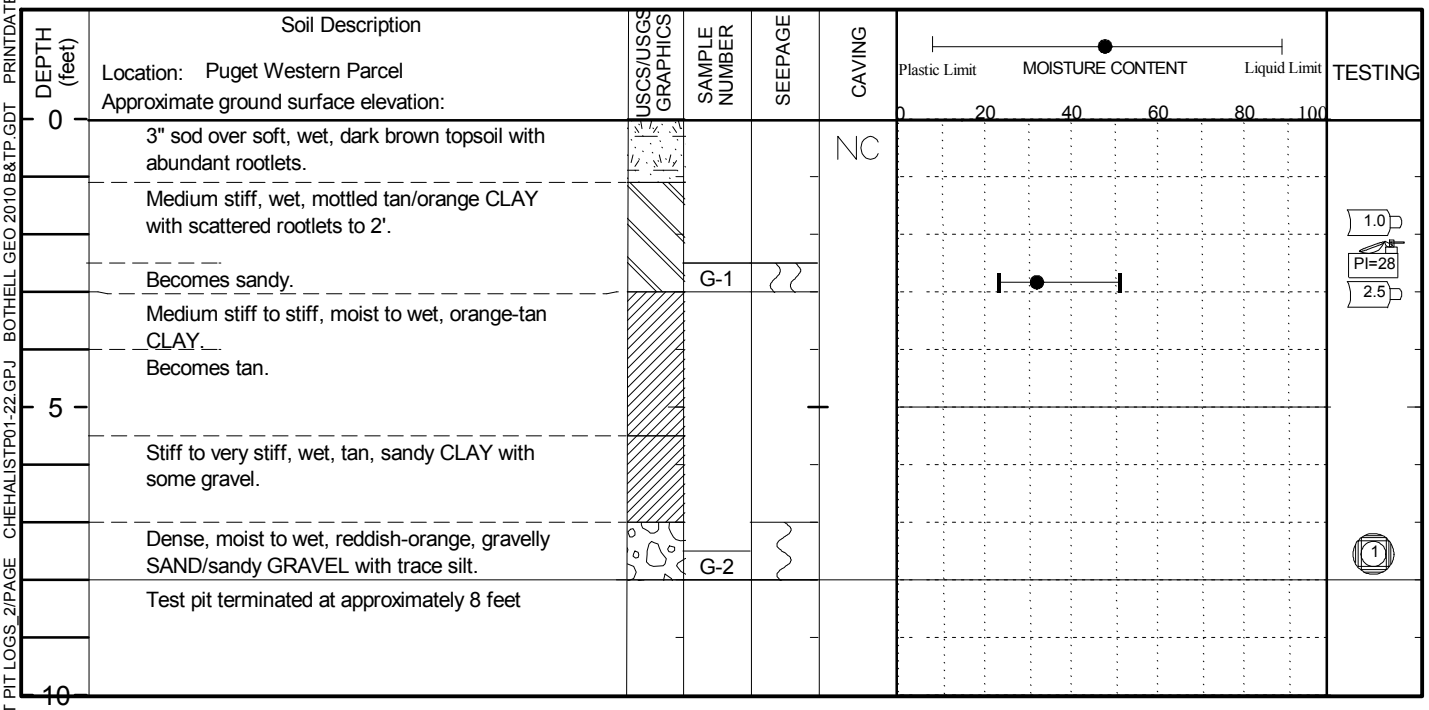
Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-05



Test Pit No.: TP-06



LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

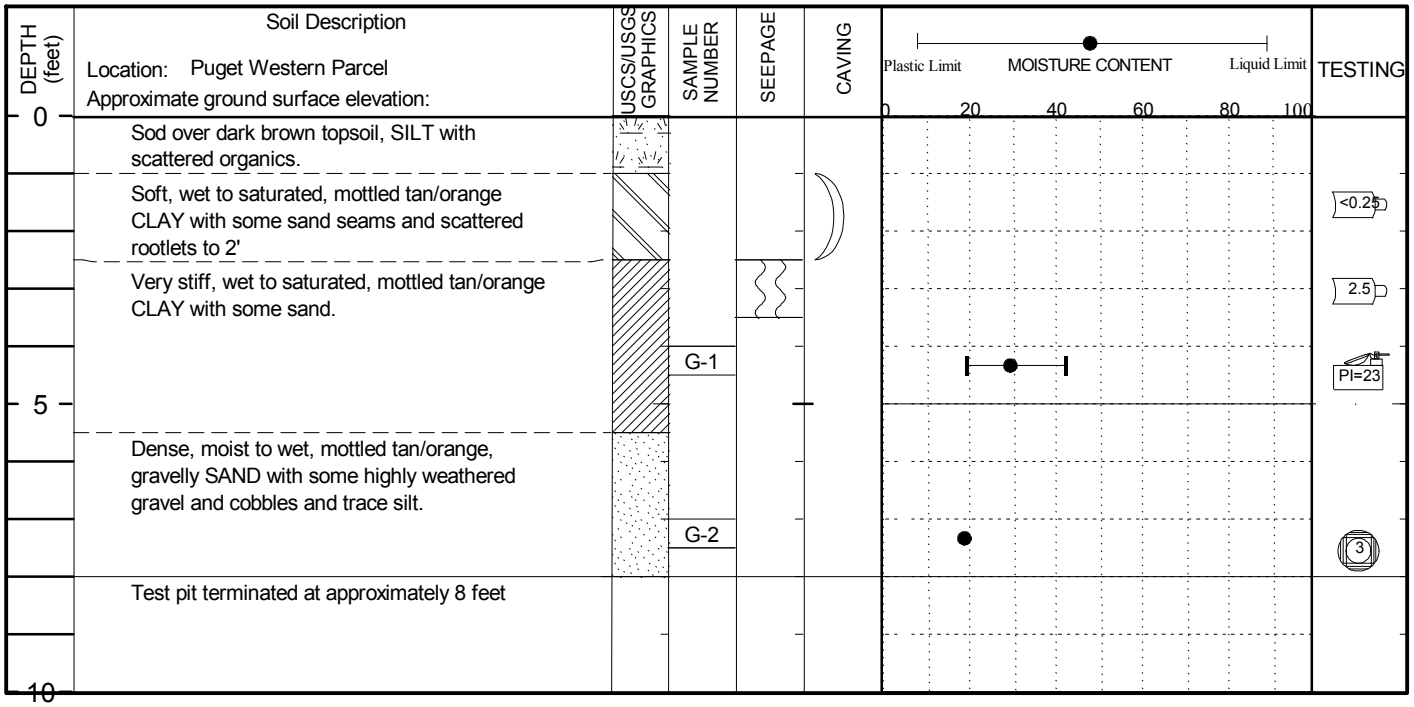
Excavation Method: Trackhoe

Date Excavated: *February 02, 2017*

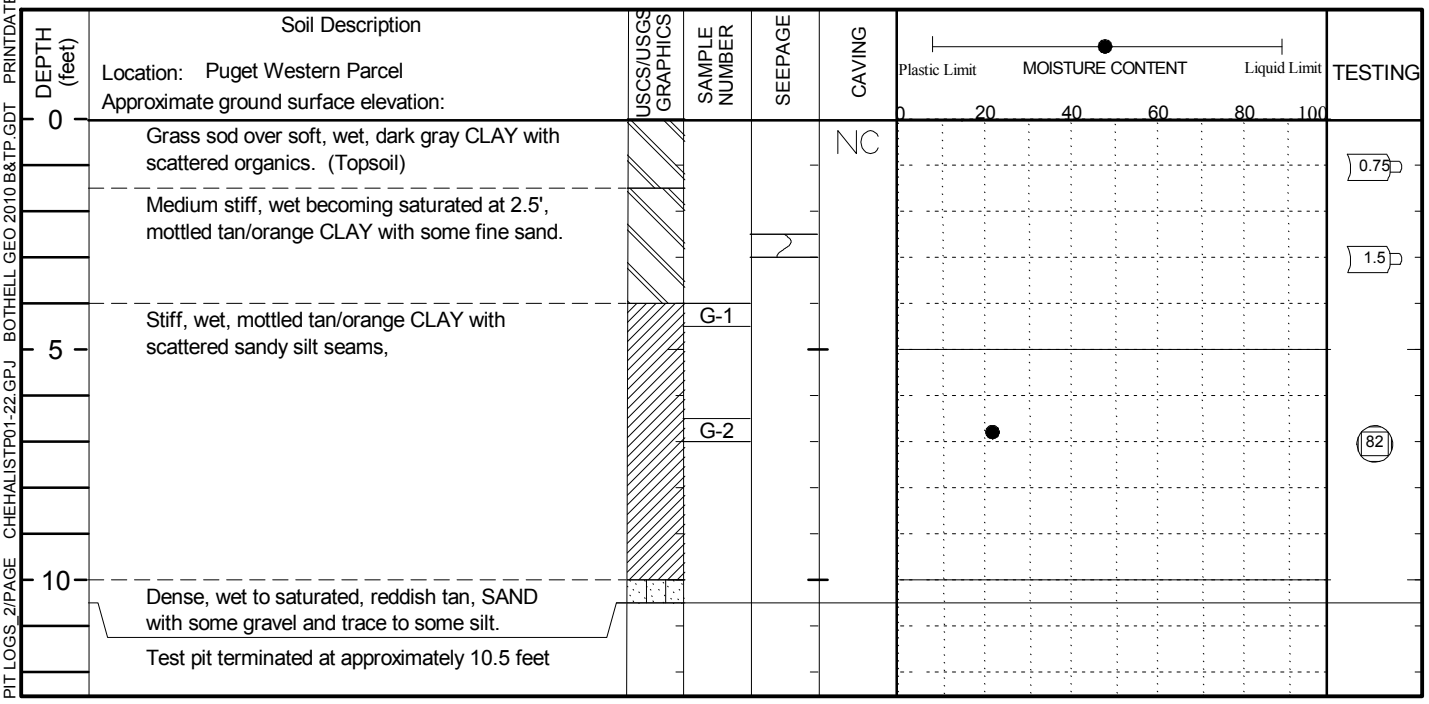
Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-07



Test Pit No.: TP-08



LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

Excavation Method: Trackhoe

Date Excavated: *February 02, 2017*

Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-09

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE NUMBER	SEEPAGE	CAVING	MOISTURE CONTENT (Plastic Limit / Liquid Limit; 0 20 40 60 80 100)	TESTING
	Location: Port of Chehalis Parcel Approximate ground surface elevation:						
0	2" grass sod over topsoil SILT with some sand and abundant rootlets.				NC		
	Stiff, wet, mottled orange/gray CLAY with scattered rootlets to 2'.		G-1			●	72
			G-2				1.5
	Stiff, moist to wet, mottled tan/orange CLAY.						2.0
5							
	Dense, wet to saturated, mottled orange/tan, gravelly SAND with some silt.		G-3				
10	Test pit terminated at approximately 9 feet						

Test Pit No.: TP-10

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE NUMBER	SEEPAGE	CAVING	MOISTURE CONTENT (Plastic Limit / Liquid Limit; 0 20 40 60 80 100)	TESTING
	Location: Port of Chehalis Parcel Approximate ground surface elevation:						
0	2" sod over dark brown SILT topsoil with numerous rootlets.				NC		
	Stiff, wet, mottled tan/orange CLAY, with scattered rootlets to 2'						0.25
	Very stiff, wet, mottled tan CLAY with some sand.		G-1				1.25
							4.5
	Dense, moist to wet, orange/tan, sandy GRAVEL with some silt.						
5	Dense, moist to wet, orange/black/tan, silty, sandy GRAVEL/gravelly SAND.		G-2				
	Test pit terminated at approximately 8 feet						
10							

LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

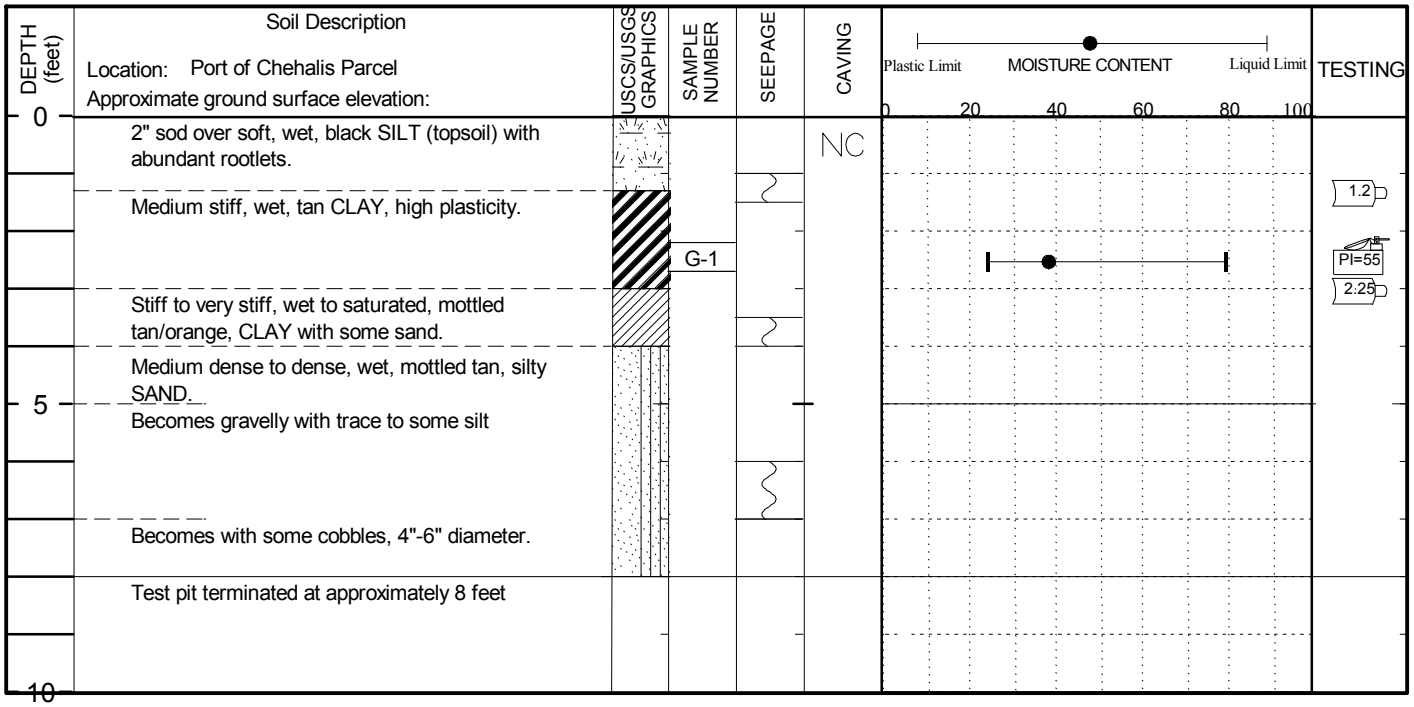
Excavation Method: Trackhoe

Date Excavated: *February 02, 2017*

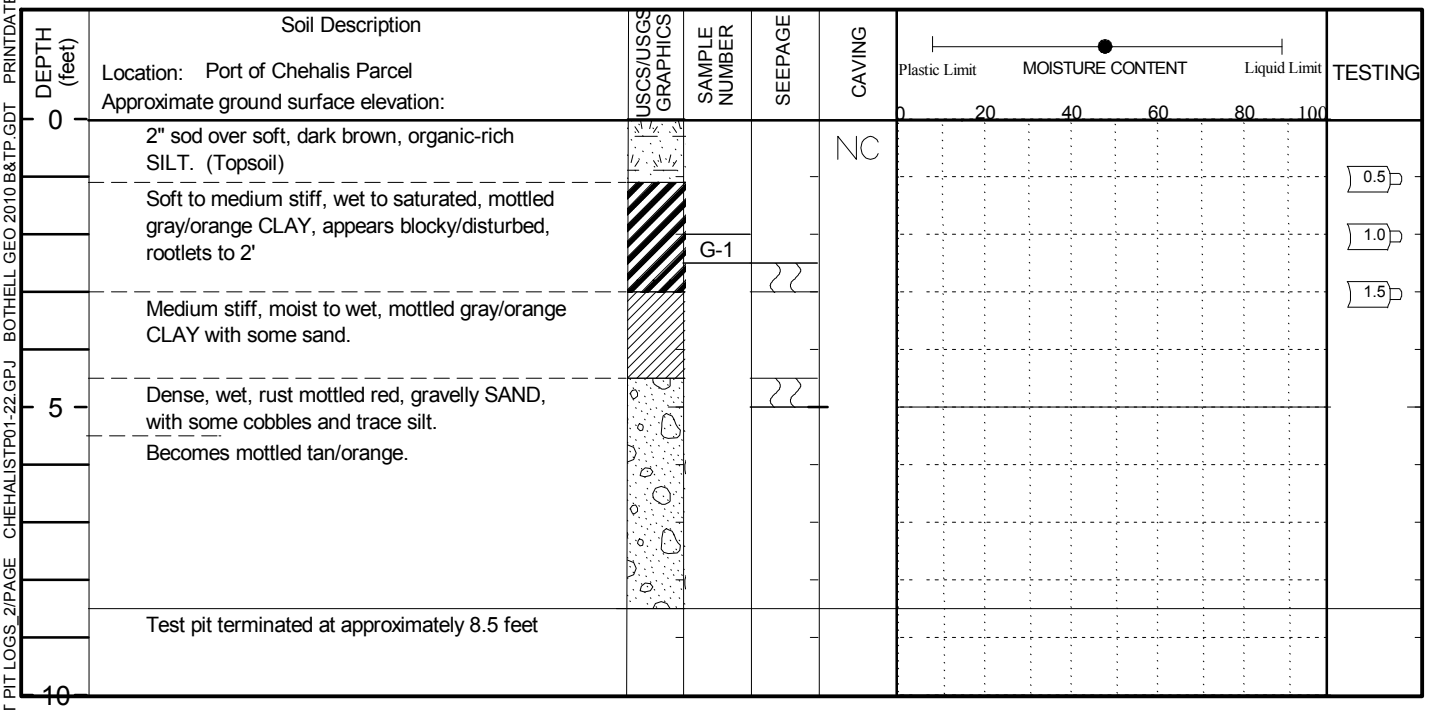
Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-11



Test Pit No.: TP-12



LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

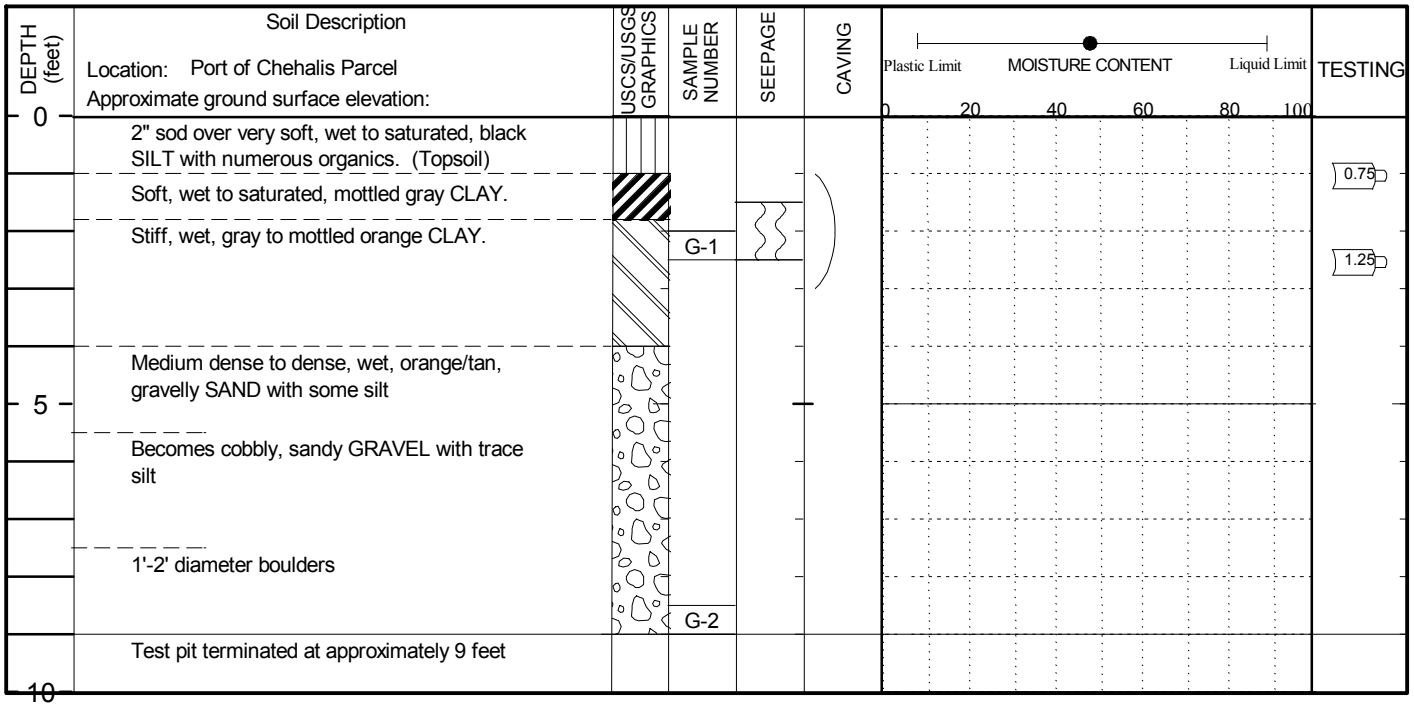
Excavation Method: Trackhoe

Date Excavated: *February 02, 2017*

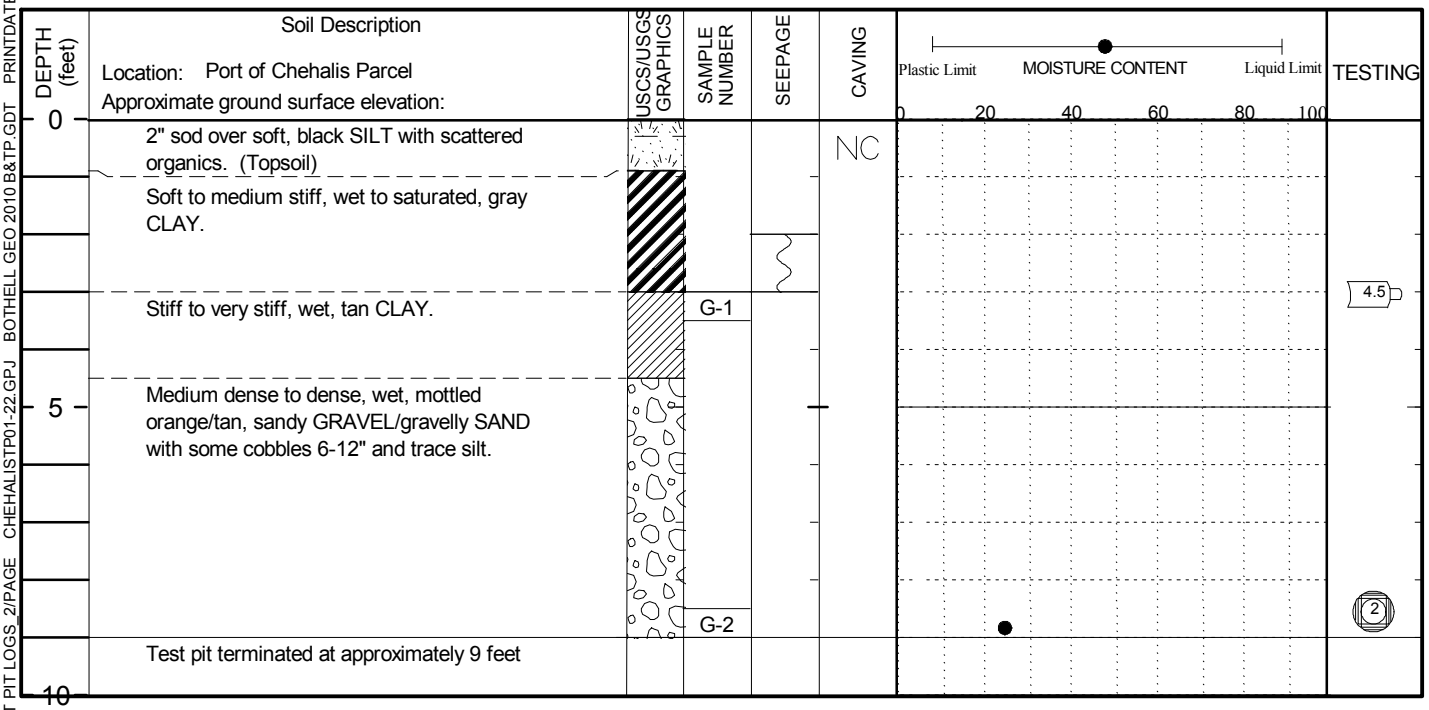
Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-13



Test Pit No.: TP-14



LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

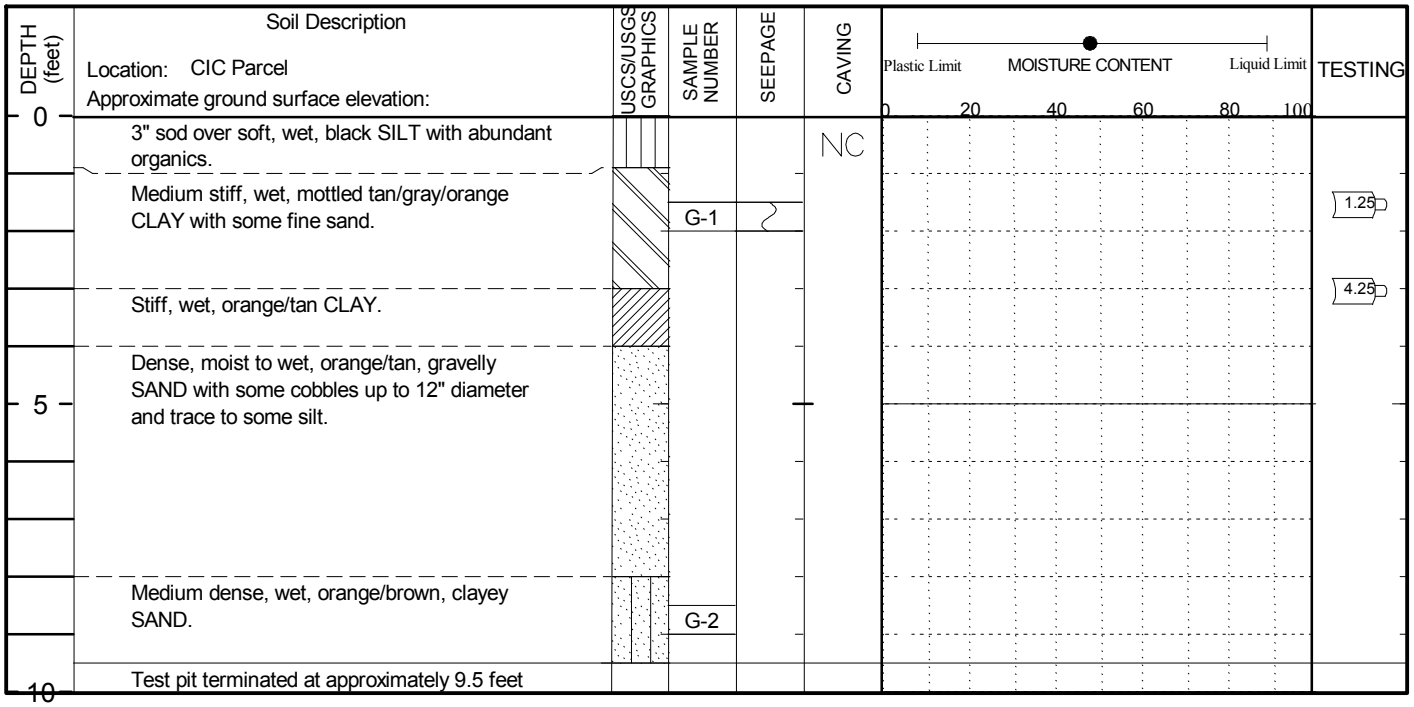
Excavation Method: Trackhoe

Date Excavated: *February 02, 2017*

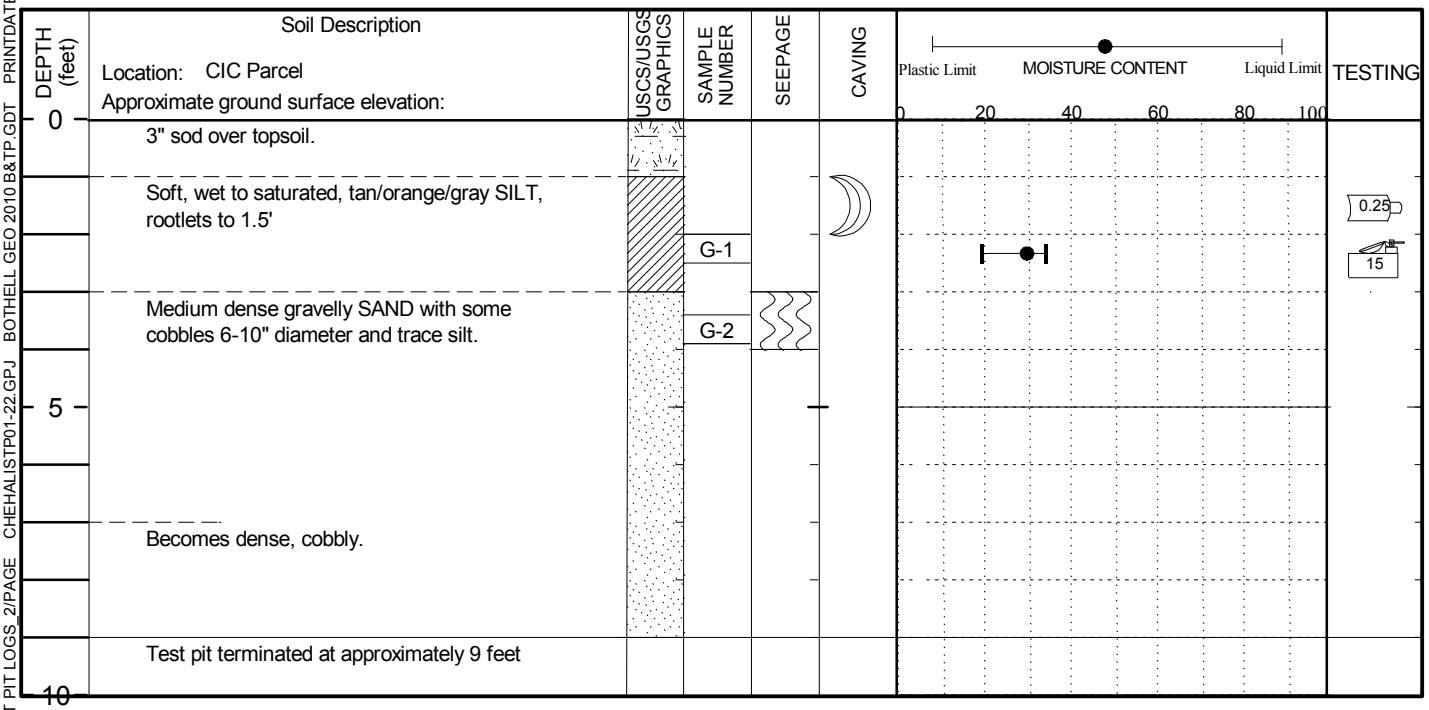
Logged By: *WJL*

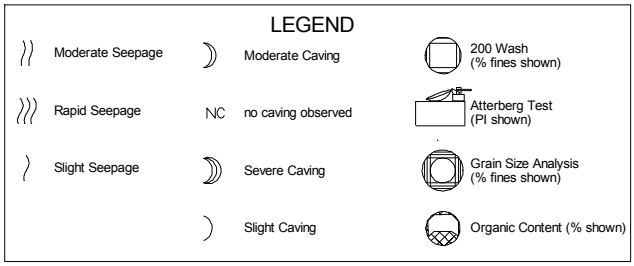
amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-15



Test Pit No.: TP-16





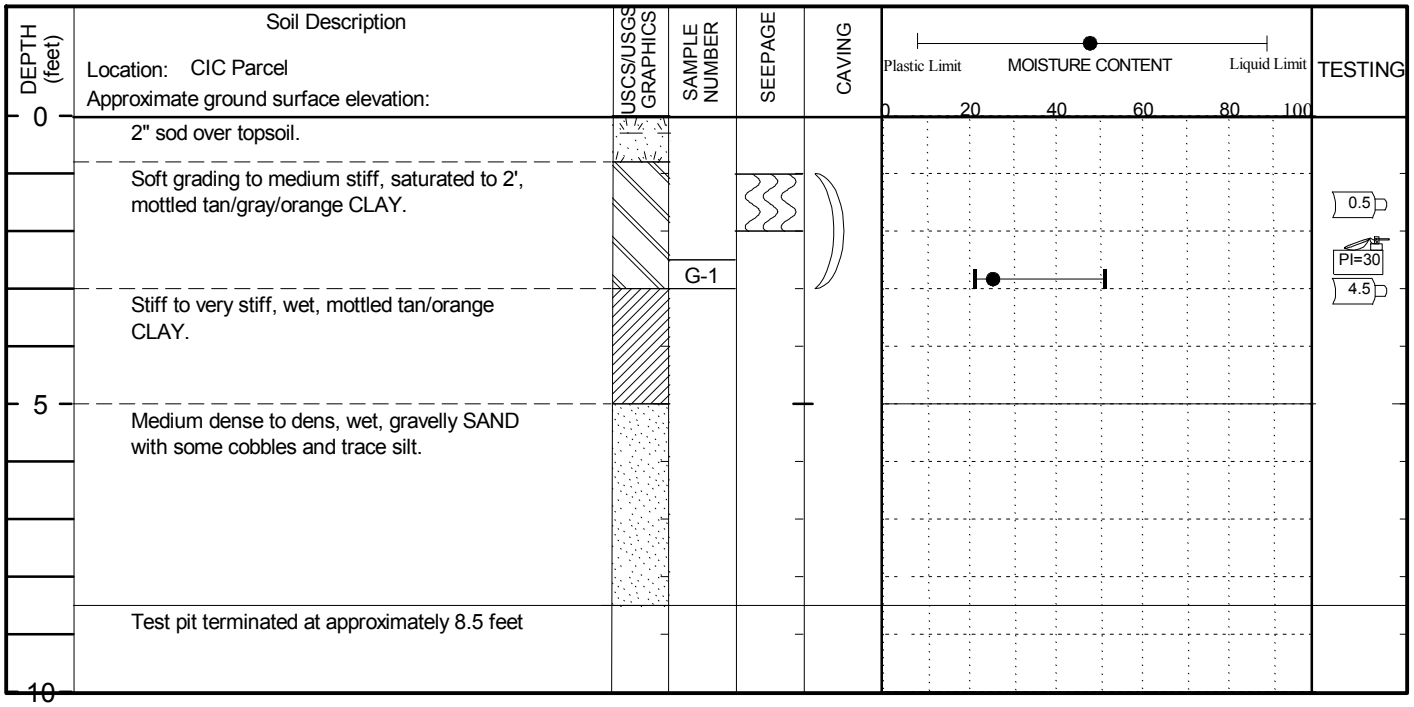
Excavation Method: Trackhoe

Date Excavated: *February 03, 2017*

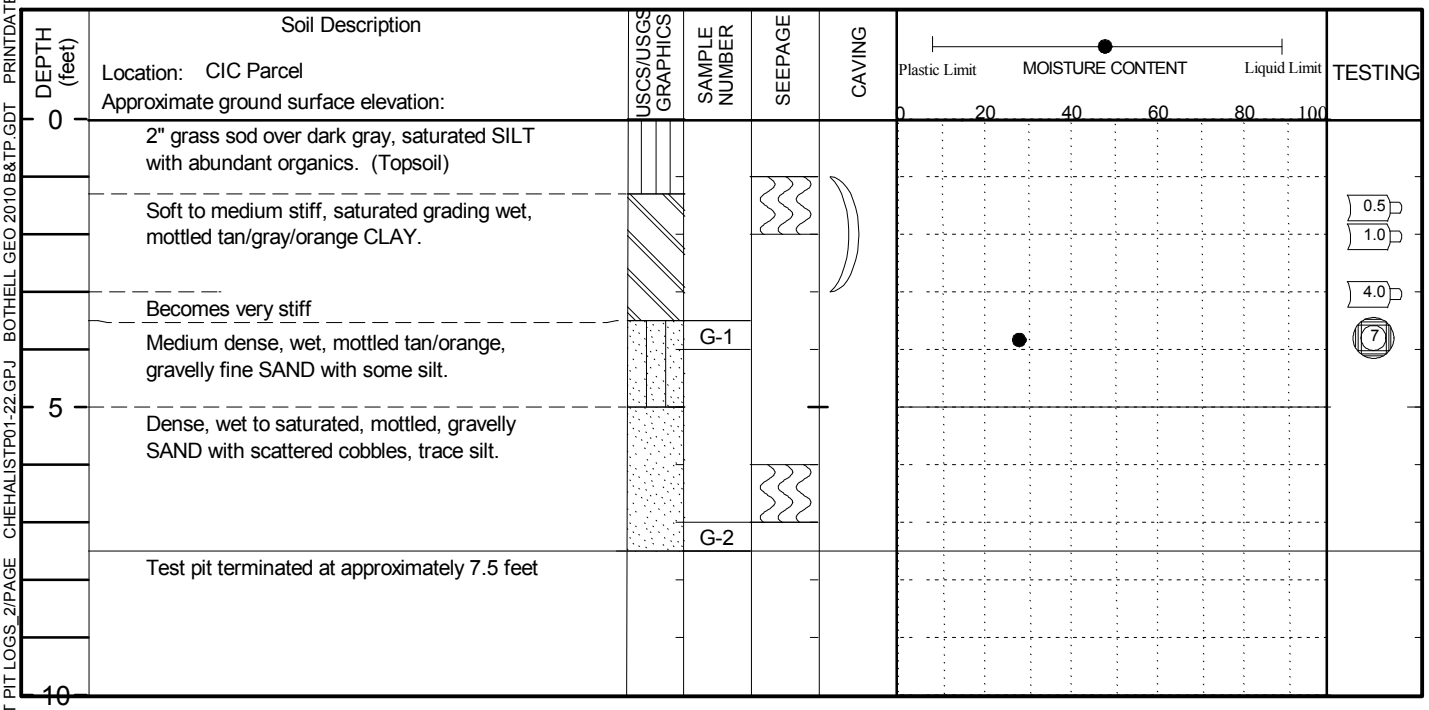
Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-17



Test Pit No.: TP-18



LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

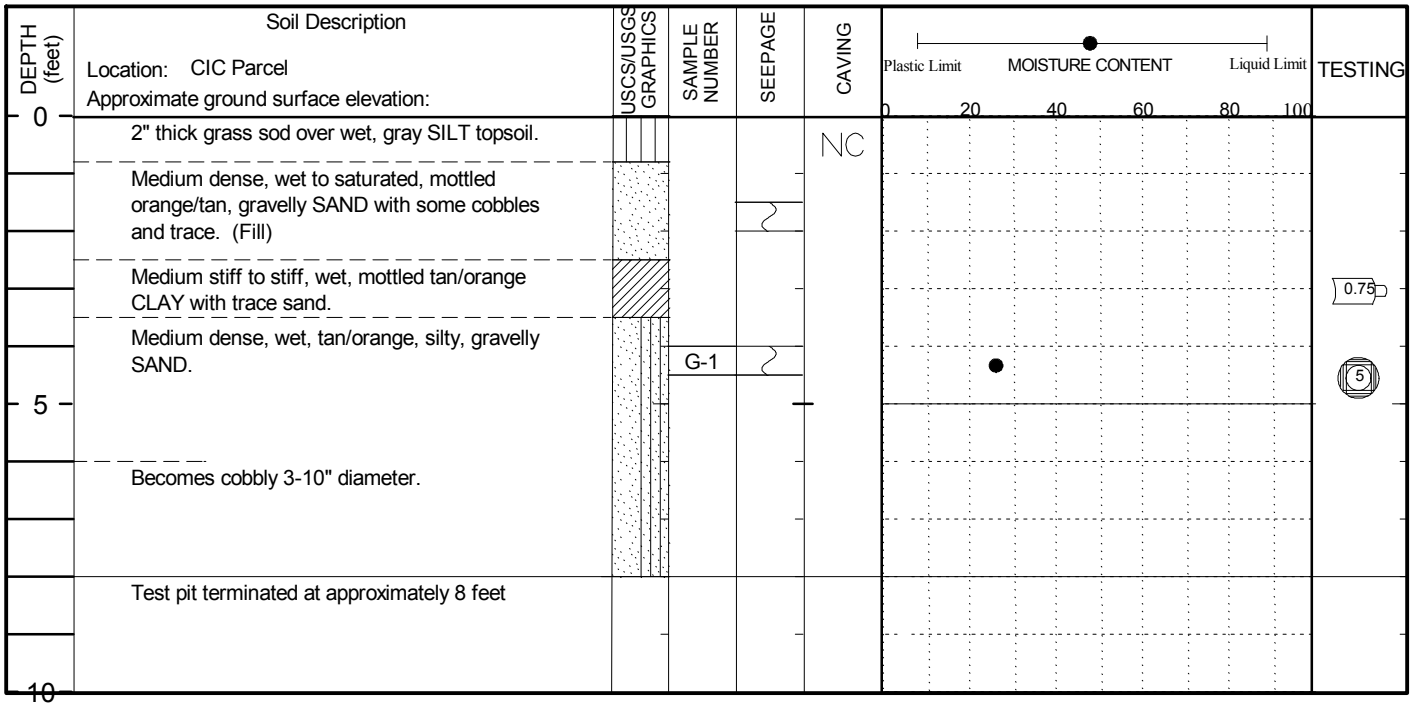
Excavation Method: Trackhoe

Date Excavated: *February 03, 2017*

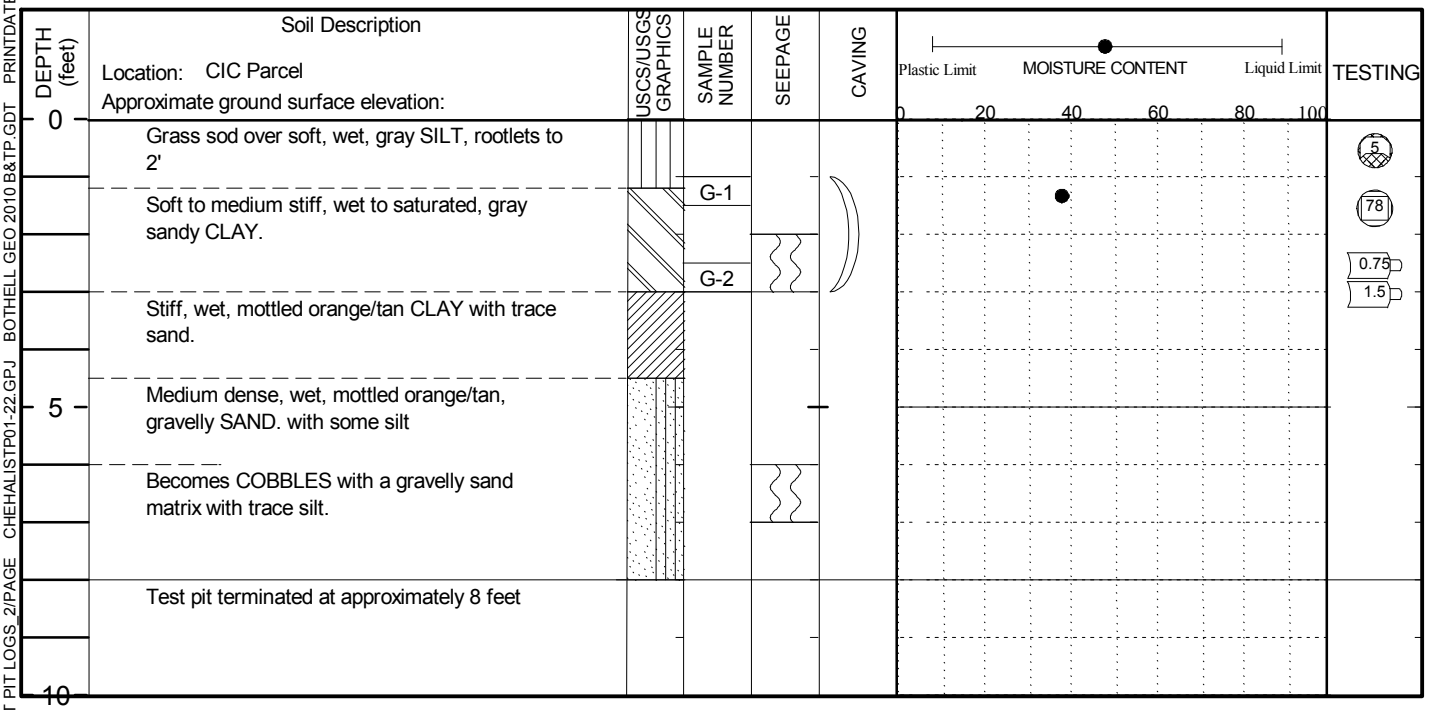
Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-19



Test Pit No.: TP-20



LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

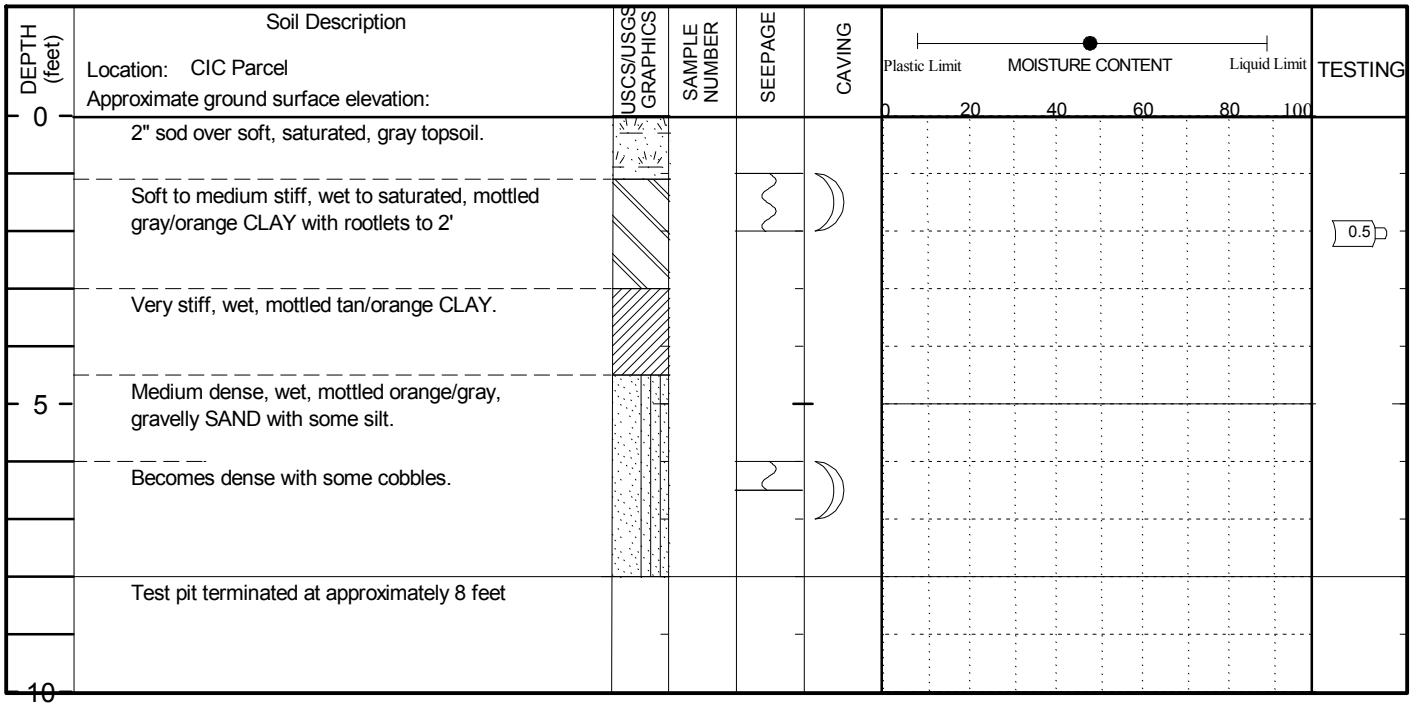
Excavation Method: Trackhoe

Date Excavated: *February 03, 2017*

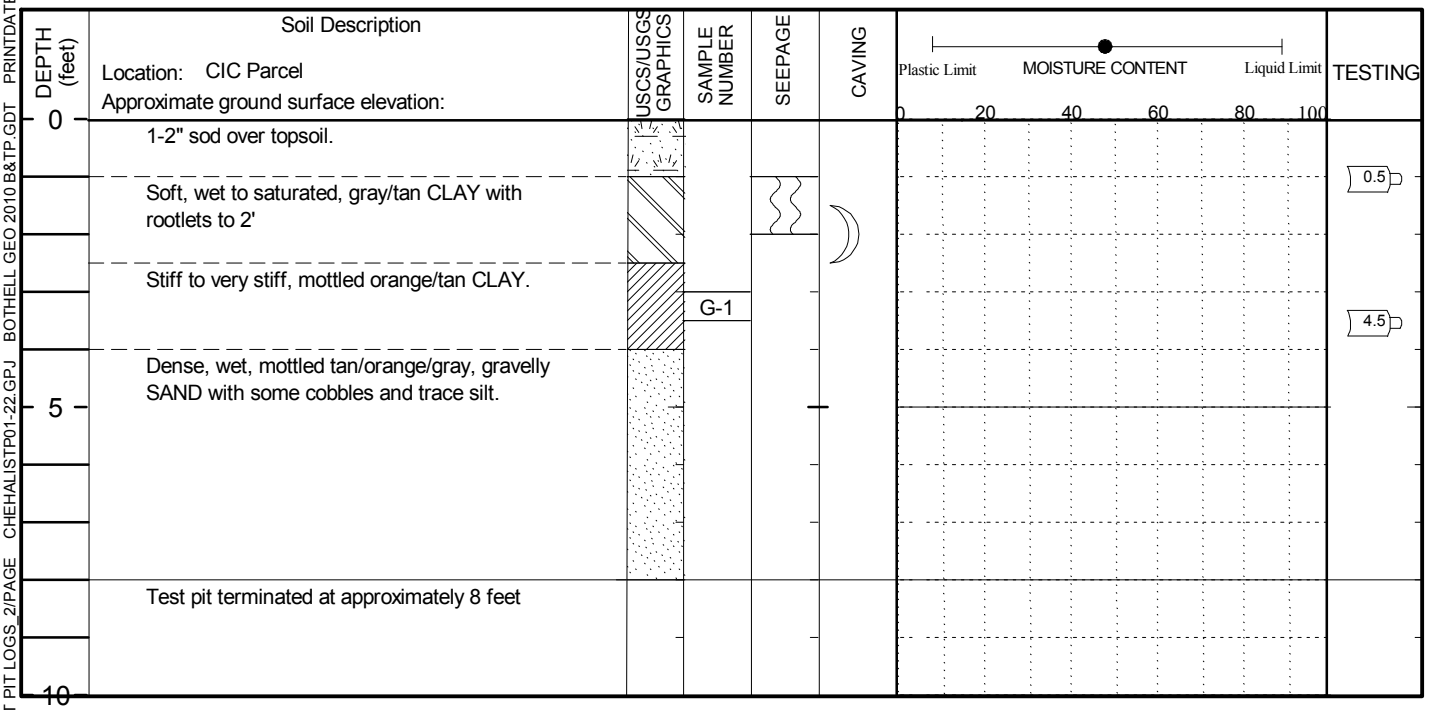
Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-21



Test Pit No.: TP-22



LEGEND

- Moderate Seepage
- Rapid Seepage
- Slight Seepage
- Moderate Caving
- NC no caving observed
- Severe Caving
- Slight Caving
- 200 Wash (% fines shown)
- Atterberg Test (PI shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

Excavation Method: Trackhoe

Date Excavated: *February 03, 2017*

Logged By: *WJL*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

APPENDIX B

Laboratory Testing Procedures and Results

APPENDIX B
Laboratory Testing Procedures and Results
Project No. 2424-17-005

The following paragraphs describe procedures associated with the laboratory tests conducted for this project. Graphical results of certain laboratory tests are enclosed in this appendix.

VISUAL CLASSIFICATION PROCEDURES

Visual soil classifications were conducted on all samples in the field and on selected samples in the laboratory. All soils were classified in general accordance with the Unified Soil Classification System, which includes color, relative moisture content, primary soil type (based on grain size), and any accessory soil types. The resulting soil classifications are presented on the exploration logs contained in Appendix A.

MOISTURE CONTENT DETERMINATION PROCEDURES

Moisture content determinations were performed on representative samples to aid in identification and correlation of soil types. All determinations were made in general accordance with ASTM D-2216. The results of these tests are shown on the exploration logs contained in Appendix A.

GRAIN-SIZE ANALYSIS PROCEDURES

A grain-size analysis indicates the range of soil particle diameters included in a particular sample. Grain-size analyses were performed on representative samples in general accordance with ASTM D-422. The results of these tests are presented on the enclosed grain-size distribution graphs and were used in soil classifications shown on the exploration logs contained in Appendix A.

ATTERBERG LIMIT DETERMINATION PROCEDURES

Atterberg limits are used primarily for classifying and indexing cohesive soils. The liquid and plastic limits, which are defined as the moisture contents of a cohesive soil at arbitrarily established limits for liquid and plastic behavior, were determined for selected samples in general accordance with ASTM D-4318. The results of these tests are presented on the enclosed Atterberg limit graphs and on the exploration logs contained in Appendix A.

MINUS 200-WASH PROCEDURES

A “minus 200-wash” analysis indicates the “fines” range of soil particle diameters included in a particular sample. “Fines” are defined as silt and clay size particles which are able to pass the US No. 200 sieve. “Minus 200-wash” analyses were performed on representative samples in general accordance with ASTM D-1140-97. The results of these tests are presented on the enclosed spreadsheet and were used in soil classifications shown on the exploration logs contained in Appendix A.

ORGANIC CONTENT DETERMINATION PROCEDURES

Test method ASTM D-2974-87 covers the measurement of organic matter, ash content and moisture content in peats and other organic soils, such as organic clays and silts. The results are presented on the enclosed lab data sheet and on the exploration logs contained in Appendix A.

MOISTURE CONTENT AND MINUS 200 WASH
ASTM: D2216 D1140

Job Name: Chehalis Property	Client: Amec/The Kroger Company
Job Number: 242417005	Sample Date: 2/9/2017
Date: 2/21/2017	Sampled By: Bill L.

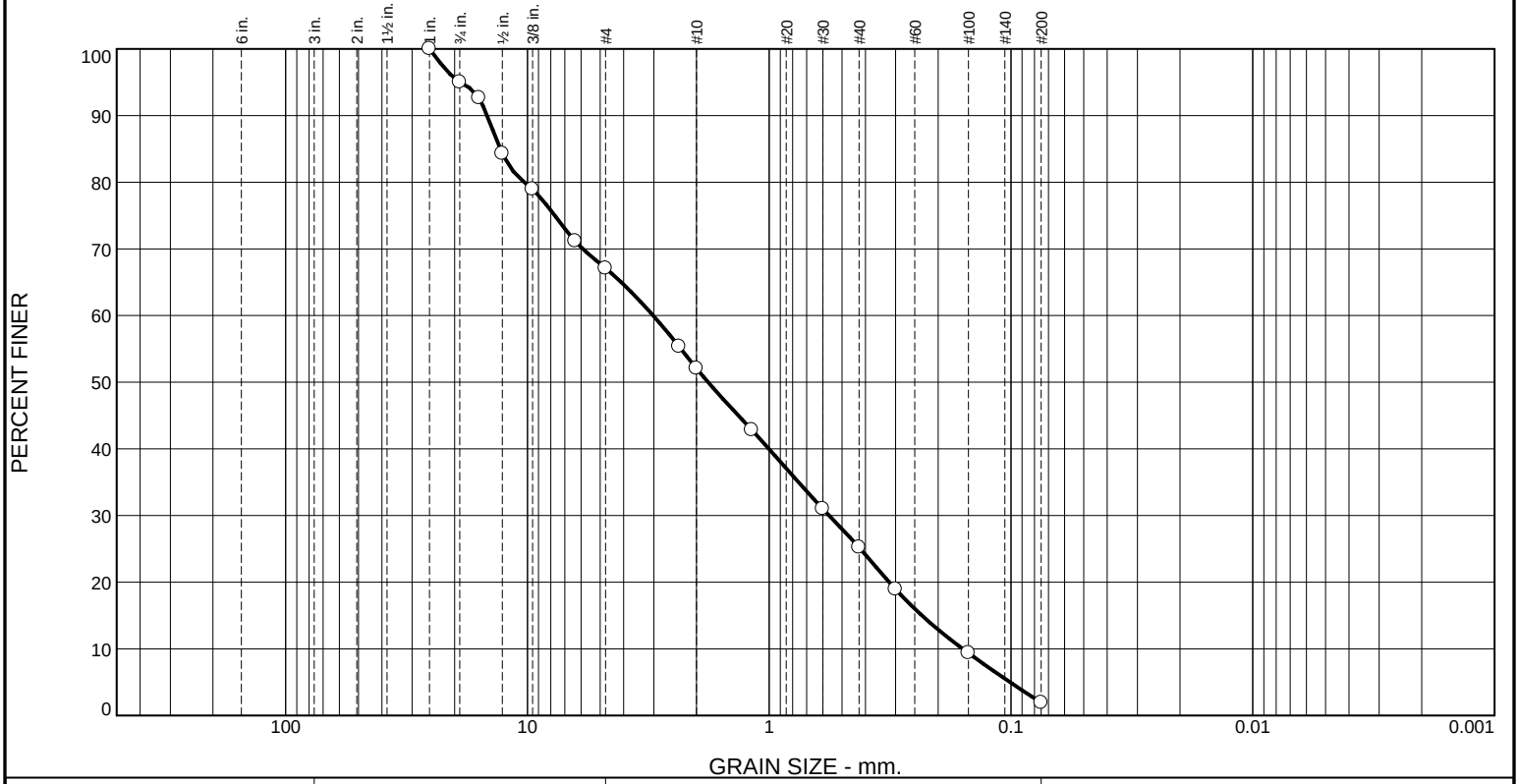
Exploration:	AB-2	AB-4	TP-8	Tp-9	TP-20
Sample Number:	S-1	S-1	S-2	S-1	S-1
Depth:	2.5	3	7	1	1
% Moisture	29.8%	25.6%	22.6%	39.7%	38.7%
% -200 Wash	33.80%	59.15%	81.96%	72.21%	77.83%

Tested By: Kinsey B.
Reveiwed By: Jeff W.
Respectfully submitted,

By: Jeff Ward

Terracon
Consulting Engineers & Scientists

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.0	27.9	15.0	26.9	23.3	1.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	95.0		
5/8"	92.6		
1/2"	84.3		
3/8"	79.0		
1/4	71.2		
#4	67.1		
#8	55.4		
#10	52.1		
#16	42.8		
#30	31.0		
#40	25.2		
#50	18.9		
#100	9.4		
#200	1.9		

* (no specification provided)

Material Description

Poorly graded sand
As Received Moisture: 13.5%

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.6696 D_{85}= 12.9626 D_{60}= 3.0203
D_{50}= 1.7900 D_{30}= 0.5651 D_{15}= 0.2334
D_{10}= 0.1582 C_u= 19.09 C_c= 0.67

Classification

USCS= SP AASHTO=

Remarks

ASTM: C136, D1140, D2216

Location: AB-1, S-1B
Sample Number: 821 **Depth:** 2.5 **Date:** 2/21/2017

Terracon Consultants, Inc.

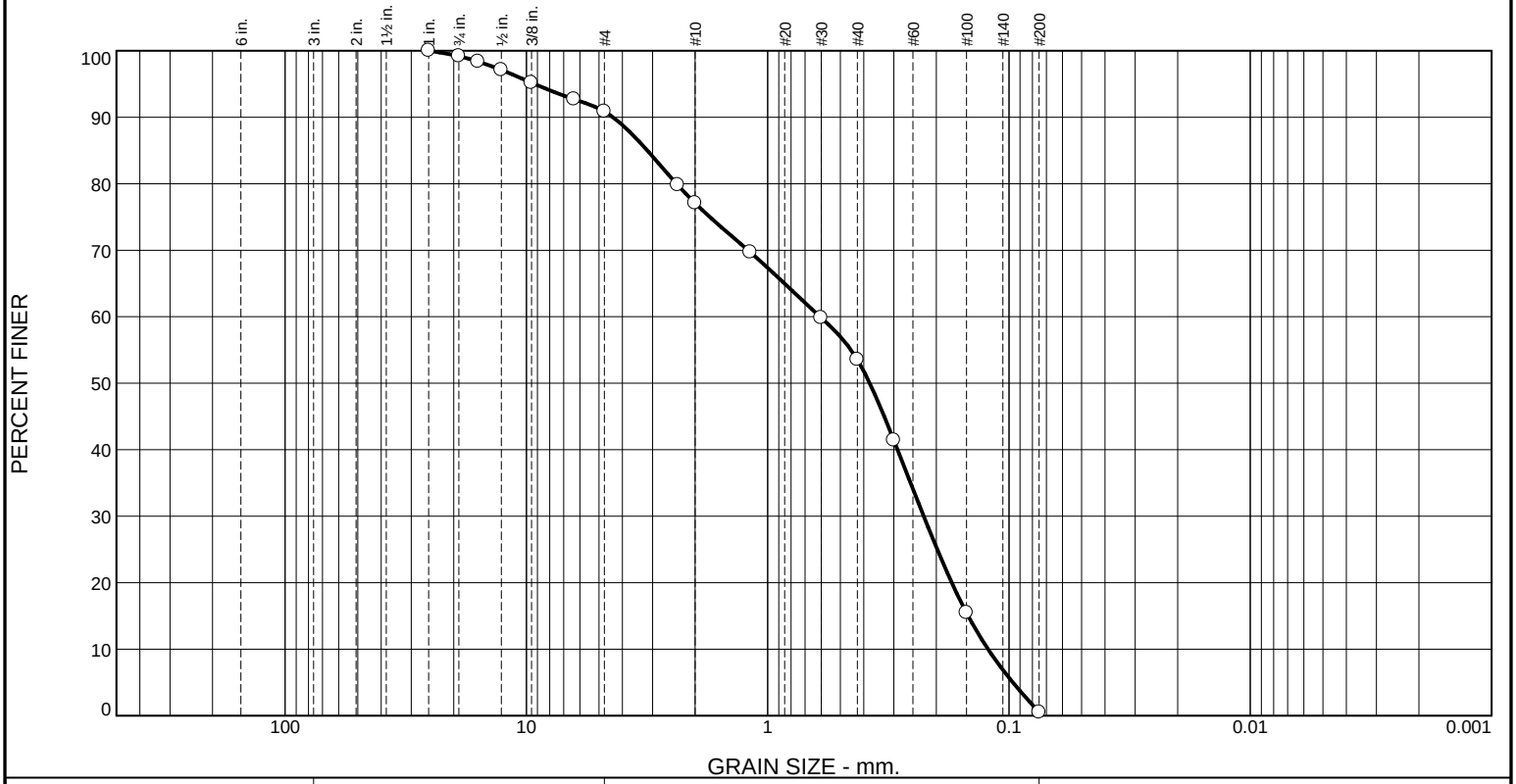
Mountlake Terrace, WA

Client: AMEC/The Kroger Company
Project: Chehalis Property

Project No: 242417005 **Figure**

Tested By: Kinsey B **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.8	8.3	13.8	23.6	53.0	0.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	99.2		
5/8"	98.4		
1/2"	97.1		
3/8"	95.2		
1/4	92.7		
#4	90.9		
#8	79.8		
#10	77.1		
#16	69.7		
#30	59.8		
#40	53.5		
#50	41.4		
#100	15.5		
#200	0.5		

* (no specification provided)

Material Description

Poorly graded sand
As Received Moisture: 20.6%

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 4.3760 D_{85}= 3.1550 D_{60}= 0.6069
D_{50}= 0.3776 D_{30}= 0.2257 D_{15}= 0.1477
D_{10}= 0.1221 C_u= 4.97 C_c= 0.69

Classification

USCS= SP AASHTO=

Remarks

ASTM: C136, D1140, D2216

Location: AB-2, S-3
Sample Number: 823 **Depth:** 7.5 **Date:** 2/21/2017

Terracon Consultants, Inc.

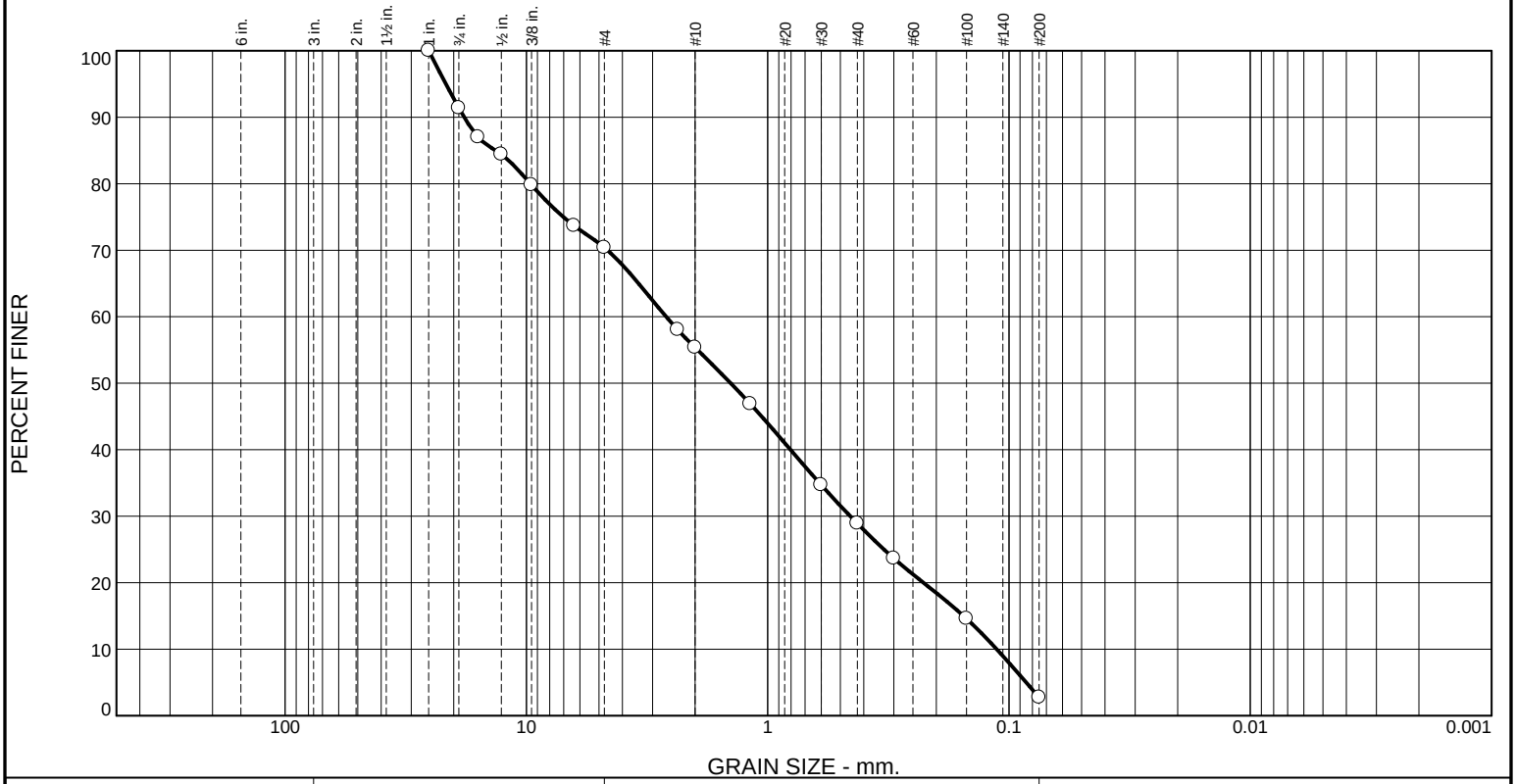
Mountlake Terrace, WA

Client: AMEC/The Kroger Company
Project: Chehalis Property

Project No: 242417005 **Figure**

Tested By: Kinsey B. **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.6	21.0	15.0	26.5	26.2	2.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	91.4		
5/8"	87.0		
1/2"	84.4		
3/8"	79.8		
1/4	73.7		
#4	70.4		
#8	58.0		
#10	55.4		
#16	46.9		
#30	34.7		
#40	28.9		
#50	23.7		
#100	14.6		
#200	2.7		

* (no specification provided)

Material Description

Poorly graded sand with gravel
As Received Moisture: 24.1%

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 18.1108 D_{85}= 13.4089 D_{60}= 2.6356
D_{50}= 1.4228 D_{30}= 0.4547 D_{15}= 0.1542
D_{10}= 0.1124 C_u= 23.44 C_c= 0.70

Classification

USCS= SP AASHTO=

Remarks

ASTM: C136, D1140, D2216

Location: AB-7, S-2
Sample Number: 826 **Depth:** 5 **Date:** 2/21/2017

Terracon Consultants, Inc.

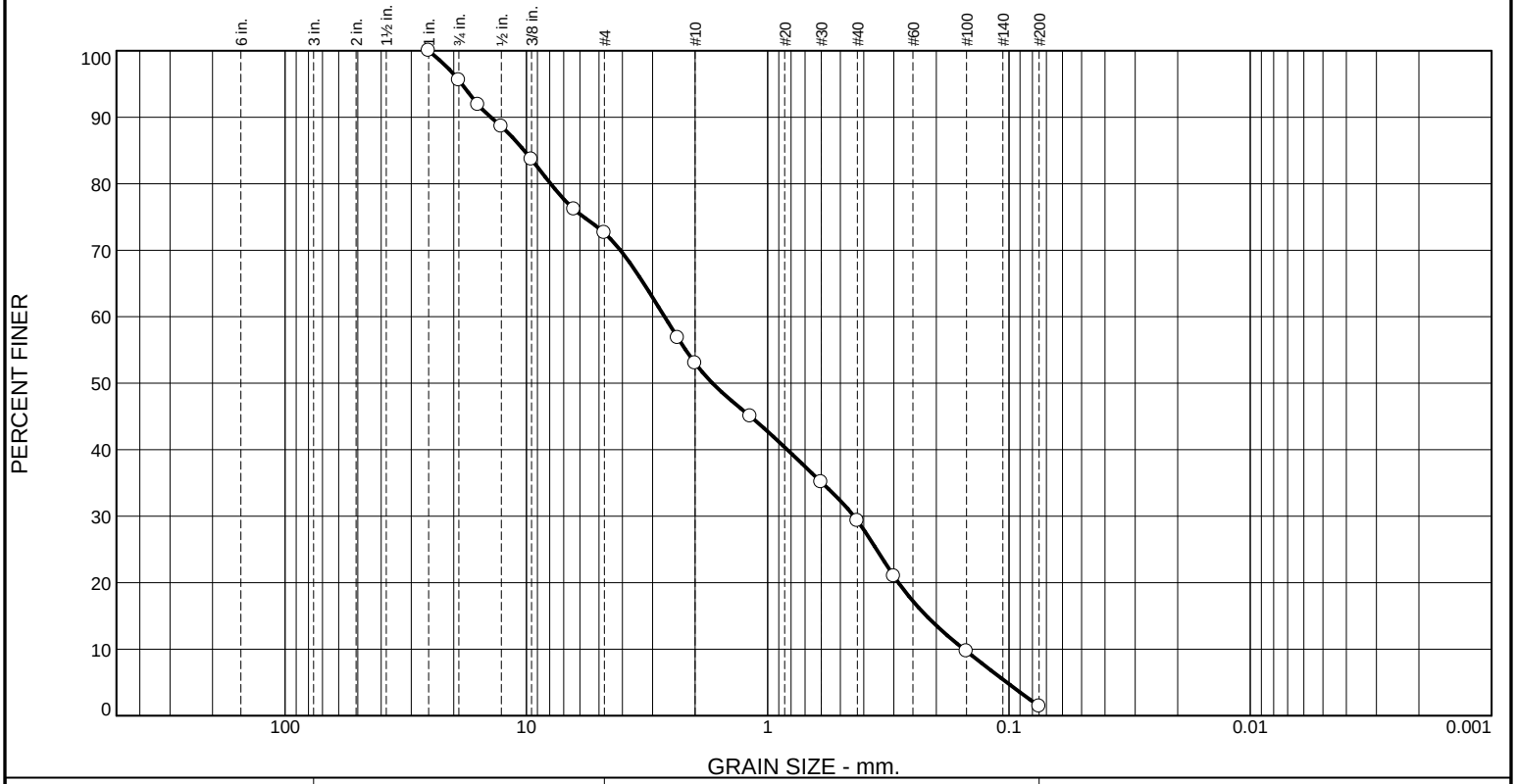
Mountlake Terrace, WA

Client: AMEC/The Kroger Company
Project: Chehalis Property

Project No: 242417005 **Figure**

Tested By: Kinsey B **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.4	23.0	19.6	23.7	27.9	1.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	95.6		
5/8"	91.9		
1/2"	88.6		
3/8"	83.7		
1/4	76.1		
#4	72.6		
#8	56.8		
#10	53.0		
#16	45.0		
#30	35.1		
#40	29.3		
#50	21.0		
#100	9.7		
#200	1.4		

* (no specification provided)

Material Description

Poorly graded sand with gravel
As Received Moisture: 18.3%

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.0374 D_{85}= 10.2166 D_{60}= 2.6755
D_{50}= 1.6940 D_{30}= 0.4391 D_{15}= 0.2197
D_{10}= 0.1537 C_u= 17.40 C_c= 0.47

Classification

USCS= SP AASHTO=

Remarks

ASTM: C136, D1140, D2216

Location: TP-6, S-2
Sample Number: 828 **Depth:** 7.5 **Date:** 2/21/2017

Terracon Consultants, Inc.

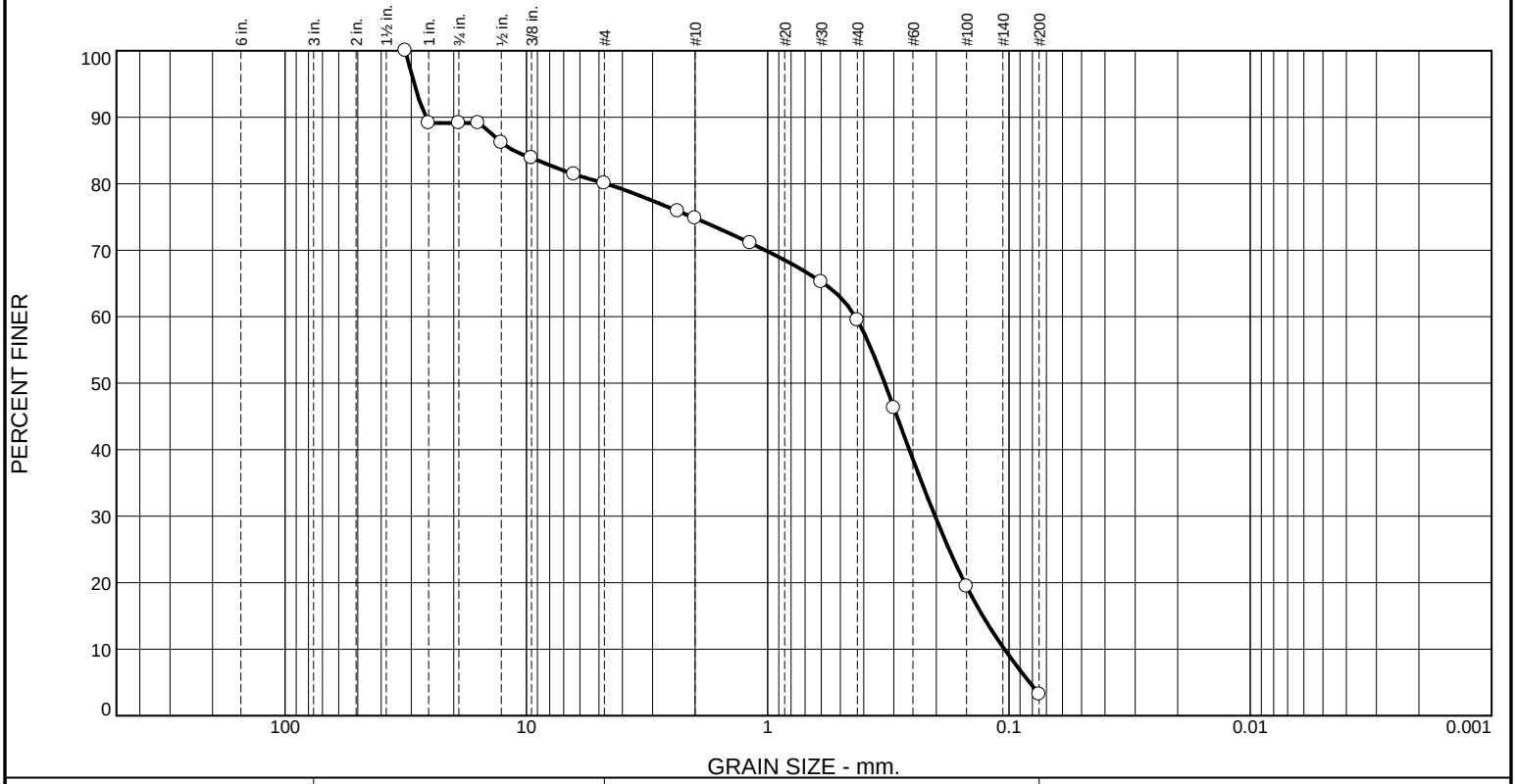
Mountlake Terrace, WA

Client: AMEC/The Kroger Company
Project: Chehalis Property

Project No: 242417005 **Figure**

Tested By: Kinsey B **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.9	9.0	5.3	15.3	56.3	3.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.25"	100.0		
1"	89.1		
3/4"	89.1		
5/8"	89.1		
1/2"	86.2		
3/8"	83.9		
1/4	81.4		
#4	80.1		
#8	75.9		
#10	74.8		
#16	71.1		
#30	65.2		
#40	59.5		
#50	46.3		
#100	19.4		
#200	3.2		

* (no specification provided)

Material Description

Poorly graded sand with gravel
As Received Moisture: 19.6%

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 26.1446 D_{85}= 11.3015 D_{60}= 0.4331
D_{50}= 0.3272 D_{30}= 0.2024 D_{15}= 0.1284
D_{10}= 0.1044 C_u= 4.15 C_c= 0.91

Classification

USCS= SP AASHTO=

Remarks

ASTM: C136, D1140, D2216

Location: TP-7, S-2
Sample Number: 830 **Depth:** 7 **Date:** 2/21/2017

Terracon Consultants, Inc.

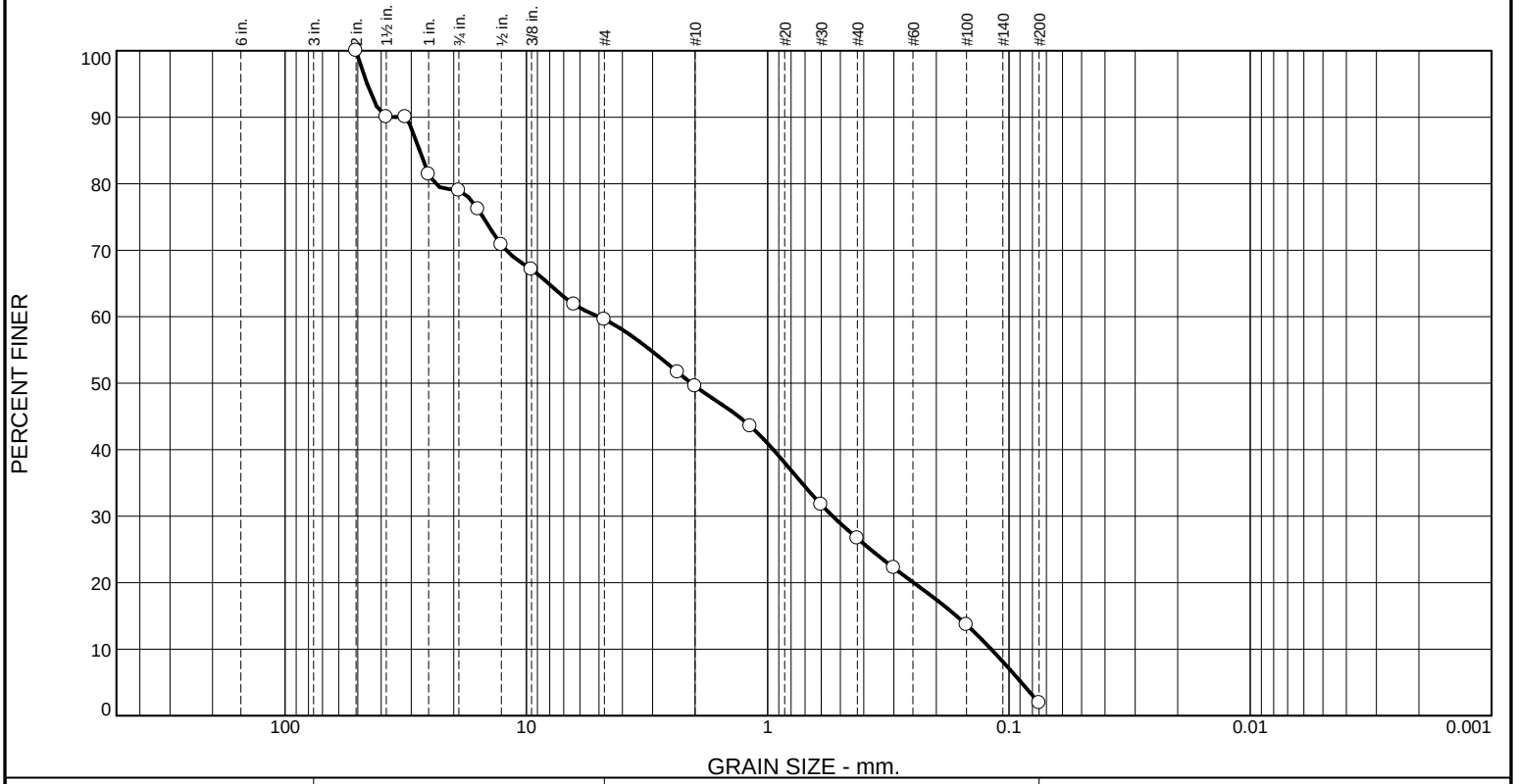
Mountlake Terrace, WA

Client: AMEC/The Kroger Company
Project: Chehalis Property

Project No: 242417005 **Figure**

Tested By: Kinsey B **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	21.0	19.4	10.0	22.9	24.8	1.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100.0		
1.5"	90.0		
1.25"	90.0		
1"	81.4		
3/4"	79.0		
5/8"	76.2		
1/2"	70.8		
3/8"	67.1		
1/4	61.9		
#4	59.6		
#8	51.7		
#10	49.6		
#16	43.6		
#30	31.7		
#40	26.7		
#50	22.2		
#100	13.7		
#200	1.9		

* (no specification provided)

Material Description

Poorly graded sand with gravel
As Received Moisture: 24.5%

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 31.6884 D_{85}= 27.7083 D_{60}= 5.0279
D_{50}= 2.0730 D_{30}= 0.5378 D_{15}= 0.1650
D_{10}= 0.1185 C_u= 42.45 C_c= 0.49

Classification

USCS= SP AASHTO=

Remarks

ASTM: C136, D1140, D2216

Location: TP-14, S-2
Sample Number: 834 **Depth:** 9 **Date:** 2/21/2017

Terracon Consultants, Inc.

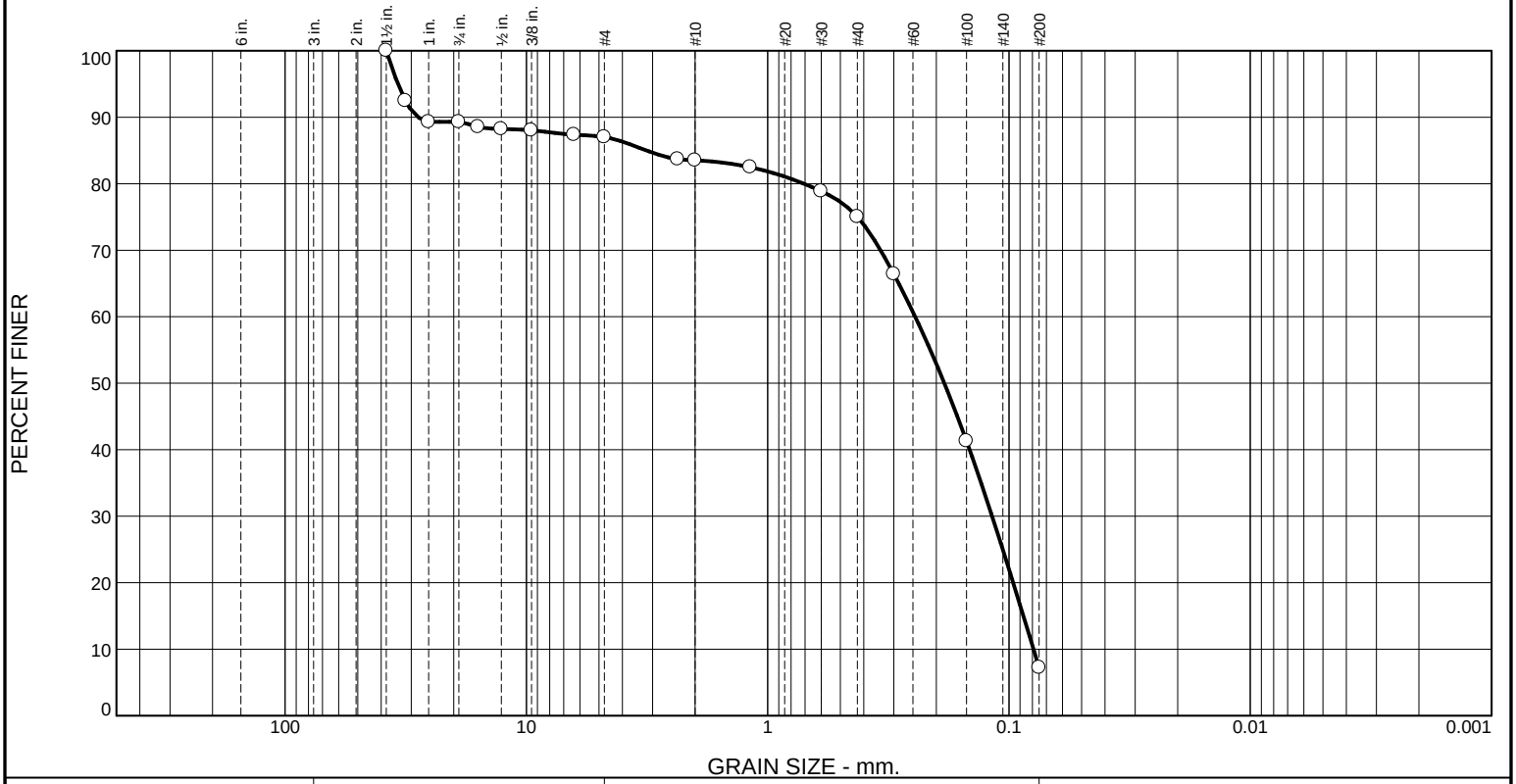
Mountlake Terrace, WA

Client: AMEC/The Kroger Company
Project: Chehalis Property

Project No: 242417005 **Figure**

Tested By: Kinsey B **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.7	2.3	3.5	8.5	67.8	7.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1.25"	92.5		
1"	89.3		
3/4"	89.3		
5/8"	88.6		
1/2"	88.2		
3/8"	88.0		
1/4	87.4		
#4	87.0		
#8	83.7		
#10	83.5		
#16	82.5		
#30	78.9		
#40	75.0		
#50	66.4		
#100	41.3		
#200	7.2		

* (no specification provided)

Material Description

Poorly graded sand with silt
As Received Moisture: 28.8%

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 28.0776 D_{85}= 3.1790 D_{60}= 0.2447
D_{50}= 0.1853 D_{30}= 0.1175 D_{15}= 0.0871
D_{10}= 0.0791 C_u= 3.09 C_c= 0.71

Classification

USCS= AASHTO=

Remarks

ASTM: C136, D1140, D2216

Location: TP-18, S-1
Sample Number: 837 **Depth:** 3.5 **Date:** 2/21/2017

Terracon Consultants, Inc.

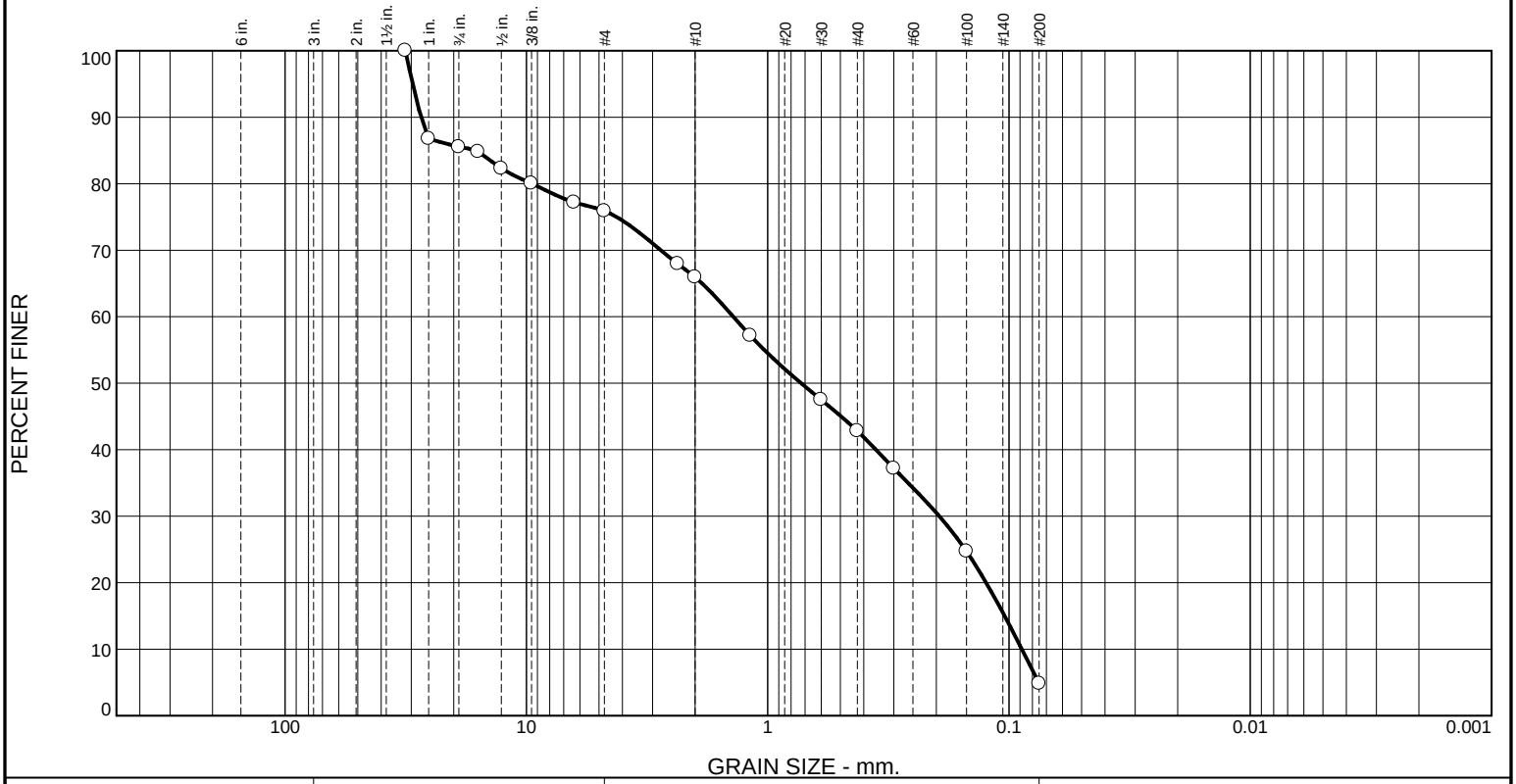
Mountlake Terrace, WA

Client: AMEC/The Kroger Company
Project: Chehalis Property

Project No: 242417005 **Figure**

Tested By: Kinsey B **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.5	9.6	9.9	23.2	38.0	4.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.25"	100.0		
1"	86.8		
3/4"	85.5		
5/8"	84.8		
1/2"	82.3		
3/8"	80.0		
1/4	77.2		
#4	75.9		
#8	68.0		
#10	66.0		
#16	57.2		
#30	47.5		
#40	42.8		
#50	37.2		
#100	24.7		
#200	4.8		

* (no specification provided)

Material Description

Poorly graded sand with gravel
As Received Moisture: 26.9%

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 27.3151 D_{85}= 16.3671 D_{60}= 1.3878
D_{50}= 0.7267 D_{30}= 0.1944 D_{15}= 0.1042
D_{10}= 0.0884 C_u= 15.70 C_c= 0.31

Classification

USCS= SP AASHTO=

Remarks

ASTM: C136, D1140, D2216

Location: TP-19, S-1
Sample Number: 838 **Depth:** 4 **Date:** 2/21/2017

Terracon Consultants, Inc.

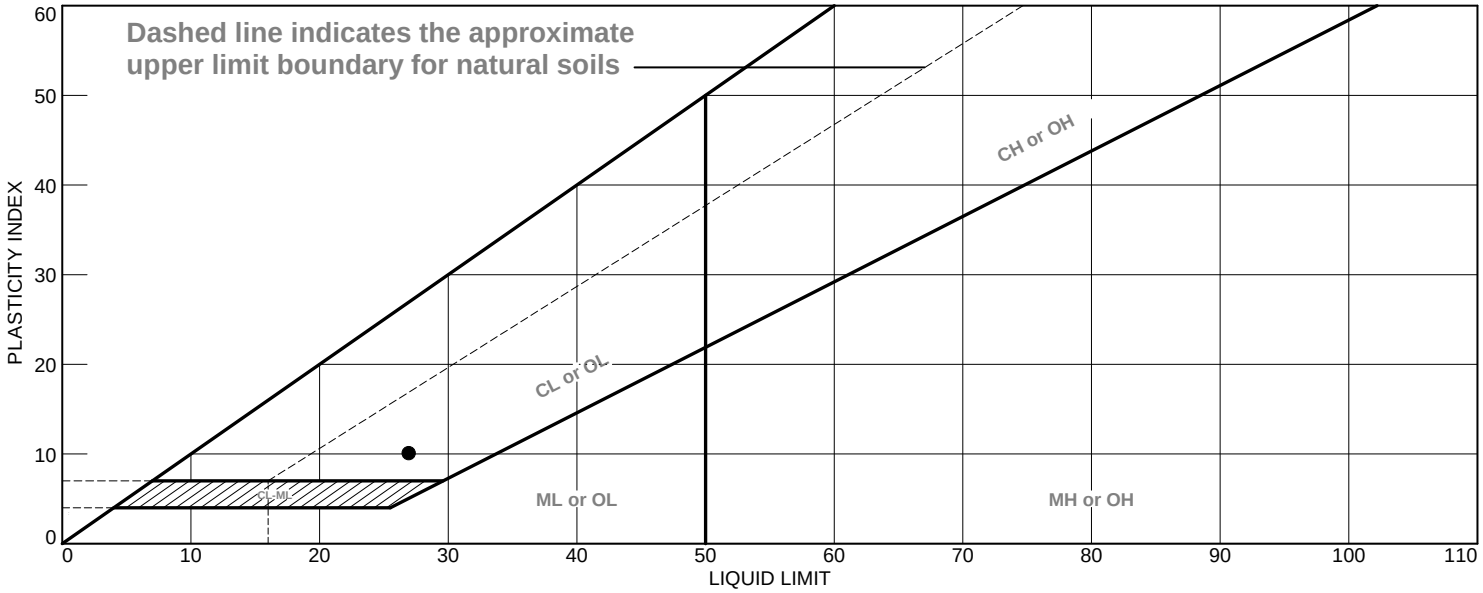
Mountlake Terrace, WA

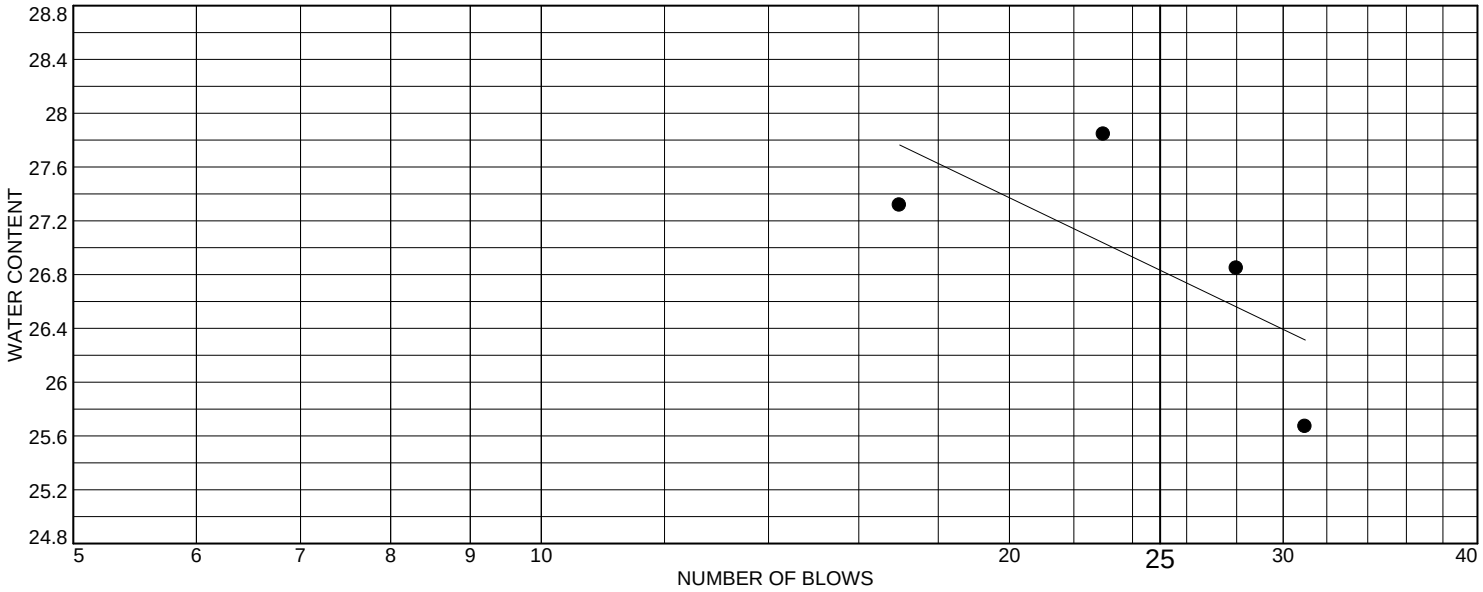
Client: AMEC/The Kroger Company
Project: Chehalis Property

Project No: 242417005 **Figure**

Tested By: Kinsey B **Checked By:** Jeff w

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		27	17	10			

Project No. 242417005 **Client:** AMEC/The Kroger Company

Project: Chehalis Property

Location: AB-6, S-2
Sample Number: 825 **Depth:** 5

Terracon Consultants, Inc.

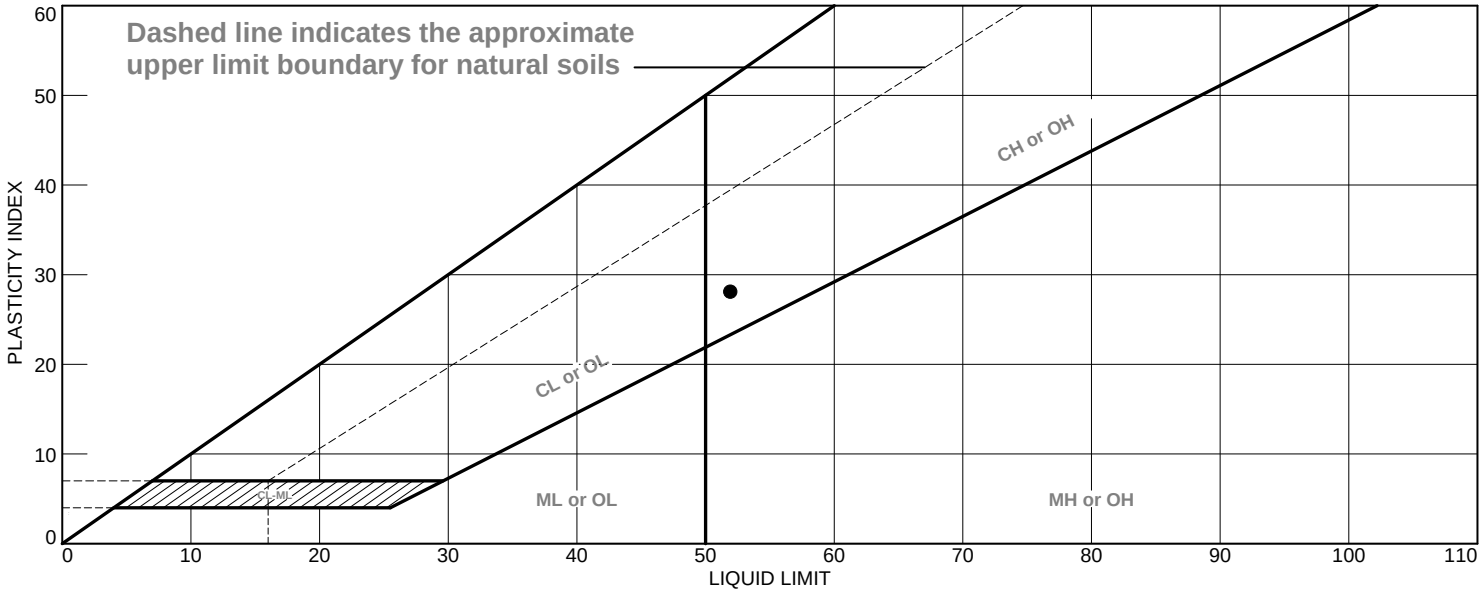
Mountlake Terrace, WA

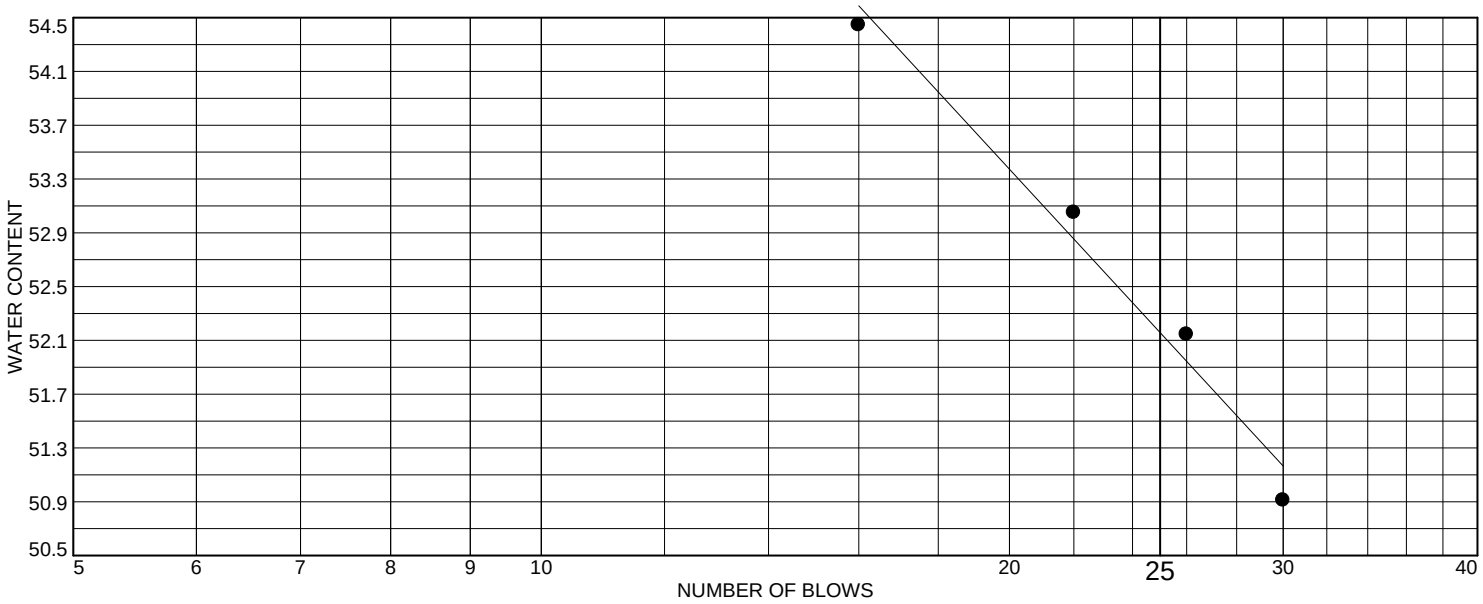
Remarks:
● As Received Moisture: 20.8%

Figure

Tested By: Kinsey B **Checked By:** Jeff W

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		52	24	28			

Project No. 242417005 **Client:** AMEC/The Kroger Company

Project: Chehalis Property

Location: TP-6, S-1
Sample Number: 827 **Depth:** 2.5

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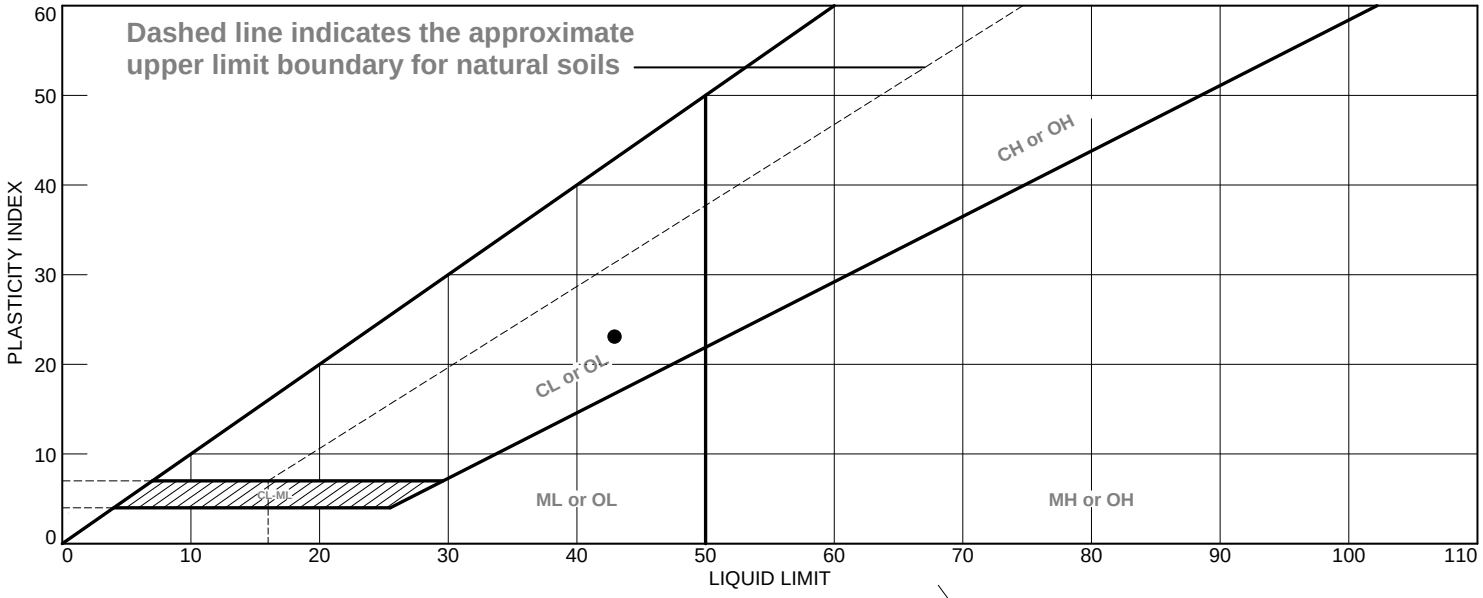
Mountlake Terrace, WA

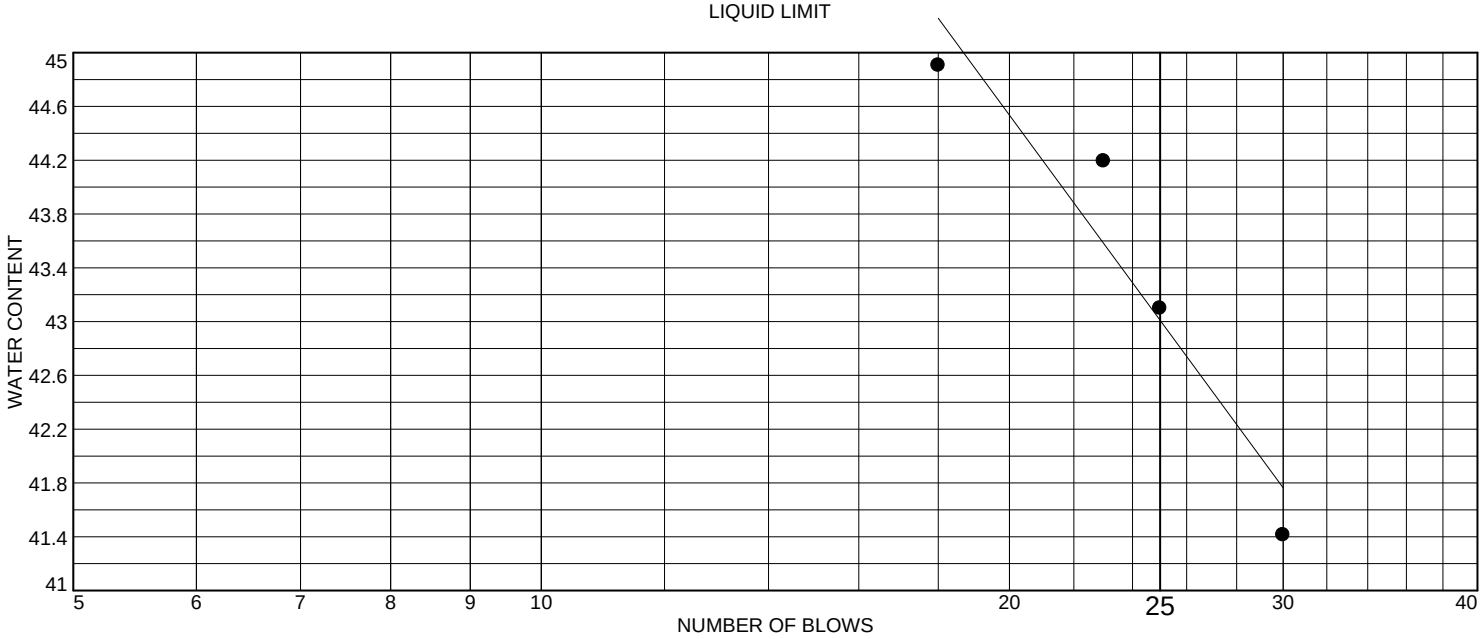
Remarks:
● As Received Moisture: 32.9%

Figure

Tested By: Kinsey B **Checked By:** Jeff W

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		43	20	23			

Project No. 242417005 **Client:** AMEC/The Kroger Company

Project: Chehalis Property

Location: TP-7, S-1
Sample Number: 829 **Depth:** 4

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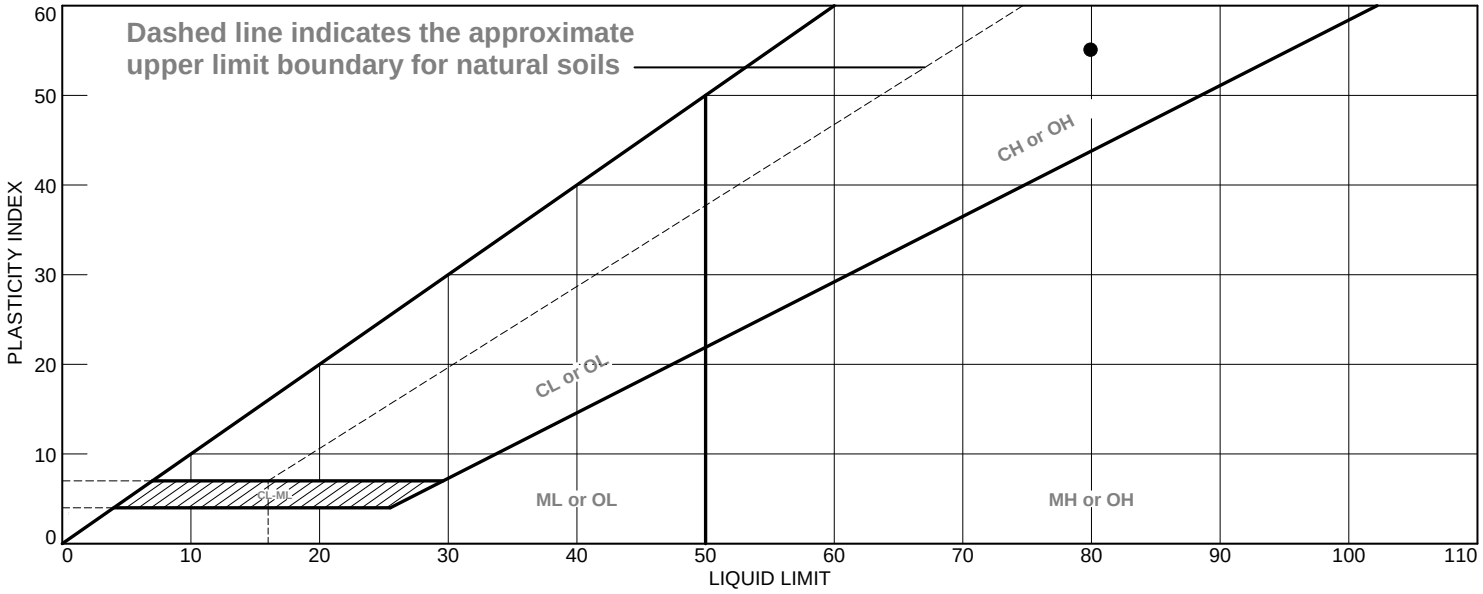
Mountlake Terrace, WA

Remarks:
● As Received Moisture: 30.2%

Figure

Tested By: Kinsey B **Checked By:** Jeff W

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		80	25	55			

Project No. 242417005 **Client:** AMEC/The Kroger Company

Project: Chehalis Property

Location: TP-11, S-1
Sample Number: 833 **Depth:** 2.2

Terracon Consultants, Inc.

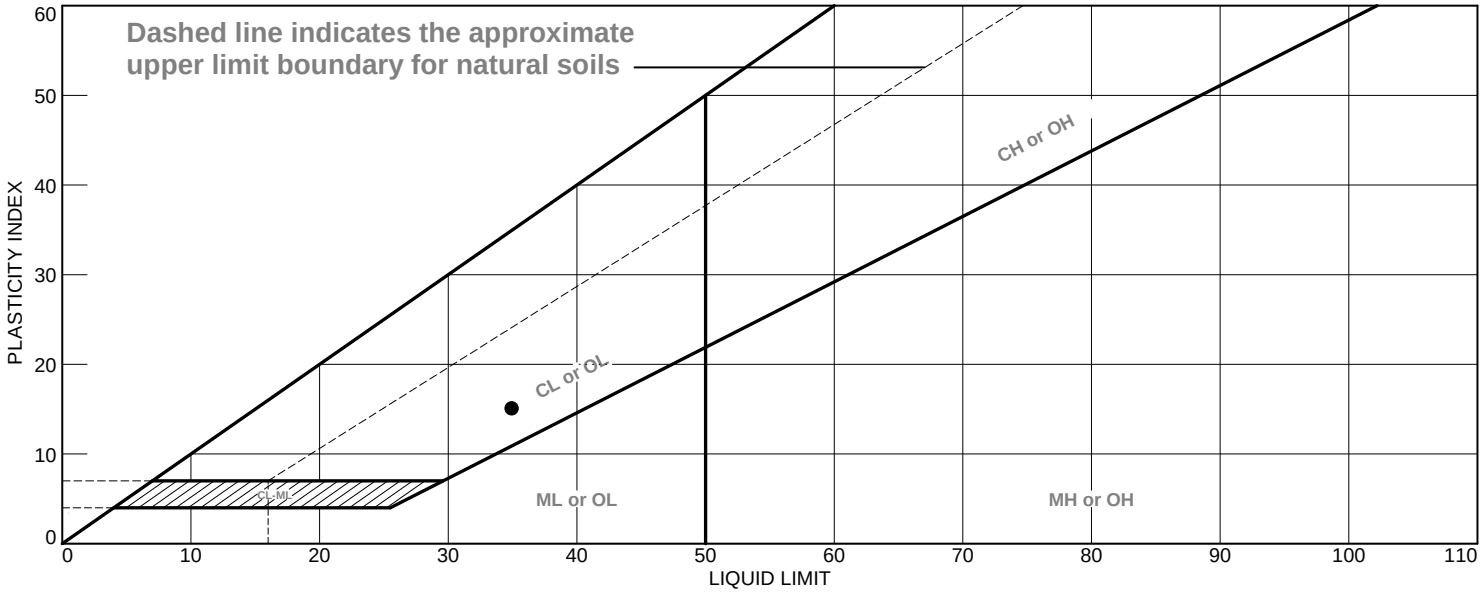
Mountlake Terrace, WA

Remarks:
● As Received Moisture: 39.1%

Figure

Tested By: Kinsey B **Checked By:** Jeff W

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		35	20	15			

Project No. 242417005 **Client:** AMEC/The Kroger Company

Project: Chehalis Property

Location: TP-16, S-1
Sample Number: 835 **Depth:** 2

Terracon Consultants, Inc.

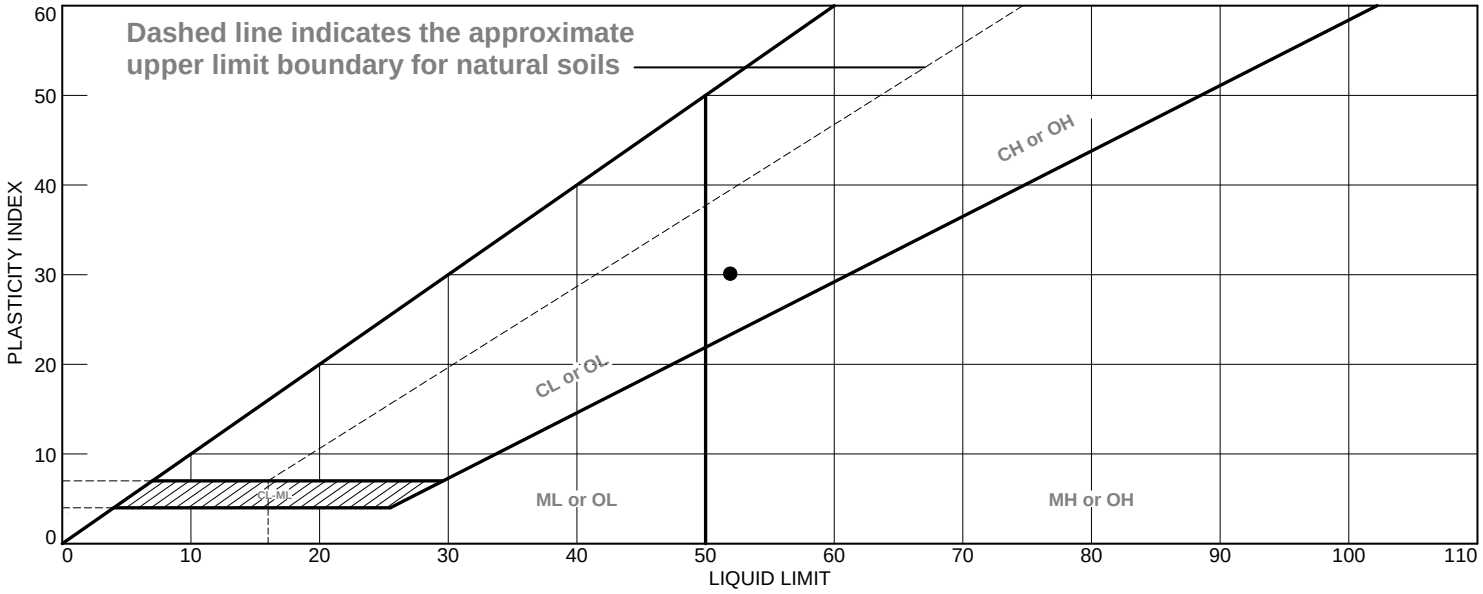
Mountlake Terrace, WA

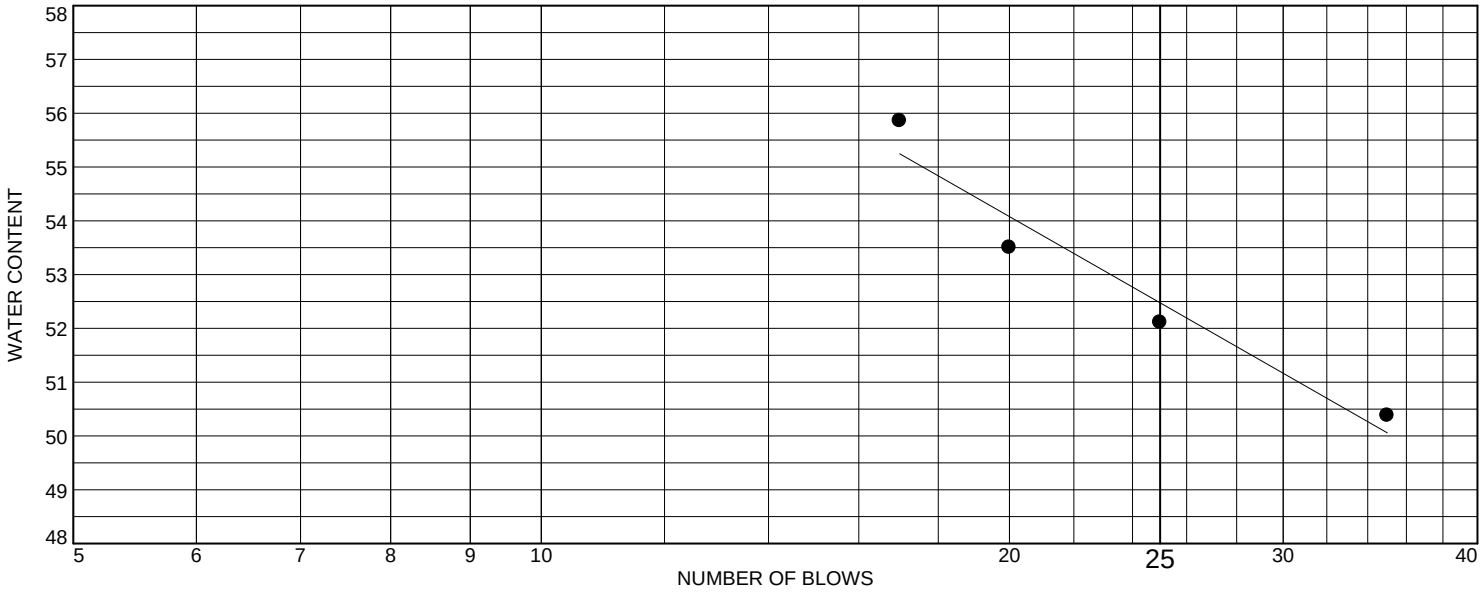
Remarks:
● As Received Moisture: 30.6%

Figure

Tested By: Kinsey B **Checked By:** Jeff W

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		52	22	30			

Project No. 242417005 **Client:** AMEC/The Kroger Company

Project: Chehalis Property

Location: TP-17, S-1
Sample Number: 836 **Depth:** 2.5

Terracon Consultants, Inc.

Mountlake Terrace, WA

Remarks:
● As Received Moisture: 26.2%

Figure

Tested By: Kinsey B **Checked By:** Jeff W

Organic Content

Job Name: Chahalis Property	Client: Amec/The Kroger Company
Job Number: 242417005	Sample Date: 2/9/2017
Date: 2/21/2017	Sampled By: Bill L.

Exploration:	TP-9	TP-20
Sample Number:	S-1	S-1
Depth:	1	1
Moisture Content:	39.7%	38.7%
Organic Content:	1.25%	5.24%

Tested By: Kinsey B.
Reveiwed By: Jeff W.
Respectfully submitted,

By: Jeff Ward

Terracon
Consulting Engineers & Scientists