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Subsurface Exploration, Geologic Hazards, and
Preliminary Geotechnical Engineering Report

INGLEMOOR HIGH SCHOOL CONCERT HALL AND MUSIC BUILDING

Kenmore, Washington

Prepared For:

NORTHSHORE SCHOOL DISTRICT NO. 417

Project No. 180364E001
February 25, 2019

Associated Earth Sciences, Inc.
911 5th Avenue
Kirkland, WA 98033
P (425) 827 7701

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Project No. 180364E001

Northshore School District No. 417
22105 23rd Drive SE
Bothell, Washington 98021

Attention: Dri Ralph

Subject: Subsurface Exploration, Geologic Hazards, and
Preliminary Geotechnical Engineering Report
Inglemoor High School Concert Hall and Music Building
15500 Simonds Road NE
Kenmore, Washington

Dear Ms. Ralph:

We are pleased to present the enclosed copies of the subject report. This report summarizes the results of our subsurface exploration, geologic hazard, geotechnical engineering, and stormwater infiltration feasibility studies, and offers preliminary recommendations for the design of the proposed project. This report is based on our current understanding of the project and our discussions with the design team and should be reviewed and updated as needed when detailed project plans have been prepared. This document has been updated from our initial report dated October 3, 2018 with additional subsurface explorations and geologic hazard mitigations.

We have enjoyed working with you on this study and are confident the recommendations presented in this report will aid in the successful completion of your project. If you should have any questions, or if we can be of additional help to you, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

Kurt D. Merriman, P.E.
Senior Principal Engineer

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SUBSURFACE EXPLORATION, GEOLOGIC HAZARD,
AND PRELIMINARY GEOTECHNICAL ENGINEERING REPORT

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I. PROJECT AND SITE CONDITIONS

1.0 INTRODUCTION

This report presents the results of our subsurface exploration, geologic hazards, preliminary geotechnical engineering, and stormwater infiltration feasibility studies for the new Inglemoor High School Concert Hall and Music Building. The location of the subject site is shown on the "Vicinity Map," Figure 1. The approximate locations of the explorations accomplished for this study are presented on the "Site and Exploration Plan," Figure 2. Interpretive exploration logs of the subsurface explorations completed for this study are included in Appendix A. When project plans have been prepared, we recommend that the conclusions and recommendations contained in this report be reviewed and modified, or verified, as necessary.

1.1 Purpose and Scope

The purpose of this study was to provide subsurface data to be used in the preliminary design of the proposed project. Our study included reviewing selected available geologic literature, drilling twelve exploratory borings, and performing geologic studies to assess the type, thickness, distribution, and physical properties of the subsurface sediments and shallow groundwater. Geotechnical engineering studies were conducted to assess the type of suitable foundation, allowable foundation soil bearing pressures, anticipated settlements, retaining wall lateral pressures, floor support recommendations, drainage considerations, and infiltration feasibility. This report summarizes our current fieldwork and development recommendations based on our understanding of the project. An environmental assessment was performed within the area of the proposed concert hall and music building and the results are presented in a separate report.

1.2 Authorization

Authorization to proceed with this study was granted by means of a Northshore School District No. 417 (District) purchase order. Our study was accomplished in general accordance with our proposal, dated July 31, 2018. This report has been prepared for the exclusive use of the District and its agents for specific application to this project. Within the limitations of scope, schedule, and budget, our services have been performed in accordance with generally accepted geotechnical engineering and engineering geology practices in effect in this area at the time our report was prepared. No other warranty, express or implied, is made.

2.0 PROJECT AND SITE DESCRIPTION

The project site is roughly L-shaped in plan view and is located within the western, central portion of the Inglemoor High School property at 15500 Simonds Road NE in Kenmore, Washington. The site is bounded to the north by an existing parking lot for the softball fields, to

the east by the existing school buildings, to the south by existing school buildings and a parking lot, and to the west by Simonds Road and residential development. The site is comprised of an undeveloped, forested plot, a gravel parking lot near the softball fields, and part of the paved parking lot west of the school buildings. Site topography consists of a local, topographic high within the forested area and the relatively flat parking lots to the north and south of this hill. Based on the site topographic survey titled "Topographic Map: Inglemoor High School" by Harmsen & Associates, Inc., (Harmsen) dated March 1, 2018, overall vertical relief across the project area is on the order of 15 feet. Previous development included filling to achieve the existing topography.

At this time, the project is in the early stage of design and limited details are available. We understand from conversations and a project concept sketch by Hutteball + Oremus that the work will include construction of a new concert hall and music building and improvements to the existing parking lots. Additional recommendations and/or explorations may be warranted later as the design matures.

3.0 SUBSURFACE EXPLORATION

Ten geotechnical exploratory borings were drilled on August 9, 10, and 30 of 2018. Two additional geotechnical exploratory borings were drilled on January 28, 2019. Direct-push Geoprobe borings were also completed to collect samples for environmental testing. The various types of materials and sediments encountered in the explorations, as well as the depths where characteristics of these materials changed, are indicated on the exploration logs presented in Appendix A. The depths indicated on the logs where conditions changed may represent gradational variations between sediment types in the field. If changes occurred between sample intervals in our borings, they were interpreted. The approximate locations of the explorations are shown on Figure 2.

The conclusions and recommendations presented in this report are based on the explorations completed for this study. The locations and depths of the explorations were completed within site access and budgetary constraints. Because of the nature of exploratory work below ground, extrapolation of subsurface conditions between and beyond the field explorations is necessary. It should be noted that differing subsurface conditions may sometimes be present due to the random nature of deposition and the alteration of topography by past grading and/or filling. The nature and extent of any variations between and beyond the field explorations may not become fully evident until construction. If variations are observed at that time, it may be necessary to re-evaluate specific recommendations in this report and make appropriate changes.

3.1 Hollow-Stem Auger Borings

Exploration borings EB-1 through EB-5 and EB-7 were drilled using an excavator-mounted drill, exploration borings EB-6 and EB-8 through EB-10 were drilled using a truck-mounted, hollow-stem auger drill rig, and exploration borings EB-11 and EB-12 were drilled using a track-mounted drill with Geoprobe and augering capabilities. During the drilling process, samples were obtained at 2.5- and 5-foot intervals. The borings were continuously observed and logged by a field engineer from our firm. The interpretive exploration logs presented in Appendix A are based on the field logs, drilling action, and observation of the samples collected.

Disturbed, but representative samples were obtained by using the Standard Penetration Test (SPT) procedure in accordance with *American Society for Testing and Materials* (ASTM) D-1586. This test and sampling method consists of driving a standard, 2-inch outside-diameter, split-barrel sampler a distance of 18 inches into the soil with a 140-pound hammer free-falling a distance of 30 inches. The number of blows for each 6-inch interval is recorded, and the number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance ("N") or blow count. If a total of 50 blows is recorded at or before the end of one 6-inch interval, the blow count is recorded as the number of blows for the corresponding number of inches of penetration. The resistance, or N-value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils. These values are plotted on the attached boring logs.

The samples obtained from the split-barrel sampler were classified in the field and representative portions placed in water-tight containers. The samples were then transported to our laboratory for further visual classification and geotechnical laboratory testing, as necessary.

The various types of soil and groundwater elevations, as well as the depths where soil and groundwater characteristics changed, are indicated on the exploration boring logs presented in Appendix A of this report. The locations of our explorations were approximated by measuring from known site features.

3.2 Geoprobe Explorations

We completed five Geoprobe explorations primarily to collect samples for environmental analytical testing. Environmental data and recommendations are presented in a separate report. Geoprobe explorations were relied on to aid in delineation of existing fill in the proposed building footprint. Geoprobe exploration locations are depicted on Figure 2, and logs of Geoprobe explorations are included in Appendix A.

4.0 SUBSURFACE CONDITIONS

Subsurface conditions at the project site were inferred from the field explorations accomplished for this study, visual reconnaissance of the site, and review of selected geologic literature. The general distribution of geologic units is shown on the exploration logs. The explorations generally encountered native materials consisting of older nonglacial deposits overlying older glacial till and glacial marine sediments. Deposits of artificial fill and recent glacial sediments were encountered overlying the older materials in some explorations.

4.1 Stratigraphy

The following sections present more detailed subsurface information organized from the youngest (shallowest) to the oldest (deepest) sediment types.

Grass/Topsoil/Forest Duff

A surficial layer of grass and organic topsoil was encountered in explorations EB-1 through EB-4 and GP-2 through GP-5 and a surficial layer of forest duff was encountered in EB-7. The organic layers were encountered in thicknesses of approximately 6 inches. Due to their high organic content, these materials are not considered suitable for foundation, roadway, or slab-on-grade floor support, or for reuse in a structural fill.

Hard Surfacing

Artificially placed hard surfacing was encountered in several of our explorations and consisted of crushed rock or gravel in EB-2 through EB-6, EB-11, and EB-12, and asphalt in EB-8 through EB-10 and GP-1. Gravel and crushed rock were encountered in thicknesses of about 6 inches and asphalt was encountered in thickness ranging from about 2 to 6.5 inches. Crushed rock, gravel, and removed asphalt materials, if any, may be suitable for reuse if properly prepared and if allowed by project plans.

Fill

Existing fill was observed in exploration borings EB-1, EB-8 through EB-11, and GP-1 through GP-5 to depths of 4 to 13 feet below the ground surface. Observed fill depths at exploration locations are shown on Figure 2. Fill was highly variable and ranged from loose to medium dense silty sand to stiff to hard sandy silt. All fills contained organic material. In EB-1, the fill contained buried debris such as copper wire and had a chemical odor at 6 to 7 feet below the ground surface; these soils, including further delineation, analytical testing and disposal recommendations, are discussed further under separate cover.

Due to its variability and organic content, existing fill on this site is not suitable for structural support or for reuse in structural fill applications and warrants remedial preparation below new paving.

Vashon Ice-Contact Sediments

Underlying the forest duff, exploration boring EB-7 encountered sediments that ranged from very stiff, sandy, silt to medium dense, silty, fine sand, with trace gravel and occasional organic matter, to a depth of 15 feet. These materials are interpreted to represent Vashon ice-contact sediments. Ice-contact sediments were initially deposited in contact with glacial ice and were redeposited at the time the ice melted. Ice-contact sediments can be highly variable in density and texture. All sediments of glacial origin may contain large cobbles or boulders at random locations.

Vashon ice-contact sediments are suitable for support of lightly to moderately loaded foundations and new paving with proper preparation. Ice-contact sediments are silty and moisture-sensitive; careful management of moisture-sensitive soils, as recommended in this report, will be needed to reduce the potential for disturbance of wet ice-contact sediments and costs associated with repairing disturbed soils. Excavated ice-contact sediments are suitable for reuse in structural fill applications if specifically allowed by project specifications, and if moisture conditions are adjusted to allow compaction to a firm and unyielding condition at the specified level.

Vashon Lodgement Till

Underlying the ice-contact sediments in EB-7, we observed very dense, silty, fine sand with some gravel grading to gravelly sand with trace silt to a depth of 22 feet. This material is interpreted as Vashon lodgement till. Lodgement till was deposited at the base of an active ice sheet and was subsequently compacted by the weight of the overlying glacial ice. All sediments of glacial origin may contain large cobbles or boulders at random locations.

Due to the depth below grade where it was observed, we do not anticipate that Vashon lodgement till will provide direct foundation support or be used to construct compacted fill.

Older Nonglacial

Underlying the thin surface deposits, sediments encountered in all explorations except EB-7 ranged from hard, sandy silt to very dense, silty, fine sand. These sediments were present in various colors, including tan, grayish brown to brownish gray, greenish gray, gray, and yellowish brown. Sediments were generally massive to weakly stratified, and in some areas contained scattered organic matter. We interpret these materials as older nonglacial sediments, deposited prior to glaciation and subsequently compacted by the weight of the overriding ice

sheet. The older nonglacial sediments were weathered in EB-1 through EB-3, EB-5, and EB-11 for the upper approximately 5.5 to 12.5 feet. The weathering was typically characterized by iron-oxide staining and, in some areas, lower density or consistency. Weathering can be attributed to natural processes of freeze-thaw and bioturbation by roots and animals. In EB-5 at about 15 feet, we observed a layer of lower density and organic material; we interpret this as colluvium deposited during an ancient landslide.

Due to their compacted state, the older nonglacial sediments, with proper preparation, are considered suitable for support of foundations, floor slabs, and paving. The older nonglacial sediments are silty and moisture-sensitive; careful management of moisture-sensitive soils, as recommended in this report, will be needed to reduce the potential for disturbance of wet nonglacial soils and costs associated with repairing disturbed soils. Excavated older nonglacial sediments are suitable for reuse in structural fill applications if specifically allowed by project specifications, and if moisture conditions are adjusted to allow compaction to a firm and unyielding condition at the specified level.

Older Glacial Till

Underlying the older nonglacial sediments in EB-3 and EB-6, we encountered dense to very dense, silty to very silty, fine sand with trace to some gravel to depths of 21.5 and 30 feet, respectively. This material is interpreted as older glacial till. The till was deposited during an early glacial period in association with an active ice sheet and was compacted by the weight of overlying glacial ice during subsequent glaciation. The upper 9 feet of older till in EB-6 was weathered, characterized by a tannish color and lower density. Weathering was caused by natural processes of freeze-thaw and bioturbation by roots and animals. All sediments of glacial origin may contain large cobbles or boulders at random locations.

Due to the depth below existing grade where observed, we do not anticipate that older glacial till will provide direct foundation support or be used to construct compacted fill.

Glaciomarine

Underlying the older glacial till and older nonglacial sediments in EB-6 and EB-8, our explorations encountered gray, very dense, silty, fine sand and gray, hard, sandy silt to the full depths explored of 51.5 and 36 feet, respectively. When exposed to hydrochloric acid, samples of these sediments reacted to form gas bubbles, which may indicate the presence of calcium carbonate associated with marine deposition. We interpret these sediments as glaciomarine sediments, deposited in a glacial marine environment and overridden by glacial ice during subsequent glaciation.

Due to the depth below existing grade where they were observed, the glaciomarine sediments are not expected to provide direct foundation support or to be used in structural fills.

4.2 Published Geologic Map

We reviewed a published geologic map of the project area, the *Geologic Map of the Kirkland Quadrangle, Washington*, by J.P. Minard (1983). The referenced map indicates that the site is expected to be underlain at shallow depths by Vashon lodgement till (Qvt), with Transitional beds (Qtb) mapped nearby at the shallow depth and at lower elevations than (underlying) the Vashon lodgement till. Although Vashon lodgement till was not encountered at the surface in our explorations, the nearby Transitional beds are described as including fine-grained, nonglacial sediments similar to the older nonglacial sediments we encountered.

4.3 Hydrology

Groundwater was encountered in exploration borings EB-7 and EB-8 at depths of approximately 30 feet. It was encountered at EB-11 at a depth of approximately 3 feet.

4.4 Geotechnical Laboratory Testing

One laboratory grain-size analysis was completed on a sample from exploration boring EB-3. Laboratory test results are included in Appendix B.

II. GEOLOGIC HAZARDS AND MITIGATIONS

The following discussion of potential geologic hazards is based on the geologic conditions as observed and discussed herein.

5.0 SLOPE STABILITY HAZARDS AND RECOMMENDED MITIGATION

A portion of the property about 400 feet east of the eastern extent of the project site is mapped as a landslide hazard area on the City of Kenmore *Kenmore Critical Areas: Geologic Hazard Areas* map. The *City of Kenmore Municipal Code* (KMC) Section 18.55.620 defines landslide hazard areas as "areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors," and development within landslide hazard areas and their buffers is subject to special regulation. Based on our subsurface exploration, our recent visual reconnaissance of the site, and the topographic site survey, it is our opinion that no portion of the project area meets the criteria of a landslide hazard area or a landslide hazard area buffer. No slope stability mitigation measures are recommended beyond following the general geotechnical recommendations contained in this report. No detailed assessment of slope stability was prepared as part of this report and none is warranted, in our opinion.

6.0 SEISMIC HAZARDS AND RECOMMENDED MITIGATION

Earthquakes occur regularly in the Puget Sound Lowland. The majority of these events are small and are not felt by people. However, large earthquakes do occur as evidenced by the recent 6.8-magnitude event on February 28, 2001, near Olympia Washington; the 1965 6.5-magnitude event; and the 1949 7.2-magnitude event. The 1949 earthquake appears to have been the largest in this area during recorded history.

Generally, there are four types of potential geologic hazards associated with large seismic events: 1) surficial ground rupture, 2) seismically induced landslides, 3) liquefaction, and 4) ground motion. The potential for each of these hazards to adversely impact the proposed project is discussed below.

6.1 Surficial Ground Rupture

We reviewed a map of possible geologic fault traces on the U.S. Geological Survey (USGS) Interactive Fault Map web application and identified a trace of the Southern Whidbey Island Fault Zone mapped approximately three-quarters of a mile northeast of the site. According to USGS studies, the recurrence interval of movements along the Southern Whidbey Island Fault Zone is unknown, but it is speculated to be on the order of 1,000 years. Due to the distance of the project site from mapped fault traces, the risk to the proposed project due to surficial ground rupture during a seismic event is low, in our opinion.

6.2 Seismically Induced Landslides

Our explorations generally encountered stiff or medium dense sediments at relatively shallow depth. Where less dense fills were observed near the surface, such as EB-1 and EB-11, the topography is gently sloped. It is our opinion that the potential risk of damage to the proposed development by seismically induced slope failures is low due to the high density and consistency of site soils and the absence of substantial slopes in the immediate project area.

6.3 Liquefaction

Liquefaction is a process through which unconsolidated soil loses strength as a result of vibrations, such as those which occur during a seismic event. During normal conditions, the weight of the soil is supported by both grain-to-grain contacts and by the fluid pressure within the pore spaces of the soil below the water table. Extreme vibratory shaking can disrupt the grain-to-grain contact, increase the pore pressure, and result in a temporary decrease in soil shear strength. The soil is said to be liquefied when nearly all of the weight of the soil is supported by pore water pressure alone. Liquefaction can result in deformation of the sediment and settlement of overlying structures. Areas most susceptible to liquefaction include those areas underlain by non-cohesive silt and sand with low relative densities, accompanied by a shallow water table.

Our explorations generally encountered stiff to hard or medium dense to very dense sediments at relatively shallow depth. Minimal groundwater was encountered at the time of our exploration. Based on the subsurface conditions, it is our opinion that the risk to the proposed project due to liquefaction is low. No additional mitigations are recommended beyond following the general geotechnical recommendations contained in this report.

6.4 Ground Motion/Seismic Site Class (2015 *International Building Code*)

Seismic design of the project should follow the 2015 *International Building Code* (IBC) guidelines. Seismic site class selection is outlined in *American Society of Civil Engineers* (ASCE) 7-10. Based on our subsurface explorations, the site is considered to be in Seismic Site Class "D."

7.0 EROSION HAZARD AND RECOMMENDED MITIGATION

A portion of the property north of the project area is mapped as an erosion hazard area on the *Kenmore Critical Areas: Geologic Hazard Areas* map. Erosion hazard areas are defined in KMC 18.55.620.A as "those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service or identified by a special study as having a "moderate to severe," "severe," or "very severe" erosion potential." The erosion hazard area is mapped as "Kitsap silt loam, 15 to 30 percent slopes (KpD)" and is rated "severe" erosion potential. Based

on the topographic survey, site slopes near the mapped erosion hazard area are inclined up to about 13 percent. Therefore, this portion of the site may be better defined as "Kitsap silt loam, 8 to 15 percent slopes (KpC)," which is rated "moderate to severe" erosion potential.

Additionally, an erosion hazard area exists to the east of the planned addition, approximately north of the existing track and field and south of the tennis courts, adjacent to the existing parking lot.

We recommend the following best management practices (BMPs) to mitigate erosion hazards and potential for off-site sediment transport:

1. Construction activity should be scheduled or phased as much as possible to avoid earthwork activity during the wet season.

2. The winter performance of a site is dependent on a well-conceived plan for control of site erosion and stormwater runoff. The site plan should include ground-cover measures and staging areas. The contractor should be prepared to implement and maintain the required measures to reduce the amount of exposed ground.

3. Temporary erosion and sedimentation control (TESC) elements and perimeter flow control should be established prior to the start of grading.

4. During the wetter months of the year, or when significant storm events are predicted during the summer months, the work area should be stabilized so that if showers occur, it can receive the rainfall without excessive erosion or sediment transport. The required measures for an area to be "buttoned-up" will depend on the time of year and the duration that the area will be left unworked. During the winter months, areas that are to be left unworked for more than 2 days should be mulched or covered with plastic. During the summer months, stabilization will usually consist of seal-rolling the subgrade. Such measures will aid in the contractor's ability to get back into a work area after a storm event. The stabilization process also includes establishing temporary stormwater conveyance channels through work areas to route runoff to the approved treatment/discharge facilities.

5. All disturbed areas should be revegetated as soon as possible. If it is outside of the growing season, the disturbed areas should be covered with mulch. Straw mulch provides a cost-effective cover measure and can be made wind-resistant with the application of a tackifier after it is placed.

6. Surface runoff and discharge should be controlled during and following development. Uncontrolled discharge may promote erosion and sediment transport.

7. Soils that are to be reused around the site should be stored in such a manner as to reduce erosion from the stockpile. Protective measures may include, but are not limited to, covering stockpiles with plastic sheeting, or the use of silt fences around pile perimeters.

8. Timely implementation of permanent drainage control measures should also be a part of the project plans and will help reduce erosion and generation of silty surface water.

It is our opinion that the risk to the proposed project and adjacent properties by erosion is low, provided the recommended mitigations and other recommendations contained in this report are properly implemented during design and construction.

III. PRELIMINARY DESIGN RECOMMENDATIONS

8.0 INTRODUCTION

Some portions of the site are underlain by a layer of existing fill of variable density and content. Existing fill is not suitable for support of new foundations and warrants remedial preparation where it occurs below planned paving and similar lightly-loaded structures. Older nonglacial sediments were observed underlying the fill or near the surface throughout most of the site and are hard or dense. Older nonglacial sediments are suitable for support of shallow foundations. Due to the low-permeability soils encountered throughout the site, we do not recommend the site for infiltration of stormwater.

The following sections of this report provide recommendations concerning site preparation, structural fill placement, foundations, building floor support, drainage, and infiltration.

9.0 SITE PREPARATION

Existing paving, foundations, buried utilities, vegetation, topsoil, and any other deleterious materials should be removed where they are located below planned construction areas. All existing fill should be removed from under planned foundation areas. All disturbed soils resulting from demolition activities should be removed to expose underlying undisturbed native sediments and replaced with structural fill, as needed. All excavations below final grade should be backfilled, as needed, with structural fill. Erosion and surface water control should be established around the clearing limits to satisfy local requirements.

9.1 Temporary Cut Slopes

In our opinion, stable construction slopes should be the responsibility of the contractor and should be determined during construction. For estimating purposes, however, temporary, unsupported cut slopes can be planned at 1.5H:1V (Horizontal:Vertical) in unsaturated existing fill and weathered and unweathered older nonglacial sediments.

These slope angles are for areas where groundwater seepage is not present at the faces of the slopes, which may require temporary dewatering in the form of pumped sumps or other measures. If ground or surface water is present when the temporary excavation slopes are exposed, flatter slope angles may be required. As is typical with earthwork operations, some sloughing and raveling may occur, and cut slopes may have to be adjusted in the field. In addition, WISHA/OSHA regulations should be followed at all times. Unsupported temporary excavations below groundwater levels should not be attempted.

9.2 Site Disturbance

Most of the on-site soils contain fine-grained material, which makes them moisture-sensitive and subject to disturbance when wet. The contractor must use care during site preparation and excavation operations so that the underlying soils are not softened. If disturbance occurs, the softened soils should be removed, and the area brought to grade with structural fill.

9.3 Winter Construction

Site soils contain substantial silt and are considered highly moisture-sensitive. Soils excavated onsite will likely require drying during favorable dry weather conditions to allow their reuse in structural fill applications. Care should be taken to seal all earthwork areas during mass grading at the end of each workday by grading all surfaces to drain and sealing them with a smooth-drum roller. Stockpiled soils that will be reused in structural fill applications should be covered whenever rain is possible. We recommend that project planning not assume that excavated on-site soils will be available for reuse in compacted fills except during dry summer weather when soils can be aerated and moisture contents can be reduced prior to compaction.

If winter construction is expected, crushed rock fill could be used to provide construction staging areas where exposed soil is present. The stripped subgrade should be observed by the geotechnical engineer, and then be covered with a geotextile fabric, such as Mirafi 500X or equivalent. Once the fabric is placed, we recommend using a crushed rock fill layer at least 10 inches thick in areas where construction equipment will be used.

10.0 STORMWATER INFILTRATION FEASIBILITY

A stormwater infiltration facility requires a permeable, unsaturated receptor soil of sufficient lateral and vertical extent capable of receiving runoff from large, tributary areas. Fill soils are not permitted for use as receptors of infiltrated surface water. This site is underlain at shallow depths by fill or relatively dense and stiff soils with high fines content, which are typically low permeability. Due to the absence of a suitable receptor soil, we do not recommend stormwater infiltration for this project.

11.0 STRUCTURAL FILL

All references to structural fill in this report refer to subgrade preparation, fill type and placement, and compaction of materials, as discussed in this section. If a percentage of compaction is specified under another section of this report, the value given in that section should be used.

After stripping, planned excavation, and any required overexcavation have been performed to the satisfaction of the geotechnical engineer, the exposed ground in areas to receive fill should be recompacted to a firm and unyielding condition. If the subgrade contains silty soils and too much moisture, adequate recompaction may be difficult or impossible to obtain and should probably not be attempted. In lieu of recompaction, the area to receive fill should be blanketed with washed rock or quarry spalls to act as a capillary break between the new fill and the wet subgrade. Where the exposed ground remains soft and further overexcavation is impractical, placement of an engineering stabilization fabric may be necessary to prevent contamination of the free-draining layer by silt migration from below.

After recompaction of the exposed ground is tested and approved, or a free-draining rock course is laid, structural fill may be placed to attain desired grades. Structural fill is defined as non-organic soil, acceptable to the geotechnical engineer, placed in maximum 8-inch loose lifts, with each lift being compacted to 95 percent of the modified Proctor maximum density using ASTM D-1557 as the standard. In the case of roadway and utility trench filling, structural fill should be placed and compacted in accordance with current City of Kenmore codes and standards. The top of the compacted fill should extend horizontally outward a minimum distance of 3 feet beyond the locations of the roadway edges before sloping down at an angle of 2H:1V.

The contractor should note that any proposed fill soils must be evaluated by Associated Earth Sciences, Inc. (AESI) prior to their use in fills. This would require that we have a sample of the material 72 hours in advance to perform a Proctor test and determine its field compaction standard. The on-site soils are silty and generally above optimum moisture content for use in compacted fills and must be dried during favorable dry site and weather conditions before reuse. If wet site and weather conditions, or project schedule requires the use of imported fill material, we recommend that the fill material selected contain less than 5 percent passing the US No. 200 sieve, based on that fraction passing the US No. 4 sieve, and should contain no gravel larger than 4 inches in diameter.

A representative from our firm should observe the stripped subgrade and be present during placement of structural fill to observe the work and perform a representative number of in-place density tests. In this way, the adequacy of the earthwork may be evaluated as filling progresses, and any problem areas may be corrected at that time. It is important to understand that taking random compaction tests on a part-time basis will not assure uniformity or acceptable performance of a fill. As such, we are available to aid the owner in developing a suitable monitoring and testing program.

11.1 Use of On-Site Soils in Structural Fills

The site soils were generally wetter than optimum for compaction purposes and are only suitable for reuse in structural fill applications if such reuse is specifically allowed in the project

specifications, if the soils are moisture conditioned or dried during dry site and weather conditions prior to compaction, and if the soils are processed to remove any organic debris. During the wetter portion of the year, typically from approximately October to June, we recommend assuming that the on-site soils will not be suitable for reuse in structural fill applications. Possible alternatives would include cement treating on-site soils or using only imported soils. Even during dry summer weather, significant but unavoidable time will be required to dry site soils if they are to be reused.

12.0 FOUNDATIONS

We recommend building loads be supported by shallow foundations bearing on native soils consisting of dense or stiff older nonglacial sediments or medium dense ice-contact sediments, or on structural fill placed as described above. The site is underlain in some areas by existing fills that are loose, soft, or contain organic debris, and are unsuitable for support of conventional shallow foundations. Where present under building areas, we recommend overexcavation of existing fill and replacement with structural fill.

12.1 Spread Footings

Spread footings may be used for building support when founded on undisturbed native sediments or approved structural fill placed as previously discussed. For footings founded on a suitably prepared surface, we recommend that an allowable bearing pressure of 3,500 pounds per square foot (psf) be utilized for design purposes, including both dead and live loads. If higher foundation soil bearing pressures are needed we should provide situation-specific recommendations. Foundations supported directly on dense native soils could be designed with higher allowable foundation soil bearing pressures. An increase of one-third may be used for short-term wind or seismic loading. Perimeter footings should be buried at least 18 inches into the surrounding soil for frost protection. However, all footings must penetrate to the prescribed bearing stratum, and no footing should be founded in or above loose, organic, or non-structural fill soils.

It should be noted that the area bounded by lines extending downward at 1H:1V from any footing must not intersect another footing or intersect a filled area that has not been compacted to at least 95 percent of ASTM D-1557. In addition, a 1.5H:1V line extending down from any footing must not daylight because sloughing or raveling may eventually undermine the footing. Thus, footings should not be placed near the edge of steps or cuts in the bearing soils.

Anticipated settlement of footings founded as recommended above should be less than ½ inch. However, disturbed soil not removed from footing excavations prior to footing placement could result in increased settlements. All footing areas should be inspected by AESI prior to placing

concrete to verify that the design bearing capacity of the soils has been attained and that construction conforms with the recommendations contained in this report. Perimeter footing drains should be provided as discussed under the "Drainage Considerations" section of this report.

13.0 FLOOR SUPPORT

Where crawl-space floors are used, an impervious moisture barrier should be provided above the soil surface within the crawl space. Slab-on-grade floors may be used over medium dense or stiff native soils, or over structural fill placed as recommended in the "Site Preparation" and "Structural Fill" sections of this report. Slab-on-grade floors should be cast atop a minimum of 4 inches of pea gravel or clean crushed rock to act as a capillary break. The floors should also be protected from dampness by covering the capillary break layer with an impervious moisture barrier at least 10 mils in thickness. Floor slabs that are supported by site soils prepared in accordance with the "Site Preparation" section of this report, or by structural fill should experience 1 inch or less of settlement. Differential settlements across the length or width of the floor could approach one-half of the actual total settlement.

14.0 DRAINAGE CONSIDERATIONS

Groundwater was not encountered at shallow depth at the time of our exploration but may vary depending on weather, season, or land-use changes and may be encountered in proposed excavations. Prior to site work and construction, the contractor should be prepared to provide temporary drainage and subgrade protection, including during utility installation, as necessary.

All footings, slabs, and foundation walls should be provided with drains at the footing or slab subgrade elevation. Drains should consist of rigid, perforated, polyvinyl chloride (PVC) pipe surrounded by washed pea gravel. The drains should be constructed with sufficient gradient to allow gravity discharge away from the proposed buildings. Roof and surface runoff should not discharge into the footing drain system, but should be handled by a separate, rigid, tightline drain. In planning, exterior grades adjacent to walls should be sloped downward away from the proposed structures to achieve surface drainage.

15.0 FOUNDATION WALLS

The following recommendations are applicable to conventional foundation walls less than 8 feet tall. If shoring walls, taller walls, or walls with substantial surcharges are planned, we should be allowed to offer situation-specific recommendations.

All backfill behind foundation walls or around foundation units should be placed as per our recommendations for structural fill and as described in this section of the report. Horizontally backfilled walls, which are free to yield laterally at least 0.1 percent of their height, may be designed to resist active lateral earth pressure represented by an equivalent fluid equal to 35 pounds per cubic foot (pcf). Fully restrained, horizontally backfilled, rigid walls that cannot yield should be designed for an equivalent fluid of 50 pcf. Walls with sloping backfill up to a maximum gradient of 2H:1V should be designed using an equivalent fluid of 50 pcf for yielding conditions or 75 pcf for fully restrained conditions. If parking areas are adjacent to walls, a surcharge equivalent to 2 feet of soil should be added to the wall height in determining lateral design forces.

As required by the 2015 IBC, retaining wall design should include a seismic surcharge pressure in addition to the equivalent fluid pressures presented above. Considering the site soils and the recommended wall backfill materials, we recommend a seismic surcharge pressure of 5H and 10H psf, where H is the wall height in feet for the "active" and "at-rest" loading conditions, respectively. The seismic surcharge should be modeled as a rectangular distribution with the resultant applied at the midpoint of the walls.

The lateral pressures presented above are based on the conditions of a uniform backfill consisting of excavated on-site soils, or imported structural fill compacted to 90 percent of ASTM D-1557. A higher degree of compaction is not recommended, as this will increase the pressure acting on the walls. A lower compaction may result in settlement of the slab-on-grade or other structures supported above the walls. Thus, the compaction level is critical and must be tested by our firm during placement. Surcharges from adjacent footings or heavy construction equipment must be added to the above values.

Perimeter footing drains should be provided for all retaining walls, as discussed under the "Drainage Considerations" section of this report. It is imperative that proper drainage be provided so that hydrostatic pressures do not develop against the walls. This would involve installation of a minimum 1-foot-wide blanket drain to within 1 foot of finish grade for the full wall height using imported, washed gravel against the walls.

15.1 Foundation Walls Passive Resistance and Friction Factors

Lateral loads can be resisted by friction between the foundation and the natural soils or supporting structural fill soils, and by passive earth pressure acting on the buried portions of the foundations. The foundations must be backfilled with structural fill and compacted to at least 95 percent of the maximum dry density to achieve the passive resistance provided below. We recommend the following allowable design parameters:

- Passive equivalent fluid = 250 pcf
- Coefficient of friction = 0.30

16.0 PAVEMENT

Pavement areas should be prepared in accordance with the "Site Preparation" section of this report. If the stripped native soil can be compacted to a firm and unyielding condition as determined by the geotechnical engineer, no additional overexcavation is required. Soft or yielding areas should be overexcavated to provide a suitable subgrade and backfilled with structural fill. Areas where existing fill is present under new paving should be recompacted to 95 percent of ASTM D-1557.

Once overexcavation and recompaction are completed to the satisfaction of the geotechnical engineer, structural fill may then be placed to achieve desired subbase grades, if required. Upon completion of the recompaction and structural fill, a pavement section consisting of 3 inches of asphaltic concrete pavement (ACP) underlain by 4 inches of 1¼-inch crushed surfacing base course is the recommended minimum in areas of planned passenger car driving and parking. In heavy traffic areas, a minimum pavement section consisting of 4 inches of ACP underlain by 2 inches of $^{5}/_{8}$-inch crushed surfacing top course and 4 inches of 1¼-inch crushed surfacing base course is recommended. The crushed rock courses must be compacted to 95 percent of the maximum density, as determined by ASTM D-1557. All paving materials should meet gradation criteria contained in the current Washington State Department of Transportation (WSDOT) Standard Specifications.

Depending on construction staging and desired performance, the crushed base course material may be substituted with asphalt treated base (ATB) beneath the final asphalt surfacing. The substitution of ATB should be as follows: 4 inches of crushed rock can be substituted with 3 inches of ATB, and 6 inches of crushed rock may be substituted with 4 inches of ATB. ATB should be placed over a native or structural fill subgrade compacted to a minimum of 95 percent relative density, and a 1.5- to 2-inch thickness of crushed rock to act as a working surface. If ATB is used for construction access and staging areas, some rutting and disturbance of the ATB surface should be expected. The general contractor should remove affected areas and replace them with properly compacted ATB prior to final surfacing.

17.0 PROJECT DESIGN AND CONSTRUCTION MONITORING

This report is based on a site plan that was current at the time this report was written. We are available to provide additional geotechnical consultation as the project design develops and possibly changes from that upon which this report is based. We recommend that AESI perform a geotechnical review of the plans prior to construction. In this way, our earthwork and foundation recommendations may be properly interpreted and implemented in the design.

We are also available to provide geotechnical engineering services during construction. The integrity of the foundation system depends on proper site preparation and construction

procedures. In addition, engineering decisions may have to be made in the field in the event that variations in subsurface conditions become apparent. Construction monitoring services are not part of this current scope of work. If these services are desired, please let us know, and we will prepare a cost proposal.

18.0 CLOSURE

We have enjoyed working with you on this study and are confident these recommendations will aid in the successful completion of your project. If you should have any questions or require further assistance, please do not hesitate to call.

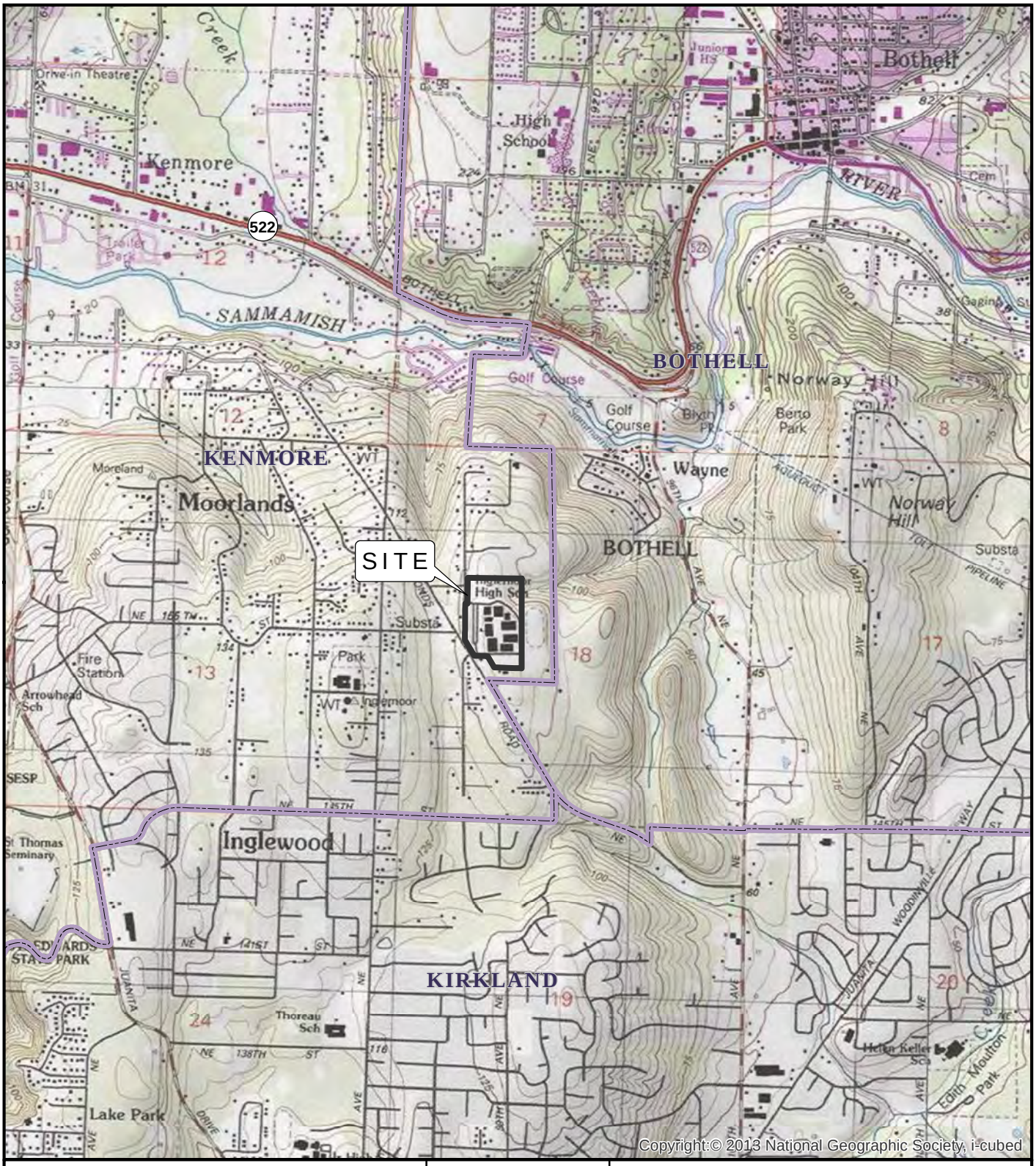
Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

Charles R. Christopher, G.I.T.
Staff Geologist

Bruce W. Guenzler, L.E.G.
Associate Geologist

Kurt D. Merriman, P.E.
Senior Principal Engineer

Attachments:
Figure 1: Vicinity Map
Figure 2: Site and Exploration Plan
Appendix A: Exploration Logs
Appendix B: Laboratory Test Results



DATA SOURCES / REFERENCES:
USGS: 7.5' SERIES TOPOGRAPHIC MAPS, ESRI/I-CUBED/NGS 2013
KING CO: STREETS, PARCELS, CITY LIMITS 1/18

LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE

N

0 1000 2000

FEET

NOTE: BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION

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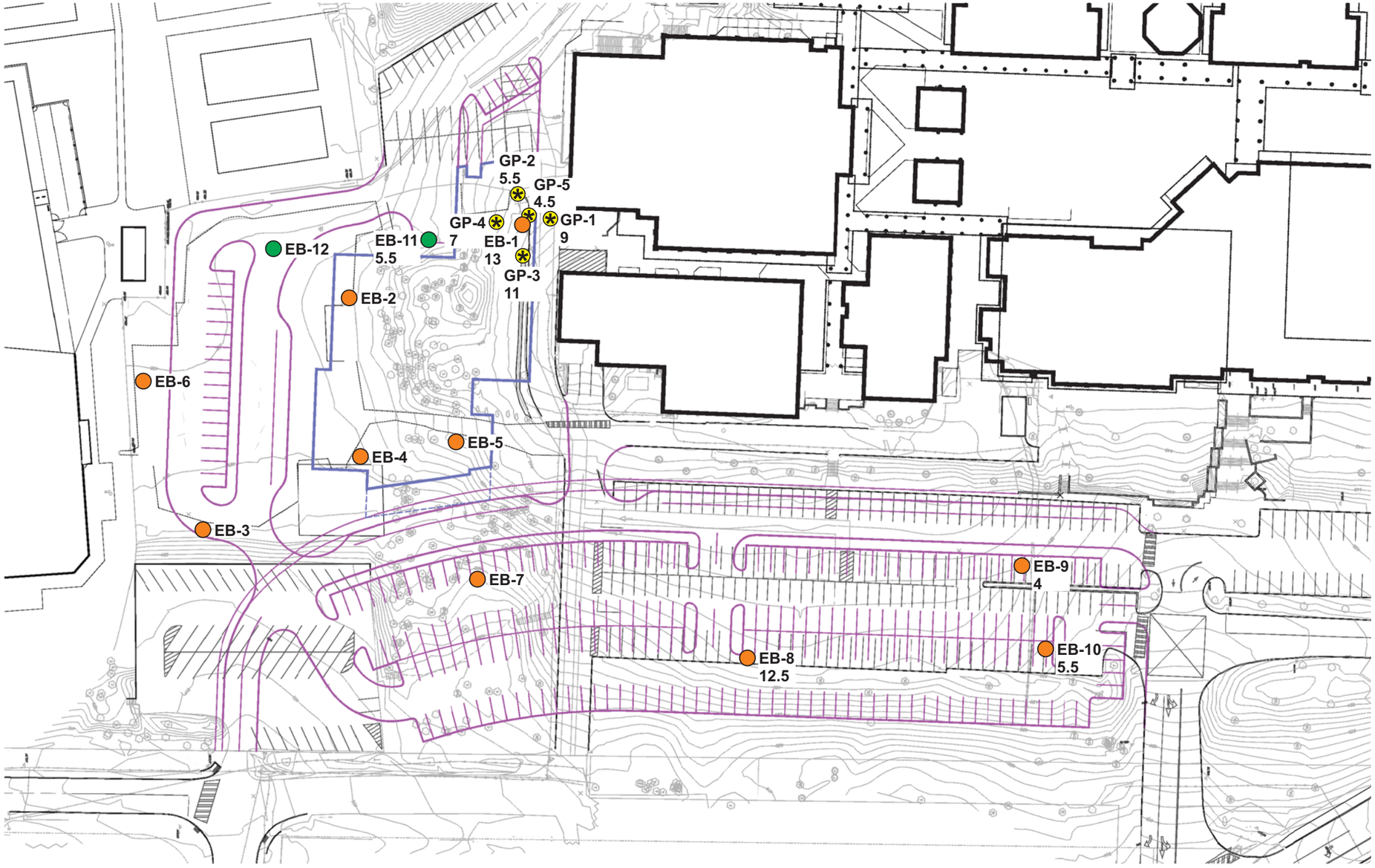
VICINITY MAP

INGLEMOOR HIGH SCHOOL
CONCERT HALL & MUSIC BUILDING
KENMORE, WASHINGTON

PROJ NO.	DATE:	FIGURE:
180364V001	2/19	1

Document Path: G:\GIS_Projects\aaY2018\VM\180364E001 F1 VM_InglemoorHS.mxd



LEGEND:

- **EB** EXPLORATION BORING WITH DEPTH (FT) OF FILL - 2019
- **GP** GEOPROBE BORING WITH DEPTH (FT) OF FILL - 2019
- **EB** EXPLORATION BORING WITH DEPTH (FT) OF FILL - 2018

CONTOUR INTERVAL = 1'

NOTE: LOCATION AND DISTANCES SHOWN ARE APPROXIMATE.

NOTES:
1. BASE MAP REFERENCE: HUTTEBALL & OREMUS, INGLEMOOR HIGH SCHOOL CONCERT HALL & MUSIC BUILDING, GEOTECHNICAL INVESTIGATION.

2. ENVIRONMENTAL EXPLORATION DETAILS PROVIDED UNDER SEPARATE REPORT.

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SITE AND EXPLORATION PLAN

INGLEMOOR HIGH SCHOOL
CONCERT HALL AND MUSIC BUILDING
KENMORE, WASHINGTON

PROJ NO.	DATE:	FIGURE:
180364E001	2/19	2

APPENDIX A

Exploration Logs

Coarse-Grained Soils - More than 50% [1] Retained on No. 200 Sieve	Gravels - More than 50% [1] of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines [5]	GW	Well-graded gravel and gravel with sand, little to no fines
			GP	Poorly-graded gravel and gravel with sand, little to no fines
		≥12% Fines [5]	GM	Silty gravel and silty gravel with sand
			GC	Clayey gravel and clayey gravel with sand
	Sands - 50% [1] or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines [5]	SW	Well-graded sand and sand with gravel, little to no fines
			SP	Poorly-graded sand and sand with gravel, little to no fines
		≥12% Fines [5]	SM	Silty sand and silty sand with gravel
			SC	Clayey sand and clayey sand with gravel
Fine-Grained Soils - 50% [1] or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50		ML	Silt, sandy silt, gravelly silt, silt with sand or gravel
			CL	Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay
			OL	Organic clay or silt of low plasticity
	Silts and Clays Liquid Limit 50 or More		MH	Elastic silt, clayey silt, silt with micaceous or diatomaceous fine sand or silt
			CH	Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel
			OH	Organic clay or silt of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

Terms Describing Relative Density and Consistency

	Density	SPT [2] blows/foot
Coarse-Grained Soils	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
	Very Dense	>50
	Consistency	**SPT [2] blows/foot**
Fine-Grained Soils	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
	Hard	>30

Test Symbols

G = Grain Size
M = Moisture Content
A = Atterberg Limits
C = Chemical
DD = Dry Density
K = Permeability

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

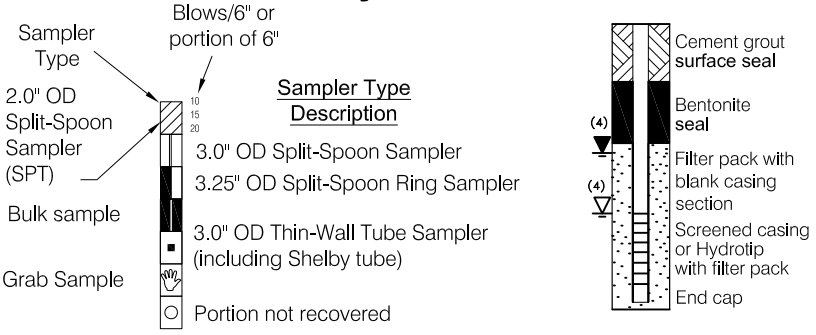
[3] Estimated Percentage

Component	Percentage by Weight
Trace	<5
Some	5 to <12
Modifier (silty, sandy, gravelly)	12 to <30
Very *modifier* (silty, sandy, gravelly)	30 to <50

Moisture Content

Dry - Absence of moisture, dusty, dry to the touch
Slightly Moist - Perceptible moisture
Moist - Damp but no visible water
Very Moist - Water visible but not free draining
Wet - Visible free water, usually from below water table

Symbols



(1) Percentage by dry weight
(2) (SPT) Standard Penetration Test (ASTM D-1586)
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
(4) Depth of ground water
▼ ATD = At time of drilling
▽ Static water level (date)
(5) Combined USCS symbols used for fines between 5% and 12%

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-1	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	441
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Boretec / EC-95 Excavator Mounted Drill	Date Start/Finish	8/30/18,8/30/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	6.25 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Grass / Topsoil					
				Fill					
		S-1		Moist to slightly moist, light brown with iron oxide staining, silty, fine SAND, trace gravel; occasional organics; jumbled texture (SM).			6 5 4	▲9	
				Increased drilling difficulty at 4 feet.					
5		S-2		As above; contains woody debris; copper wire; organic smell.			11 5 4	▲9	
				Cuttings have chemical odor 6 to 7 feet.					
10		S-3		Moist, brown to gray with iron oxide staining, sandy, SILT, trace gravel; occasional rootlets and woody debris; contains lenses of gray, sandy, silt (ML).			7 9 9	▲18	
				Weathered Older Nonglacial					
15		S-4		Moist, orangish brownish gray with intermittent iron oxide staining, silty, fine to medium SAND, some gravel (SM).			17 17 21	▲38	
20		S-5		Moist, brown to brownish gray with oxidation in sand, silty, fine SAND, trace gravel; increasing fines to sandy silt at depth (SM).			14 25 27	▲52	
				Bottom of exploration boring at 21.5 feet No groundwater encountered.					
25									
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: CRC
Approved by: CJK

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-2	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	431
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Boretec / EC-95 Excavator Mounted Drill	Date Start/Finish	8/30/18,8/30/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	6.25 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Grass / Gravel					
				Weathered Older Nonglacial					
		S-1		Moist, bluish gray with occasional iron oxide staining, silty, fine SAND; scattered rootlets and organics; lenses of sandy, silt; unsorted (SM).			8 12 18	▲30	
5		S-2		Moist, brownish gray, sandy, SILT, trace gravel; occasional decimated organic material; unsorted (ML).			6 8 12	▲20	
10		S-3		Top 12 inches: As above; very moist, trace to some gravel (ML).			18 33 50	▲83	
				Older Nonglacial					
				Lower 6 inches: moist, bluish green gray, silty, fine SAND, trace gravel (SM).					
15		S-4		Moist, brownish gray to bluish green with iron oxide staining, sandy, GRAVEL, trace silt; gravel lodged in sampler head (GW).			50/6"	▲50/6"	
				Bottom of exploration boring at 16 feet No groundwater encountered.					
20									
25									
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-3	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	430
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Boretec / EC-95 Excavator Mounted Drill	Date Start/Finish	8/30/18,8/30/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	6.25 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Grass / Crushed Rock					
				Weathered Older Nonglacial					
5		S-1		Moist, brownish gray to brown with iron oxide staining, sandy, SILT; occasional organics; jumbled texture (ML).			5 6 7	▲13	
10		S-2		Moist, grayish brown, silty, fine SAND, trace to some gravel; occasional organics; jumbled texture; lens (2 inches thick) of gray, sandy, silt in middle of sampler; ranges to gray, sandy, silt in bottom inch of sampler; massive (SM).			10 19 17	▲36	
				Older Nonglacial					
				Increased drilling difficulty at 13 feet.					
15		S-3		Top 12 inches: moist, bluish greenish gray, sandy, SILT, trace gravel (ML).			16 25 30	▲55	
				Older Glacial Till ?					
				Lower 6 inches: Moist, light brown, silty, fine SAND, trace to some gravel; gradual transition zone (SM). Difficult drill action at 17 feet.					
20		S-4		Moist, light brown, very silty, fine SAND, trace to some gravel; massive (SM).			19 50/4"	▲50/4"	
				Bottom of exploration boring at 21.5 feet No groundwater encountered.					
25									
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-4	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	430
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Boretec / EC-95 Excavator Mounted Drill	Date Start/Finish	8/30/18,8/30/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	6.25 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Grass / Crushed Rock					
				Older Nonglacial					
		S-1		Moist, oxidized grayish brown with iron oxide staining, sandy, SILT; jumbled texture at top of sampler; lenses of silty, fine sand (ML).			7 14 22	▲36	
5		S-2		Moist, grayish brown to brownish gray with frequent iron oxide staining, sandy, SILT to silty, fine SAND; increasing fines with depth; stratified to massive with depth; minor diagonal jointing; occasional rootlets; inclusions of gray silt; oxidized fracture zones (SM-ML).			10 15 19	▲34	
10		S-3		Moist, grayish brown with slight iron oxide staining, sandy, SILT, trace gravel; slightly stratified (ML).			29 32 50	▲82	
				Difficult drilling at 13 feet.					
15		S-4		No recovery.			50/5"	▲50/5"	
				Bottom of exploration boring at 16.5 feet No groundwater encountered.					
20									
25									
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-5	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	436
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Boretec / EC-95 Excavator Mounted Drill	Date Start/Finish	8/30/18,8/30/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	6.25 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock					
				Weathered Older Nonglacial					
		S-1		Moist, grayish brown with iron oxide staining, SILT, some fine sand ranging to SILT to clayey, SILT; jumbled texture; occasional organics (ML).			13 15 18	▲33	
5		S-2		Top 12 inches: moist, brownish gray, sandy, SILT, trace to some gravel; unsorted; occasional organic debris (ML). Lower 6 inches: moist, gray, clayey, SILT; one coarse gravel; split spoon partially wedged apart at 5 foot interval (ML).			11 26 50	▲76	
10		S-3		**Older Nonglacial** Moist, grayish light brown with iron oxide staining, very silty, fine SAND; massive to slightly bedded; ranges to a gray, sandy, SILT; contains a lens (2 inches thick) of moist, oxidized brown, silty, fine sand at transition boundary (SM-ML).			15 24 29	▲53	
15		S-4		Difficult drilling at 14 feet. Very moist, brownish green to greenish gray, sandy, SILT, trace gravel; occasional organics and rootlets; decimated organic material; occasional mica (ML).			6 7 26	▲33	
20		S-5		No recovery, very moist, greenish gray, SILT to clayey, SILT in sampler head (ML-CL).			50/3"	▲50/3"	
				Bottom of exploration boring at 20.5 feet No groundwater encountered.					
25									
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-6	1 of 2

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	430
Location	Kenmore, WA	Datum	N/A
Driller/Equipment	Environmental Drilling Inc / Truck Mounted Drill Rig	Date Start/Finish	8/9/18,8/9/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	7.5 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock - 6 inches					
				Older Nonglacial					
5		S-1		Moist, gray, clayey, SILT; massive (ML-CL).			3 6 15	▲21	
10		S-2		Moist to very moist, brownish gray to dark olive gray, silty to very silty, fine SAND, trace gravel; unsorted; slightly stratified (SM).			5 7 20	▲27	
				Weathered Older Glacial Till					
15		S-3		Increasingly difficult drill action at 14 feet. Moist, tannish brown, very silty to silty, fine SAND, trace to some gravel; unsorted (SM).			11 25 42	▲67	
20		S-4		Moist, grayish brown to brownish gray, very silty to silty, fine SAND, trace to some gravel; unsorted (SM).			15 22 20	▲42	
				Older Glacial Till					
				Difficult to very difficult drilling at 22 feet.					
25		S-5		Moist, brownish gray, silty,fine SAND, trace gravel; unsorted (SM).			21 50/6"	▲50/6"	
				Water added outside of auger to assist in drilling at 29 feet.					
30		S-6		**Glaciomarine** Moist, light brownish gray to light gray, very silty, fine SAND ranging to sandy, SILT; unsorted; reacts with hydrochloric acid (SM-ML).			30 50/8"	▲50/8"	
				Very difficult drill action at 33 feet.					
35		S-7		Moist, gray, sandy, SILT; massive; reacts with hydrochloric acid (ML).			50 32 50/6"	▲50/6"	
				Water added outside of auger to assist in drilling at 37 feet.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: CRC

Approved by: JHS

AESIBOR 180364.GPJ September 14, 2018

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-6	2 of 2

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	430
Location	Kenmore, WA	Datum	N/A
Driller/Equipment	Environmental Drilling Inc / Truck Mounted Drill Rig	Date Start/Finish	8/9/18,8/9/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	7.5 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
		S-8		Moist, gray, sandy, SILT; massive; reacts with hydrochloric acid (ML).			15 30 50/6"	50/6"	
45		S-9		As above.			17 30 50/6"	50/6"	
				Water added outside of auger to assist in drilling at 47 feet.					
50		S-10		Moist, gray, sandy, SILT; massive; reacts with hydrochloric acid (ML).			17 28 50/5"	50/5"	
				Bottom of exploration boring at 51.5 feet No groundwater encountered.					
55									
60									
65									
70									
75									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: CRC
Approved by: JHS

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-7	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	424
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Boretec / EC-95 Excavator Mounted Drill	Date Start/Finish	8/30/18,8/30/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	6.25 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Forest Duff					
				Vashon Ice Contact					
5		S-1		Moist, light brownish grayish brown with frequent iron oxide staining, sandy, SILT to silty, fine SAND; occasional mica; nonstratified; occasional rootlets; jumbled texture; mottled (SM-ML).			6 8 11	▲19	
10		S-2		Moist, brownish gray to grayish brown with iron oxide staining, sandy, SILT, trace gravel ranging to silty, fine SAND, trace gravel; occasional organics; jumbled texture (ML).			5 8 14	▲22	
15		S-3		Upper 6 inches: As above.			29 50/5"		▲50/5"
				Vashon Lodgement Till					
				Lower 12 inches: moist, brownish gray, silty, fine SAND, some gravel; unsorted (SM). Difficult drilling starting at 15.5 feet.					
				Very difficult drilling at 19 feet.					
20		S-4		Moist, grayish brown, gravelly, SAND, trace silt; occasional silty sand fragments; seam (1/4 inch thick) of silty, sand (SW-GW).			22 50/6"		▲50/6"
				Weathered Glaciomarine					
				Difficult drilling at 22 feet.					
25		S-5		Moist, light grayish brown ranging from gray to oxidized grayish brown with depth with iron oxide staining in thin lenses, sandy, SILT; occasional jointing (ML). Bottom 1.5 inches of sampler contains wet, slightly oxidized brown, fine SAND, some silt; occasional mica (SM-ML). Driller notes consistent drilling difficulty at 26 feet.		▼	20 24 17	▲41	
30		S-6		**Glaciomarine** Moist, gray, SILT, some sand ranging to clayey, SILT, trace gravel; massive; reacts with hydrochloric acid (ML-CL). 4.5 feet of drill stem wet.			17 24 37		▲61
35		S-7		As above, no gravel; reacts with hydrochloric acid (ML-CL).			33 50/5"		▲50/5"
				Bottom of exploration boring at 36 feet Groundwater encountered at 29 feet.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: CRC

Approved by: CJK

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-8	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	432
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Environmental Drilling Inc / Truck Mounted Drill Rig	Date Start/Finish	8/10/18,8/10/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	7.5 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
		S-1		**Asphalt - 2 inches** **Fill** Medium dense, moist, dark grayish brown, silty, fine SAND, some gravel to gravelly; occasional organics; faint organic odor (SM).					
		S-2		Moist, brown and gray, sandy, SILT, some gravel; frequent organic matter (ML). Moist, light and dark brown, sandy, SILT, some gravel; frequent organic matter; jumbled (ML)			14 16 19	▲35	
5		S-3		Moist, greenish gray grading to tan at tip, silty, fine SAND, trace gravel; massive to faintly disrupted; occasional organics (SM). Moist, mottled gray brown and orange, sandy, SILT, trace gravel; blocky (ML). Moist, greenish gray, silty, fine SAND, trace gravel; scattered roots; thin seam of dark brown silt in tip (SM).			7 7 16	▲23	
10		S-4		Moist, dark brown, sandy, SILT, some coarse sand, trace gravel; abundant organic matter; irregular texture (ML).			3 7 7	▲14	
				Older Nonglacial					
15		S-5		Moist, greenish gray, SILT, some fine sand to sandy, trace gravel; mostly jumbled/irregular texture with occasional areas of faint lamination; scattered organic matter (ML).			18 15 13	▲28	
20		S-6		Upper 6 inches: moist, gray with oxidized streaks, SILT, trace sand seams (1/8 inch thick) (ML). Lower 12 inches: moist, light grayish brown with gray and oxidized mottling, SILT, trace sand (laminae), trace coarse sand, trace fine gravel; diagonally jointed; contains mica (ML).			7 6 15	▲21	
25		S-7		Moist to very moist, gray to greenish gray with scattered iron oxide stains, sandy, SILT to silty, fine SAND, trace coarse sand; unsorted; grading to weakly stratified; less silt near tip (ML/SM). Harder drilling, some bouncing at 25 feet.			45 20 21	▲41	
30		S-8		Wet, gray, fine SAND, trace silt; massive (SP). Moist, gray with dark gray streaks, SILT, some fine sand present in joints; scattered organic particles (ML).		▽	22 32 50/6"	▲50/6"	
				Glaciomarine					
35		S-9		Very moist to wet, gray, silty, fine SAND; massive (SM). Moist, gray, silty, fine SAND; contains seams (1/4 inch thick) of silt and lamination (SM). Bottom of exploration boring at 36 feet Groundwater encountered at 32.87 feet after drilling.			30 50/6"	▲50/6"	

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- ▽ Water Level (8/10/18)
- ▼ Water Level at time of drilling (ATD)

Logged by: NS
Approved by: CJK

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-9	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	435
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Environmental Drilling Inc / Truck Mounted Drill Rig	Date Start/Finish	8/10/18,8/10/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	7.5 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Asphalt - 6.5 inches					
				Fill					
		S-1		Moist, gray, SILT, some fine sand, some gravel (ML).					
		S-2		Slightly moist, to moist, light gray with pockets of dark gray and streaks of iron oxide, sandy, SILT, trace gravel; jumbled, irregular texture; nonstratified (ML).			7 9 18	▲27	
				Older Nonglacial					
5		S-3		Slightly moist, yellowish brown to brown with dark speckles and gray streaks, very fine sandy, SILT; contains mica; massive (ML). In tip: slightly moist, greenish gray, SILT; contains mica; massive with fine joints (ML). More difficult drilling at 7.5 feet.			11 13 33	▲46	
10		S-4		Slightly moist, greenish gray, SILT; massive (ML). Slightly moist, light grayish brown with iron oxide laminae, SILT; weakly stratified with sandy joints (ML). In tip: yellowish brown to brown with thin bands of iron oxide, very silty, very fine SAND; contains mica (SM).			15 29 25	▲54	
15		S-5		Moist, yellowish brown, very silty, very fine SAND; contains mica and iron oxide laminae; weakly stratified; jumbled (SM); interbedded with slightly moist, gray with iron oxide stains, SILT; jumbled (ML).			14 29 50/3"	▲50/3"	
				Bottom of exploration boring at 16.5 feet No groundwater encountered.					
20									
25									
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: NS

Approved by: CJK

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-10	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	430
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Environmental Drilling Inc / Truck Mounted Drill Rig	Date Start/Finish	8/10/18,8/10/18
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	7.5 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Asphalt - 6.5 inches					
				Fill					
		S-1		Moist, dark grayish brown, gravelly, silty, fine SAND (SM).					
		S-2		Moist, dark brown with gray blocks, very silty, fine SAND, some gravel; jumbled; scattered organic matter (SM).			14 10 8	▲18	
5		S-3		Moist to very moist, dark gray with oxidized streaks, very silty, fine SAND, trace gravel; nonstratified (SM).			4 5 13	▲18	
				Older Nonglacial					
				Near tip: moist, gray with tan mottling, SILT, some fine sand to sandy, trace gravel; nonstratified; blocky (ML).					
10		S-4		Moist, light creamy grayish brown with dark iron oxide stains, SILT, trace coarse sand; scattered fine roots; unsorted; some diagonal jointing (ML).			15 15 21	▲36	
15		S-5		Upper 12 inches: as above with less iron oxide staining.			11 15 18	▲33	
				Lower 6 inches: moist, light creamy grayish brown with heavy iron oxide staining, fine sandy, SILT; abundant mica; faintly laminated (ML).					
				Bottom of exploration boring at 16.5 feet No groundwater encountered.					
20									
25									
30									
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: NS

Approved by: CJK

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-11	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	430
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Cascade / Geoprobe Direct Push 78222DT	Date Start/Finish	1/28/19,1/28/19
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
		S-1		**Crushed Rock - 3 inches** **Fill** Moist, dark brown with moderate oxidation, gravelly, fine SAND; occasional organics; occasional organic debris; poor recovery (SM).			8 5 4	9	
		S-2		Very moist to wet, light brown with moderate oxidation, silt, some fine SAND, trace gravel; moderate woody debris; unsorted; little to no recovery due to woody debris (ML). Water suspended in sampler at 2.5 feet.		▼	0 0 0	0	
5		S-3		Upper 6 inches: very moist, light brown with moderate oxidation, SILT, some fine sand, trace gravel; unsorted; occasional woody debris (ML). **Pre-Vashon Nonglacial** Sampler wet at 5.5 feet. Lower 12 inches: moist to very moist, oxidized orangish light brown with splotches of dark brown, SILT, trace sand, trace gravel; dropstones; massive (ML).			5 9 10	19	
		S-4		**Pre-Vashon Till** Moist to very moist, orangish light brown to grayish light brown with banded to blotchy oxidation, SILT, some fine sand, trace gravel; unsorted; sharp contact (ML).			5 12 26	38	
10		S-5		Moist, grayish light brown with moderate oxidation bands, silty, fine SAND, trace gravel; unsorted (ML).			8 29 32	61	
				Bottom of exploration boring at 11.5 feet Groundwater encountered at 3 feet.					
15									
20									
25									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: CRC
Approved by: JHS

AESIBOR 180364.GPJ February 15, 2019

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Exploration Log

Project Number	Exploration Number	Sheet
180364E001	EB-12	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	433
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Cascade / Geoprobe Direct Push 78222DT	Date Start/Finish	1/28/19,1/28/19
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	8 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Crushed Rock - 6 inches					
		S-1		**Pre-Vashon Nonglacial** Moist, gray to dark gray, SILT to clayey, SILT; laminated light gray silt partings (ML).			11 7 8	▲15	
		S-2		Moist, moderately oxidized gray to dark gray, sandy, SILT to SILT, trace fine sand; laminated to slightly stratified; lens (2 inches thick) of orangish light brown, sandy, silt (ML).			11 19 22	▲41	
5		S-3		Upper 6 inches: moist, gray to dark gray, SILT to clayey, SILT; laminated to slightly stratified; dropstones (ML). Lower 12 inches: moist, gray to dark gray, SILT, trace to some fine sand; laminated to stratified (ML).			8 12 18	▲30	
		S-4		Moist, dark brownish gray, SILT, trace fine sand, trace gravel, occasional fine organic fragments and charcoal; lens (1 inch thick) of greenish gray, silt to clayey, silt; occasional mica; frequent decimated organics (ML).			4 8 17	▲25	
10		S-5		Moist, grayish green with light brown and grayish green banding, sandy, SILT, trace gravel; unsorted (ML).			14 14 30	▲44	
				Bottom of exploration boring at 11.5 feet No groundwater encountered.					
15									
20									
25									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: CRC
Approved by: JHS

AESIBOR 180364.GPJ February 15, 2019

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Exploration Log

Project Number	Exploration Number	Sheet
180364V001	GP1	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	441
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Cascade / Geoprobe Direct Push 7822DT	Date Start/Finish	1/28/19,1/28/19
Hammer Weight/Drop	N/A	Hole Diameter (in)	2 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot 10 20 30 40	Other Tests
				Asphalt - 2 inches					
				Fill					
				Slightly moist, light brown, fine to medium SAND, some gravel, trace silt (SP).					
		S-1		Dry to slightly moist, brownish gray with zones of oxidation, SILT, some fine sand, some gravel; unsorted (ML).					
				As above; scattered wood debris.					
				Slightly moist, greenish gray, very silty, fine SAND, some medium sand, trace gravel; scattered wood debris and organics (SM). GP1:4.5 (0.1 ppm)					
5									
				Slightly moist to moist, brown, sandy, SILT, some gravel; scattered organics and wood debris (ML). GP1:7 (0.0 ppm)					
		S-2							
				Older Nonglacial					
				Slightly moist, greenish gray with zones of oxidation, sandy, SILT to very silty, fine SAND, trace gravel (ML/SM).					
10									
		S-3		Moist, greenish gray, SILT; occasional fine gravel (ML).					
				Slightly moist, greenish gray, very sandy, SILT, some gravel; unsorted (SM). GP1:15 (0.1 ppm)					
15									
				Bottom of exploration boring at 15 feet No groundwater encountered. Boring backfilled with bentonite.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: KMA
Approved by: TSB

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Exploration Log

Project Number	Exploration Number	Sheet
180364V001	GP2	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	441
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Cascade / Geoprobe Direct Push 7822DT	Date Start/Finish	1/28/19,1/28/19
Hammer Weight/Drop	N/A	Hole Diameter (in)	2 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Grass / Root Mat - 2 inches					
				Fill					
				Slightly moist to moist, brown gray, silty, gravelly, fine to medium SAND; massive (SM).					
		S-1		Slightly moist, brown gray, very silty, fine SAND, some gravel; unsorted (SM).					
				Moist, brown to reddish brown, silty, fine to medium SAND; occasional wood debris and organics (SM). GP2:5 (0.1 ppm)					
5				**Weathered Nonglacial**					
				Slightly moist, grayish brown with layered oxidation, SILT; massive; cemented; slightly plastic (ML). GP2:6 (0.2 ppm)					
		S-2							
10				**Older Nonglacial**					
				As above; becomes greenish gray; plastic.					
		S-3							
				Slightly moist, greenish gray, fine sandy, SILT, some gravel; unsorted; slightly cemented (SM). GP2:15 (0.2 ppm)					
15				Bottom of exploration boring at 15 feet No groundwater encountered. Boring backfilled with bentonite.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: KMA
Approved by: TSB

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Exploration Log

Project Number	Exploration Number	Sheet
180364V001	GP3	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	441
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Cascade / Geoprobe Direct Push 7822DT	Date Start/Finish	1/28/19,1/28/19
Hammer Weight/Drop	N/A	Hole Diameter (in)	2 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Grass / Root Mat - 2 inches					
				Fill					
				Slightly moist, brown gray, very silty, fine to medium SAND, some gravel; scattered organics; unsorted (SM).					
		S-1		Slightly moist, grayish brown with orange oxidation, very silty, fine SAND, some gravel; scattered organics (SM).					
				GP3:5 (0.1 ppm)					
5				Slightly moist, grayish brown to brown, sandy, SILT, trace gravel; massive (ML).					
		S-2		GP3:7 (0.2 ppm)					
				Layer (2 inches thick) of sand.					
				Slightly moist, brownish gray, sandy, SILT, trace gravel; scattered wood debris and organics; mottled texture (ML).					
10				Pulverized rock in sampler.					
		S-3		**Older Nonglacial**					
				Slightly moist, brownish gray, sandy, SILT, some gravel; unsorted (ML). GP3:12 (0.2 ppm)					
				Bottom of exploration boring at 12 feet Driller notes refusal at 12 feet due to rock. No groundwater encountered. Boring backfilled with bentonite.					
15									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: KMA
Approved by: TSB

AESIBOR 180364V001.GPJ February 14, 2019

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Exploration Log

Project Number	Exploration Number	Sheet
180364V001	GP4	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	441
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Cascade / Geoprobe Direct Push 7822DT	Date Start/Finish	1/28/19,1/28/19
Hammer Weight/Drop	N/A	Hole Diameter (in)	2 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Grass / Root Mat - 2 inches					
				Fill					
				Slightly moist, greenish gray, gravelly, fine to medium SAND, some silt; scattered organics (SP-SM).					
		S-1		Slightly moist, brown to reddish brown, sandy, SILT, some gravel; scattered organics (ML).					
				Layer (2 inches thick) of medium sand.					
				GP4:5 (0.1 ppm)					
5									
				GP4:6.5 (0.1 ppm)					
				Weathered Nonglacial					
		S-2		Slightly moist, grayish brown with zones of orange oxidation, very silty, fine SAND to sandy, SILT, trace gravel; occasional organics; slightly plastic (SM-ML).					
10									
		S-3							
				Older Nonglacial					
				Slightly moist, grayish brown, sandy, SILT, some gravel; unsorted; slightly cemented (ML). GP4:15 (0.1 ppm)					
15				Bottom of exploration boring at 15 feet No groundwater encountered. Boring backfilled with bentonite.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: KMA
Approved by: TSB

associated earth sciences incorporated

Exploration Log

Project Number	Exploration Number	Sheet
180364V001	GP5	1 of 1

Project Name	Inglemoor HS Concert Hall and Music Building	Ground Surface Elevation (ft)	441
Location	Kenmore, WA	Datum	NAVD 88
Driller/Equipment	Cascade / Geoprobe Direct Push 7822DT	Date Start/Finish	1/28/19,1/28/19
Hammer Weight/Drop	N/A	Hole Diameter (in)	2 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Grass / Root Mat - 2 inches					
				Fill					
				Slightly moist, brown gray, sandy, SILT, some gravel; scattered organics; massive (ML).					
		S-1		Slightly moist, brown gray to gray with oxidation staining, silty, fine to medium SAND, some gravel; scattered organics (SM). GP5:5 (0.1 ppm)					
5				As above; abundant organics/wood debris (SM).					
				GP5:6.5 (0.2 ppm)					
		S-2		Slightly moist to moist, brown, very silty, fine SAND, some gravel; unsorted; occasional organics (coal pockets) (SM).					
				Weathered Nonglacial					
10				Slightly moist, brownish gray with zones of orange oxidation, fine sandy, SILT; massive; slightly plastic (ML).					
		S-3		Layer (6 inches thick) of highly oxidized orange.					
				Older Nonglacial					
				Becomes greenish gray to gray; slightly cemented. GP5:15 (0.1 ppm)					
15				Bottom of exploration boring at 15 feet No groundwater encountered. Boring backfilled with bentonite.					

Sampler Type (ST):

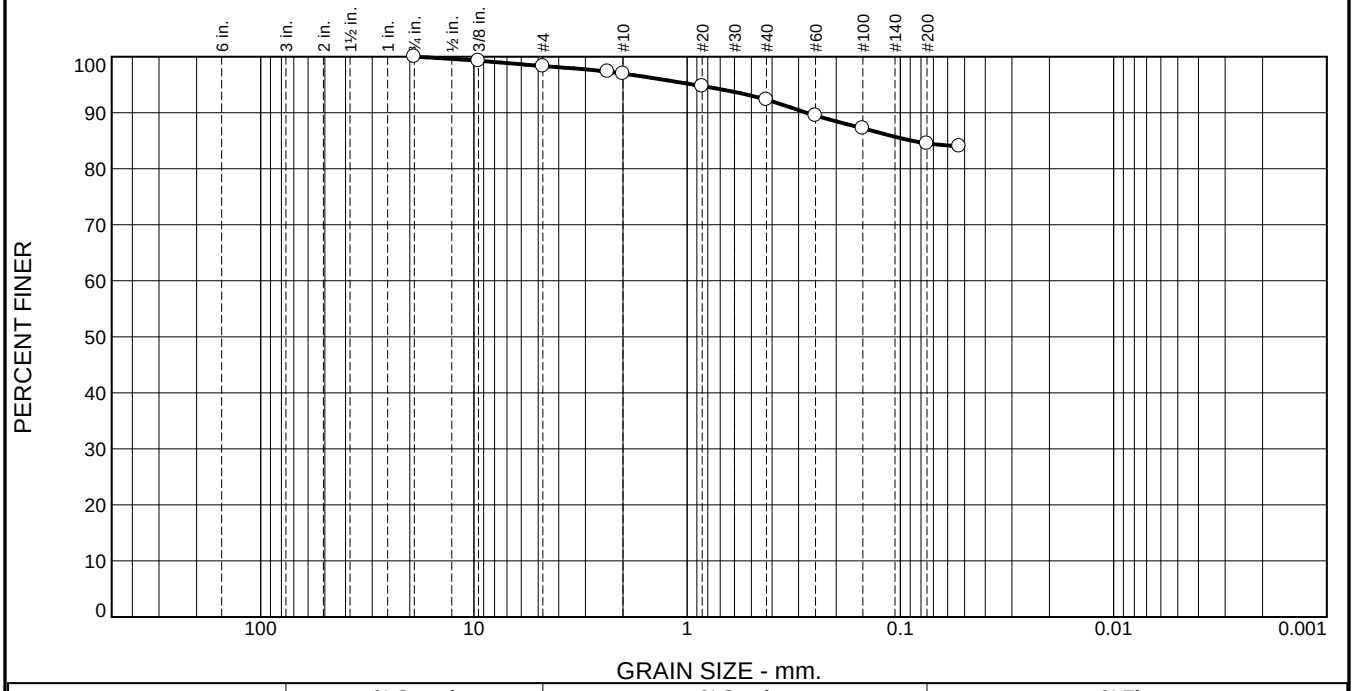
- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: KMA
Approved by: TSB

APPENDIX B

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.7	1.3	4.7	7.8	84.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
.75	100.0		
.375	99.3		
#4	98.3		
#8	97.3		
#10	97.0		
#20	94.7		
#40	92.3		
#60	89.5		
#100	87.2		
#200	84.5		
#270	84.0		

* (no specification provided)

Material Description

Sandy Silt Trace Gravel

Atterberg Limits (ASTM D 4318)

PL= np **LL=** nv **PI=**

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.2763 D_{85}= 0.0885 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 9-25-18 **Date Tested:** 9-25-18

Tested By: BN

Checked By: BG

Title:

Location: Onsite
Sample Number: EB3 S2 **Depth:** 10'

Date Sampled: 9-25-18

associated earth sciences incorporated

Client: Northshore
Project: Inglemoor HS

Project No: 180364 E001 **Figure**