February 10, 2020

Mr. Wayne Farmer
P.O. Box 31021
Spokane, Washington 99223
Phone: (509) 251-8279
Email: debbie.riley@me.com

RE: Pavement Section Thickness & Stormwater Management Facility Recommendations Report
Proposed Farmer Plat
2155 West Strong Road
Spokane, Washington
ALLWEST Project No. 219-360G

Mr. Farmer:

ALLWEST Testing & Engineering, Inc. (ALLWEST) has completed the authorized pavement section thickness and stormwater management facility recommendations report for the above-referenced site in Spokane, Washington. The purpose of our services was to provide recommendations for pavement section thickness and stormwater management facilities at the project site. This report summarizes the results of our field testing and our recommendations.

PROJECT DESCRIPTION AND FIELD OBSERVATIONS

We understand the project involves developing approximately 6.4 acres of vacant land into approximately 30 residential lots near the intersection of West Strong Road and Austin Road in Spokane, Washington (see Figure 1). We understand the project involves the development of roadways and stormwater management facilities and the installation of utilities for single family residential lots. We understand the proposed stormwater management facilities will likely be swales with water pumped back up to the Austin Road stormwater system. Specific traffic information was not available at the time this report was prepared; however, we assume traffic loads will consist predominately of passenger vehicles with occasional delivery truck traffic. This proposal does not include geotechnical services or recommendations related to the individual lots or structures proposed at the subject property.

GENERAL SOIL CONDITIONS AND AVAILABLE INFORMATION

The USDA Natural Resources Conservation Service (NRCS) has mapped the soils on and around the site in the Soil Survey of Spokane County as Seaboldt, warm-Brincken, moist complex and Brincken, moist-Uhlig complex (see Figure 2). These soils are described as ashy silt loam to extremely gravelly sandy loam that is well drained soil and formed in sandy glaciofluvial deposits. The on-site soils we observed in the test pits appeared to be consistent with the soil mapping.

Groundwater was not observed in the test pits during our field exploration. However, with the shallow depth to bedrock and the presence of fine-grained soil above the shallow bedrock, we anticipate water will remain perched above the shallow bedrock elevation and will saturate the overlying fine-grained soils during wet periods of the year. Changes in precipitation, construction, or other factors may impact the depth to groundwater on the property. Fluctuations in the groundwater level should be expected. We anticipate groundwater will affect the proposed construction and dewatering procedures should be anticipated to construct the site improvements.

FIELD TESTING, OBSERVATIONS, AND RESULTS

Subsurface Conditions

We observed the excavation of eight (8) test pits at the site at the approximate locations shown on the Test Pit Location Map, Figure 3, attached to this report. The test pits were excavated with a tracked excavator working under subcontract to ALLWEST. The soil conditions observed in the test pits were visually described and classified in general accordance with ASTM D2487 and D2488 and the subsurface profiles were logged. Representative soil samples were obtained from the test pits and returned to our Spokane Valley office for further observation and laboratory testing.

The subsurface soil profile observed in the test pits was relatively consistent and typically consisted of one (1) to two (2) feet of clayey silty sand topsoil underlain by inorganic clay or silt soil (loess) ranging in depth from two (2) to six (6) feet below the existing ground surface. Minor amounts of fractured basalt cobble and gravel were mixed with the clayey silt in test pit TP-4 from one (1) to four (4) feet below the existing ground surface. The fine grained clay and silt soils extended from below the topsoil to the refusal depths of the test pits. Each test pit encountered refusal on basalt bedrock at depths ranging from one and one half (1 ½) foot to six (6) feet below the existing ground surface. Refusal is defined as when the excavator could not advance the test pit further due to the integrity of the basalt rock.

Groundwater was not observed in the test pits at the time of our exploration. However, seasonal groundwater fluctuations should be anticipated. Changes in precipitation, construction, or other factors may impact the depth to groundwater on the property. It is our opinion preventive measures (both temporary and long-term may be necessary to manage groundwater at the site to reduce the potential for groundwater to adversely affect the roadway and stormwater management facilities.

Detailed descriptions of the soil observed in the test pits are presented on the Logs of Test Pits attached to this report. The descriptive soil terms used on the test pit logs and in this report can be referenced by the Unified Soil Classification System (USCS). A copy of the USCS is also attached to this report. The subsurface conditions may vary between exploration locations. Such changes in conditions would not be apparent until construction. **If the subsurface conditions do change from those observed in the test pits, the construction timing, plans, and costs may change.**

ANALYSIS AND CONCLUSIONS

Stormwater, Site Grading, and Drainage

Based on our review of the proposed construction and our discussions with the project engineer, Simpson Engineers, we anticipate stormwater runoff will be directed to grassed swales which will provide treatment for stormwater, but with the shallow depth to bedrock and the soils above the bedrock consisting of silt and clay, it is our opinion infiltration below the swale bottoms will not be feasible. We understand a stormwater management system exists in Austin Road and according to the project civil engineer, stormwater from the site can be pumped toward Austin Road and into the City of Spokane stormwater management system. Our opinion is that this option is likely the most feasible option for managing stormwater at the subject site. If this option is not feasible, ALLWEST should be contacted to evaluate other options for stormwater management.

We recommend the site be graded such that storm run-off water is directed away from pavement areas to stormwater management areas. We recommend landscape areas be sloped a minimum of 6 inches within 10 feet of the structure (5 percent) and slabs be sloped a minimum of 2 percent. In addition, we recommend gutters and downspouts with long splash blocks or extensions. We do not recommend directing water into foundation drain systems.

Swale Bottoms

We recommend infiltration swales be sized following the guidelines in Chapter 6 of the SRSM. We obtained soil samples from test pits TP-2, TP-5, TP-6, TP-7, and TP-8 for sieve analysis to evaluate the percent passing a No. 200 sieve. The sieve analysis for these test pits exceeded 12 percent fines by a significant amount. Based on the laboratory testing performed, we recommend Equation 6-1D of the SRSM be used to size stormwater swales for this project.

Site Preparation

We recommend all topsoil, vegetation, root zone, deleterious material, saturated or disturbed soil, soil containing significant amounts of roots and organics, and any uncontrolled fill, if encountered, be excavated and removed its entire depth below proposed pavement and flatwork areas. Based on the subsurface conditions observed in the test pits, we anticipate this may require the removal of approximately one (1) to two feet (2) feet of topsoil. Also, if encountered, we recommend removing any saturated soil encountered directly below the topsoil. The depth of removal of any saturated soil will be dependent upon the time of year and the in-situ moisture content of the soil. A representative of ALLWEST should be on site to evaluate the site conditions at the time of site preparation to aid in evaluating the minimum removal depths. The exposed subgrade should then be scarified to a minimum depth of eight (8) inches, properly moisture conditioned, and compacted to at least 95 percent of the modified Proctor maximum dry density. If the subgrade is observed to significantly deflect, it should be over-excavated to firm, non-yielding soil and replaced with properly compacted structural fill.

For pavement, we recommend sub-excavating the native, inorganic, fine-grained soil a minimum of one (1) foot below pavement subgrade elevation, placing a woven water-permeable geotextile separator fabric (Mirafi 500X, or equivalent) above the native soil, and placing a minimum of (1) foot of coarse, granular subbase compacted to at least 95 percent of the modified Proctor maximum dry density. Specific City of Spokane requirements for this subbase material are discussed in the **Pavement Section Thickness Recommendations** section of this report.

Subgrade Stabilization

If the subgrade is observed to pump or deflect significantly during grading, it should be stabilized prior to placement of fill. The subgrade may be stabilized using either fractured, angular cobble or with geosynthetic reinforcement in conjunction with imported structural fill. The required thicknesses of crushed cobble or structural fill (used in conjunction with geosynthetic reinforcement) will be dependent on the construction traffic loading which is unknown at the time of this report. Therefore, a certain degree of trial and error may be required during construction to verify the recommended stabilization section thicknesses.

If fractured, angular cobble is selected to stabilize the subgrade, it should have a maximum particle size of 8 inches and should be relatively free of sand and fines (silt and clay). The first layer of cobble should be placed in an 18-inch thick loose lift and trafficked with tracked-construction and vibratory drum compaction equipment until it is observed to densify. If vibratory compaction destabilizes the subgrade, it should be discontinued. If the cobble is placed in a confined excavation, it should be mechanically densified from outside the excavation with vibratory compaction equipment.

If geosynthetic reinforcement is selected, it should consist of Tensar TX-160 or equivalent. Alternatives to Tensar TX-160 should be approved by the geotechnical engineer prior to use on site. The following recommendations are provided for subgrade stabilization using geosynthetic reinforcement.

- Geosynthetic reinforcement materials should be placed on a properly prepared subgrade with a smooth surface. Loose and disturbed soil should be removed prior to placement of geosynthetic reinforcement materials.

- A woven geotextile filter fabric should be placed on properly prepared subgrade. The geosynthetic reinforcement should be placed directly on top of the filter fabric. The filter fabric and geosynthetic reinforcement should be unrolled in the primary direction of fill placement and should be over-lapped at least three (3) feet.

- The geosynthetic materials should be pulled taut to remove slack and pinned in place. If the material does not remain taut during fill placement, its effectiveness will be reduced.

- Construction equipment should not be operated directly on the geosynthetic materials. Fill should be placed from outside the excavation to create a pad on which equipment may be operated. We recommend a minimum of 12 inches of structural fill be placed over the geosynthetic reinforcement before operating construction equipment on the fill. Low pressure, track-mounted equipment should be used to place fill over the geosynthetic reinforcement.

- Fill placed directly over the geosynthetic reinforcement should be properly moisture conditioned prior to placement and should meet the following gradation.

Sieve Size	Percent Passing
1 ½ inch	100
¾ inch	50 - 100
#4	25 - 50
#40	10 - 20
#100	5 - 15
#200	≤ 10

- The fill material should be properly compacted. Care should be taken with the use of vibratory compaction equipment. Vibration should be discontinued if it reduces the subgrade stability.

An ALLWEST representative should be on site during subgrade stabilization to verify our recommendations are followed and to provide further recommendations as needed.

Structural Fill, Placement, and Compaction

Structural fill is defined as soil placed or moved on a site that will support any structural element including slabs or pavement. Structural fill typically includes the footprint area and five (5) feet beyond for structures. Non-structural fill is soil placed beyond the structural fill area. Structural fill should be free of organic matter, frozen soil and deleterious debris. Prior to placing structural fill, topsoil, organic material, uncontrolled fill and debris should be removed. The ground surface should be relatively level. Structural fill should be placed on subgrades prepared as directed in the Site Preparation section of this report. In wet weather or spring conditions, using silty or fine-grained soil for fill may delay construction and increase costs.

It is our opinion achieving the recommended soil density levels with the fine-grained soils observed on site will be difficult if used as structural fill. Therefore, we do not recommend using the on-site fine-grained soils as structural fill.

We recommend imported structural fill consist of granular material meeting the particle size requirements of the Washington State Department of Transportation Standard Specifications section 9-03.14(2) for Select Borrow as shown below in the following table. ALLWEST can review alternate structural fill submittals if requested prior to construction.

Sieve Size	Percent Passing
6-inch	99-100
3-inch	75-100
No. 40	50 max.
No. 200	10.0 max.

Structural fill should be placed in lift thicknesses which are appropriate for the compaction equipment used. Typically, six (6) to eight (8) inch thick loose lifts are appropriate for typical rubber tire and steel drum compaction equipment. Lift thicknesses should be reduced to four (4) inches for hand operated compaction equipment. Fill should be moisture conditioned to within two (2) percentage points of the optimum moisture content prior to placement to facilitate compaction. We recommend structural fill be compacted to a minimum of 95 percent of the modified Proctor maximum dry density up to subgrade elevation in building, parking, drive, and slab areas. The compaction efforts should result in the soil being compacted to a firm, dense, and unyielding condition (to the point where no further compression is observed following compaction efforts). We recommend ALLWEST be retained to observe the placement and compaction process to assess if sufficient compaction has been achieved.

The following recommendations are provided for placement of fill materials which cannot be tested due to the percentage of oversize particles (+3/4" diameter) being more than allowed by ASTM specifications.

- The structural fill should be placed in maximum 12-inch thick lifts with a minimum 10-ton vibratory compactor. The compactor should impart a minimum dynamic force of 30,000 pounds of impact per vibration with a minimum of 1,000 vibrations per minute. These recommendations are based on Washington State Department of Transportation Standard Specifications for placement of rock fill, WSDOT 2-03.3(14) A.

- A minimum of six (6), full coverage passes should be made for each six (6) inches of lift thickness.

- Fill materials, which cannot be tested by nuclear densometer due to the large amount of oversize particles require full time observation by a representative of ALLWEST during placement.

Pavement Section Thickness Recommendations

After removing the topsoil and preparing the subgrade, we anticipate the subgrade will consist of fine-grained, inorganic clay or silt. We recommend a coarse grained, granular subbase meeting the gradation requirements described below be placed immediately below the hot mix asphalt and crushed aggregate section. It is our opinion the granular subbase placed immediately below the hot mix asphalt and crushed aggregate section will provide an adequate pavement section subgrade provided the subgrade is prepared as recommended in the Site Preparation section of this report. It is important the subgrade surface be shaped to provide for positive drainage to reduce the potential for water to pond in the subgrade.

According to City of Spokane Design Standards Amendment No. 2 (2010), when the pavement subgrade consists of silt (ML) or clay (CL), the City of Spokane considers silt or clay to be an unsuitable subgrade soil and one of two options shall be required to mitigate the poor quality subgrade soil.

Option 1

12 inches of gravel borrow meeting the requirements of WSDOT 9-03.14(1) can be placed beneath the minimum asphalt and crushed surfacing thickness. A geotextile fabric conforming to WSDOT 9-33 shall be used to provide separation between the unsuitable subgrade soil and the gravel borrow, or

Option 2

A 12-inch minimum thickness of cement treated base can be placed beneath the minimum asphalt and crushed surfacing thickness.

If Option 1 is selected, we recommend the geotextile fabric placed below the subbase consist of a woven geotextile fabric (Mirafi 500X, or equivalent) as opposed to a non-woven geotextile fabric.

If Option 2 is selected, further recommendations and laboratory testing of various cement, soil, and moisture content combinations should be conducted prior to constructing the cement treated subgrade on site to verify an adequate strength is being achieved in the cement treated subgrade soil.

Prior to placing the aggregate base, we recommend subgrade and subbase areas be compacted to at least 95 percent of the modified Proctor maximum dry density (ASTM D1557). In addition, the subgrade area should be proof-rolled with a loaded dump truck. This measure would assist in detecting localized soft areas. Soft areas discovered during the proof-rolling operation should be excavated and replaced with a suitable structural fill material. The proof-rolling process should be observed by a geotechnical engineer to make the final evaluation of the subgrade.

Depending on the final grading plan and thus, the anticipated subgrade soil type at pavement subgrade elevation, we recommend the following pavement sections for the proposed residential street and arterial road:

Pavement Application	Thickness of Asphalt (in)	Thickness of Gravel Base (in)	Thickness of Granular Subbase (in)
Residential Street (Fine-Grained Subgrade)	3	6	12*
Arterial – Strong Road (Fine-Grained Subgrade)	4	6	12*

*Assumes the Granular Subbase is placed over woven geotextile fabric (Mirafi 500X or equivalent)

We recommend specifying crushed gravel top or base course meeting the requirements of the Washington Department of Transportation (WSDOT) Standard Specification 9-03.9(3) for crushed gravel top or base course. We recommend the subbase meet the requirements for gravel borrow according to section 9-03.14(1) of the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction. We recommend the asphalt concrete pavement meet the requirements of WSDOT Standard Specification for Hot Mix Asphalt (HMA) Class ½ inch asphalt concrete pavements. We recommend the crushed gravel base be compacted to a minimum of 95 percent of its modified Proctor maximum dry density (ASTM D 1557). We recommend the asphaltic concrete surface be compacted to a minimum of 92 percent of the Rice density. If a high percentage of truck traffic is expected, we should be notified so we can review our pavement recommendations and provide revisions, if necessary.

CONSTRUCTION RECOMMENDATIONS

Excavation

Excavation of the on-site soil can be conducted with typical excavation equipment. We recommend excavations greater than four (4) feet deep be sloped no steeper than 1.5H:1V (horizontal to vertical). Alternatively, deeper excavations may be shored or braced in accordance with OSHA specifications and local codes. Regarding trench wall support, the site soil is considered Type C soil according to Occupational Safety and Health Administration (OSHA) guidelines. The contractor is responsible to provide appropriate trench wall support and/or sloping.

Wet Weather Construction

Due to the climatic effects in this region during the late fall, winter, and early spring (generally wet conditions), we recommend construction (especially site grading) take place during the late spring and summer seasons. If construction occurs during or immediately after excessive precipitation, it may be necessary to sub-excavate and replace disturbed subgrade soils that might otherwise be suitable. We recommend the contractor have means and equipment available for altering surface water collection and dewatering open excavations.

Low ground pressure (tracked) equipment should be used to reduce disturbance. All soft and disturbed subgrade areas should be excavated to undisturbed soil and backfilled with structural fill. If construction is undertaken in wet periods of the year, the subgrades will be susceptible to disturbance including rutting and pumping. Construction costs will most likely be greater in the wetter seasons of the year due to removal of disturbed and/or wet soil.

Cold Weather Construction

The near surface soils encountered in the test pits are considered to be frost susceptible. If site grading and construction are anticipated during cold weather, we recommend good winter construction practices be observed. Snow and ice should be removed from excavated and fill areas prior to additional earthwork or construction. Footings, floor slabs, or any structural portions of the construction should not be placed on frozen ground; nor should the supporting soils for buildings be permitted to freeze during or after construction. Frozen soils should not be used as backfill or fill.

Additional Services Recommended

We recommend ALLWEST Testing & Engineering be retained to review the final plans and specifications for the project regarding the geotechnical aspects of the proposed project prior to construction. Also, we should be retained to provide construction observations and material testing to verify the soil and geologic conditions and that the report recommendations are incorporated into the actual construction. Soils density testing should be performed by an experienced engineering technician at the time of construction to verify the recommended levels of compaction are achieved. If we are not retained to provide the recommended plan review and construction observation services, we cannot be responsible for soil engineering related construction errors or omissions.

REPORT LIMITATIONS

This report has been prepared to assist in the design of pavement and stormwater management facilities for the Farmer Plat in Spokane, Washington. Our services consist of professional opinions and conclusions made in accordance with generally accepted geotechnical engineering principles and practices in our local area at the time this report was prepared. This acknowledgement is in lieu of all warranties either expressed or implied.

REMARKS

We appreciate the opportunity to be of service on this project. We are available to answer questions you may have regarding this report or to provide additional services as needed. Please feel free to contact us at (509) 534-4411 at your convenience.

Sincerely,

ALLWEST Testing & Engineering, Inc.

Andy Eliason

Andy J. Eliason, P.E.
Spokane Area Manager

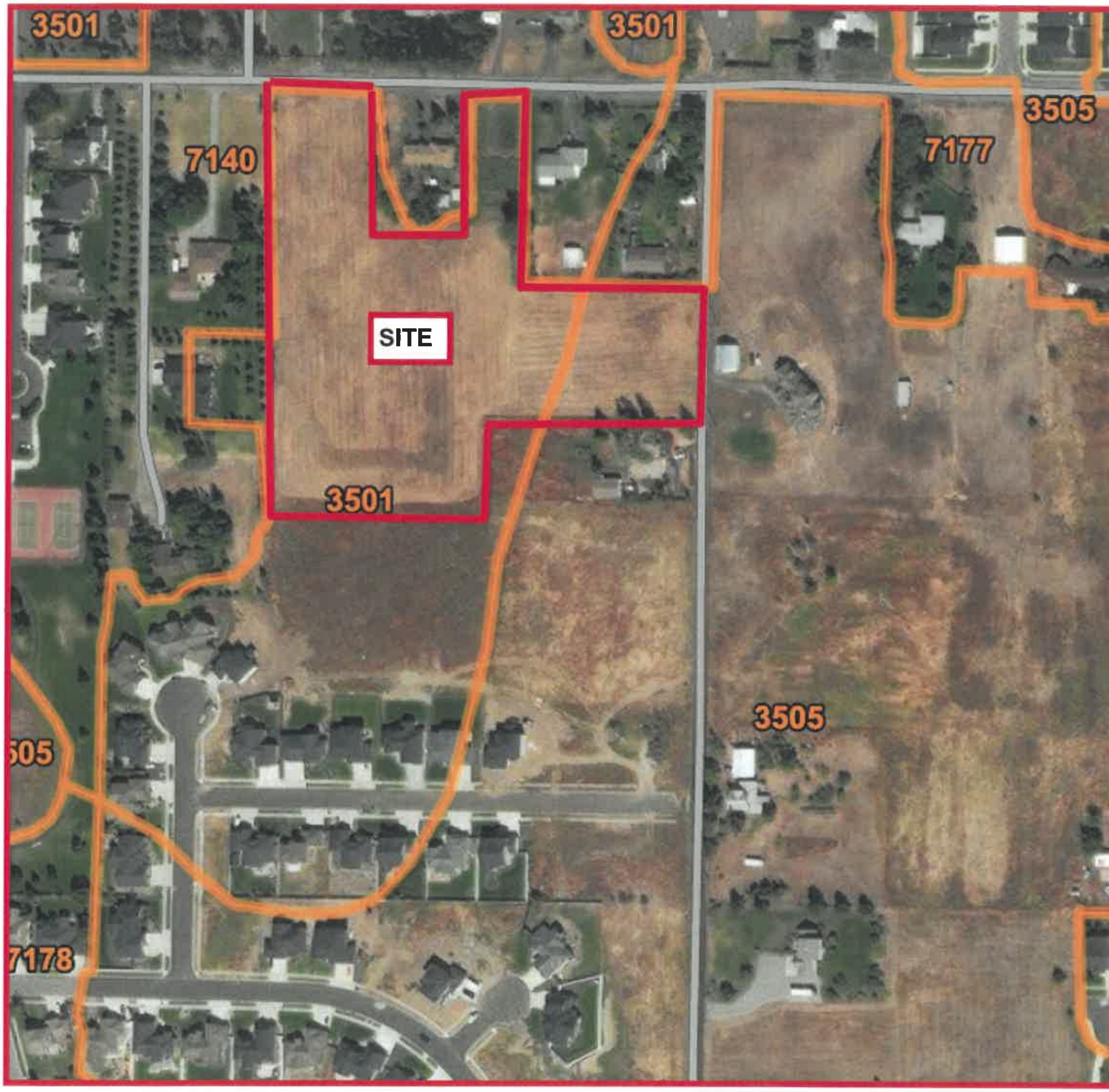
ANDY JOEL ELIASON
STATE OF WASHINGTON
42767
REGISTERED PROFESSIONAL ENGINEER
02/10/20

Attachments:
- Figure 1 – Site Location Map
- Figure 2 – NRCS Soil Map
- Figure 3 – Test Pit and Field Permeability Test Location Map
- Logs of Test Pits
- Laboratory Test Results

Google Earth, 2018

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

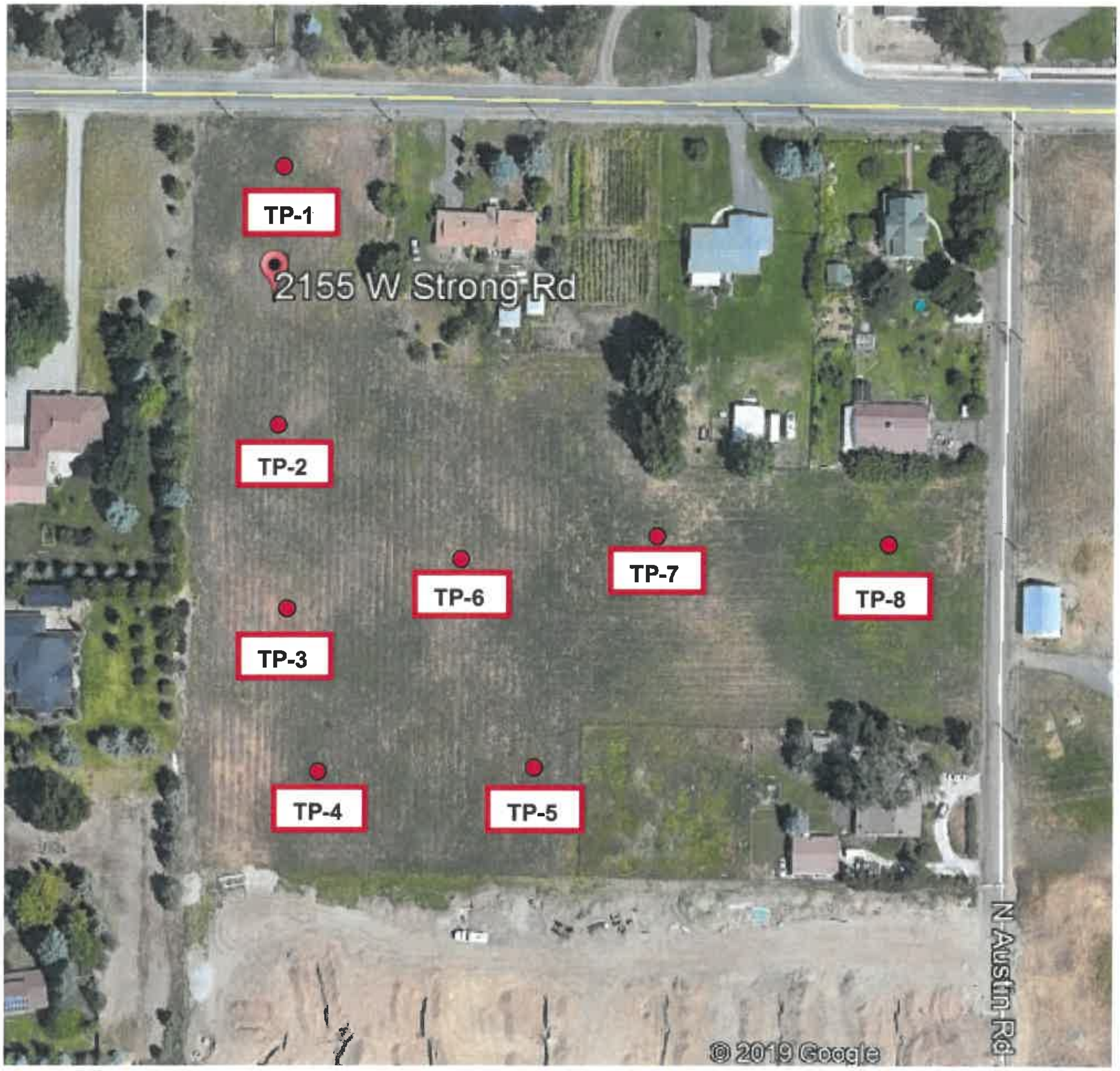
N / W / E / S	ALLWEST Testing & Engineering	**FIGURE 1 - SITE LOCATION MAP**
		PAVEMENT SECTION AND STORMWATER RECOMMENDATIONS
		PROPOSED FARMER'S PLAT
		WEST STRONG ROAD, SPOKANE, WA
	3005 N. Industrial Lane 5th Street, #S-21 Spokane Valley, Washington **www.allwesttesting.com**	Client Name: MR. WAYNE FARMER
		Project No.: 219-360G
		Date: FEBRUARY 10, 2020



United States Department of Agriculture (USDA)
National Resources Conservation Service (NRCS)
Web Soil Survey

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

N W E S	ALLWEST Testing & Engineering	FIGURE 2 - NRCS SOIL MAP
		PAVEMENT SECTION AND STORMWATER RECOMMENDATIONS
		PROPOSED FARMER'S PLAT
		WEST STRONG ROAD, SPOKANE, WA
	3005 N. Industrial Park 5th Street, #S-21 Spokane Valley, Washington www.allwesttesting.com	Client Name: MR. WAYNE FARMER
		Project No.: 219-360G
		Date: FEBRUARY 10, 2020



Approximate Test Pit Test Location

Source: Google

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

N W E S

ALLWEST Testing & Engineering

3005 N. Industrial Lane 5th Street, #S-21
Spokane Valley, Washington
www.allwesttesting.com

FIGURE 3 - TEST PIT LOCATION MAP
PAVEMENT SECTION AND STORMWATER RECOMMENDATIONS
PROPOSED FARMER'S PLAT
WEST STRONG ROAD, SPOKANE, WA
Client Name: MR. WAYNE FARMER
Project No.: 219-360G
Date: FEBRUARY 10, 2020

LOG OF TEST PIT

ALLWEST Testing & Engineering

PROJECT:	Pavement Section & Stormwater Management Recommendations Wayne Farmer Plat Austin Road & Five Mile Road Spokane County, Washington Project No. 219-360G	TEST PIT: **TP-01**
		LOCATION: **See Test Pit Location Map**
		DATE: **01-09-2020** SCALE: **1" = 2.5'**

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
1.5	SC-SM	CLAYEY SILTY SAND WITH ORGANICS, fine grained, dark brown, loose, moist. (Topsoil)		
3.5	SC	CLAYEY SAND to SANDY SILTY CLAY, fine sand, low plasticity, brown, soft, moist. (Loess)		
		Refusal on bedrock at 3.5 feet. Groundwater not observed during excavation. Test Pit backfilled immediately upon completion.		

(See Report and Standard Plates for elevation and descriptive terminology.)

LOG OF TEST PIT

ALLWEST Testing & Engineering

PROJECT:	Pavement Section & Stormwater Management Recommendations Wayne Farmer Plat Austin Road & Five Mile Road Spokane County, Washington Project No. 219-360G	TEST PIT: **TP-02**
		LOCATION: **See Test Pit Location Map**
		DATE: **01-09-2020** SCALE: **1" = 2.5'**

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
2.0	SC-SM	CLAYEY SILTY SAND WITH ORGANICS, fine grained, dark brown, loose, moist. (Topsoil)		
3.5	SM	SILTY SAND, very fine to fine grained, low plasticity, brown, soft, moist. (Loess)		
		Refusal on bedrock at 3.5 feet. Groundwater not observed during excavation. Test Pit backfilled immediately upon completion.		

(See Report and Standard Plates for elevation and descriptive terminology.)

LOG OF TEST PIT

ALLWEST Testing & Engineering

PROJECT: **Pavement Section & Stormwater Management Recommendations Wayne Farmer Plat Austin Road & Five Mile Road Spokane County, Washington Project No. 219-360G**	TEST PIT: **TP-03**
	LOCATION: **See Test Pit Location Map**
	DATE: **01-09-2020** SCALE: **1" = 2.5'**

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
1.5	SC-SM	CLAYEY SILTY SAND WITH ORGANICS, fine grained, dark brown, loose, moist. (Topsoil)		
		Refusal on bedrock at 1.5 feet. Groundwater not observed during excavation. Test Pit backfilled immediately upon completion.		

(See Report and Standard Plates for elevation and descriptive terminology.)

LOG OF TEST PIT

ALLWEST Testing & Engineering

PROJECT:	Pavement Section & Stormwater Management Recommendations Wayne Farmer Plat Austin Road & Five Mile Road Spokane County, Washington Project No. 219-360G	TEST PIT: **TP-04**
		LOCATION: **See Test Pit Location Map**
		DATE: **01-09-2020** SCALE: **1" = 2.5'**

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
1.0	SC-SM	CLAYEY SILTY SAND WITH ORGANICS, fine grained, dark brown, loose, moist. (Topsoil)		
4.0	SC-SM	CLAYEY SILTY SAND, fine grained, brown, soft, with coarse angular basalt gravel from 3 to 4 feet, moist. (Loess)		
4.5	SC-SM	CLAYEY SILTY SAND, fine to medium grained, some rounded fine to coarse gravel, light yellow brown, loose, moist. (Loess/Glaciofluvial Deposit)		
		Refusal on bedrock at 4.5 feet. Groundwater not observed during excavation. Test Pit backfilled immediately upon completion.		

(See Report and Standard Plates for elevation and descriptive terminology.)

LOG OF TEST PIT

ALLWEST Testing & Engineering

PROJECT:	TEST PIT: TP-05
Pavement Section & Stormwater Management Recommendations Wayne Farmer Plat **Austin Road & Five Mile Road** **Spokane County, Washington** **Project No. 219-360G**	LOCATION: **See Test Pit Location Map**
	DATE: **01-09-2020** SCALE: **1" = 2.5'**

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
1.5	SC-SM	CLAYEY SILTY SAND WITH ORGANICS, fine grained, dark brown, loose, moist. (Topsoil)		
6.0	CL	SANDY LEAN CLAY, light yellow brown, loose, moist. (Loess)		
		Refusal on bedrock at 6.0 feet. Groundwater not observed during excavation. Test Pit backfilled immediately upon completion.		

(See Report and Standard Plates for elevation and descriptive terminology.)

LOG OF TEST PIT

ALLWEST Testing & Engineering

PROJECT: **Pavement Section & Stormwater Management Recommendations Wayne Farmer Plat Austin Road & Five Mile Road Spokane County, Washington Project No. 219-360G**	TEST PIT: **TP-06**
	LOCATION: **See Test Pit Location Map**
	DATE: **01-09-2020** SCALE: **1" = 2.5'**

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
1.5	ML	SILTY WITH SAND AND ORGANICS, fine grained, dark brown, loose, moist. (Topsoil)		
3.0	SC-SM	CLAYEY SILTY SAND, fine grained, brown, loose, moist. (Loess)		
		Refusal on bedrock at 3.0 feet. Groundwater not observed during excavation. Test Pit backfilled immediately upon completion.		

(See Report and Standard Plates for elevation and descriptive terminology.)

LOG OF TEST PIT

ALLWEST Testing & Engineering

PROJECT:	Pavement Section & Stormwater Management Recommendations Wayne Farmer Plat Austin Road & Five Mile Road Spokane County, Washington Project No. 219-360G
TEST PIT:	TP-07
LOCATION:	See Test Pit Location Map
DATE:	01-09-2020
SCALE:	1" = 2.5'

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
1.0	SC-SM	CLAYEY SILTY SAND WITH ORGANICS, fine grained, dark brown, loose, moist. (Topsoil)		
3.0	ML	SANDY SILT, fine grained, brown, loose, moist. (Loess)		
3.5	CL	SANDY LEAN CLAY with trace of rounded gravel, red brown, loose, moist. (Loess/Glaciofluvial Deposit)		

Refusal on bedrock at 3.5 feet.

Groundwater not observed during excavation.

Test Pit backfilled immediately upon completion.

(See Report and Standard Plates for elevation and descriptive terminology.)

LOG OF TEST PIT

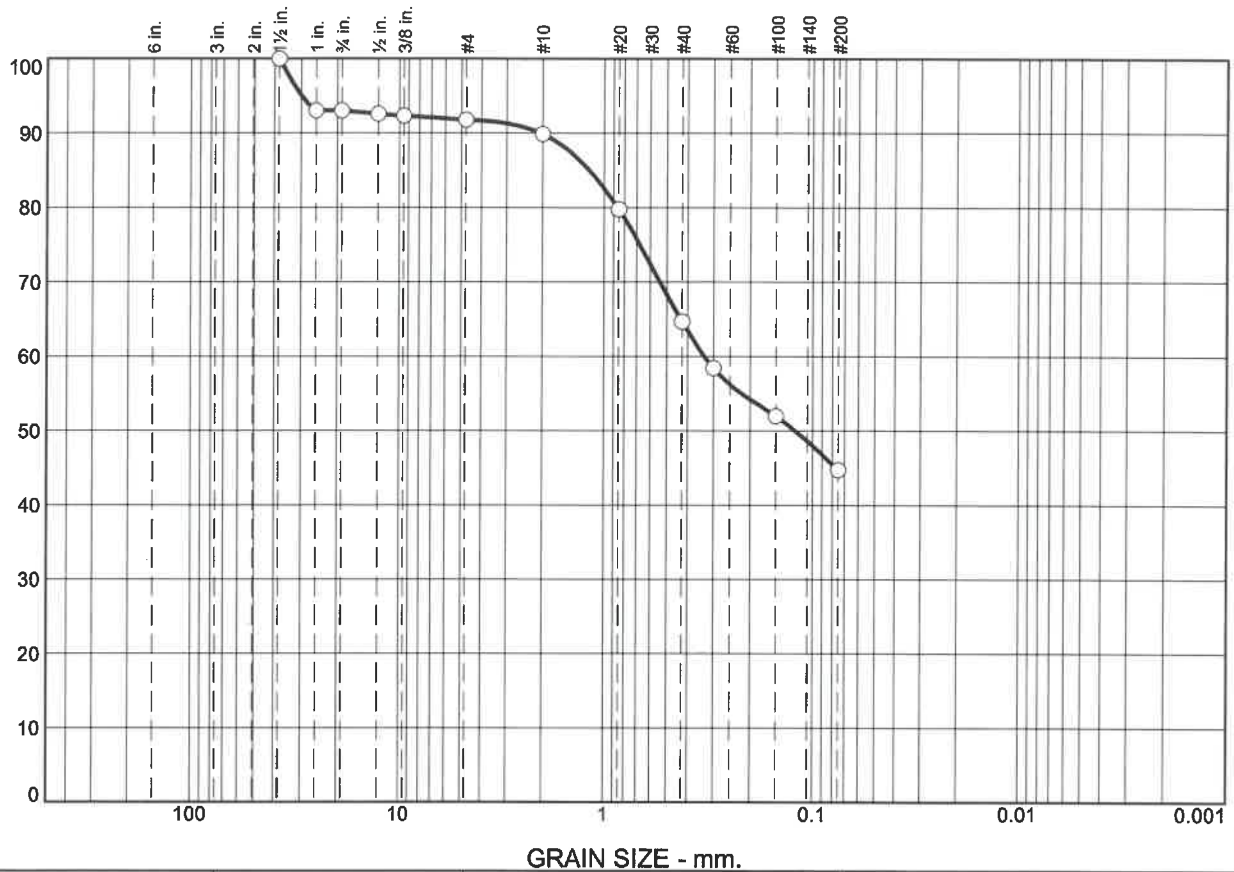
ALLWEST Testing & Engineering

PROJECT:	Pavement Section & Stormwater Management Recommendations Wayne Farmer Plat Austin Road & Five Mile Road Spokane County, Washington Project No. 219-360G	TEST PIT: **TP-08**
		LOCATION: See Test Pit Location Map
		DATE: 01-09-2020 SCALE: 1" = 2.5'

Depth 0.0	ASTM D2487 Symbol	Description of Materials	WL	Tests or Notes
1.0	SC-SM	CLAYEY SILTY SAND WITH ORGANICS, fine grained, dark brown, loose, moist. (Topsoil)		
2.5	SM	CLAYEY SILTY SAND, fine grained, brown, loose, moist. (Loess)		
5.5	SM	SILTY SAND, very fine to fine grained, light yellow brown, loose, moist. (Loess)		
		Refusal on bedrock at 5.5 feet. Groundwater not observed during excavation. Test Pit backfilled immediately upon completion.		

(See Report and Standard Plates for elevation and descriptive terminology.)

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	7	1	2	25	20	45	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100		
1"	93		
3/4"	93		
1/2"	93		
3/8"	92		
#4	92		
#10	90		
#20	80		
#40	65		
#50	58		
#100	52		
#200	45		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.0450 D_{85}= 1.1794 D_{60}= 0.3323
D_{50}= 0.1209 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

B.Borer sampled 1-9-20

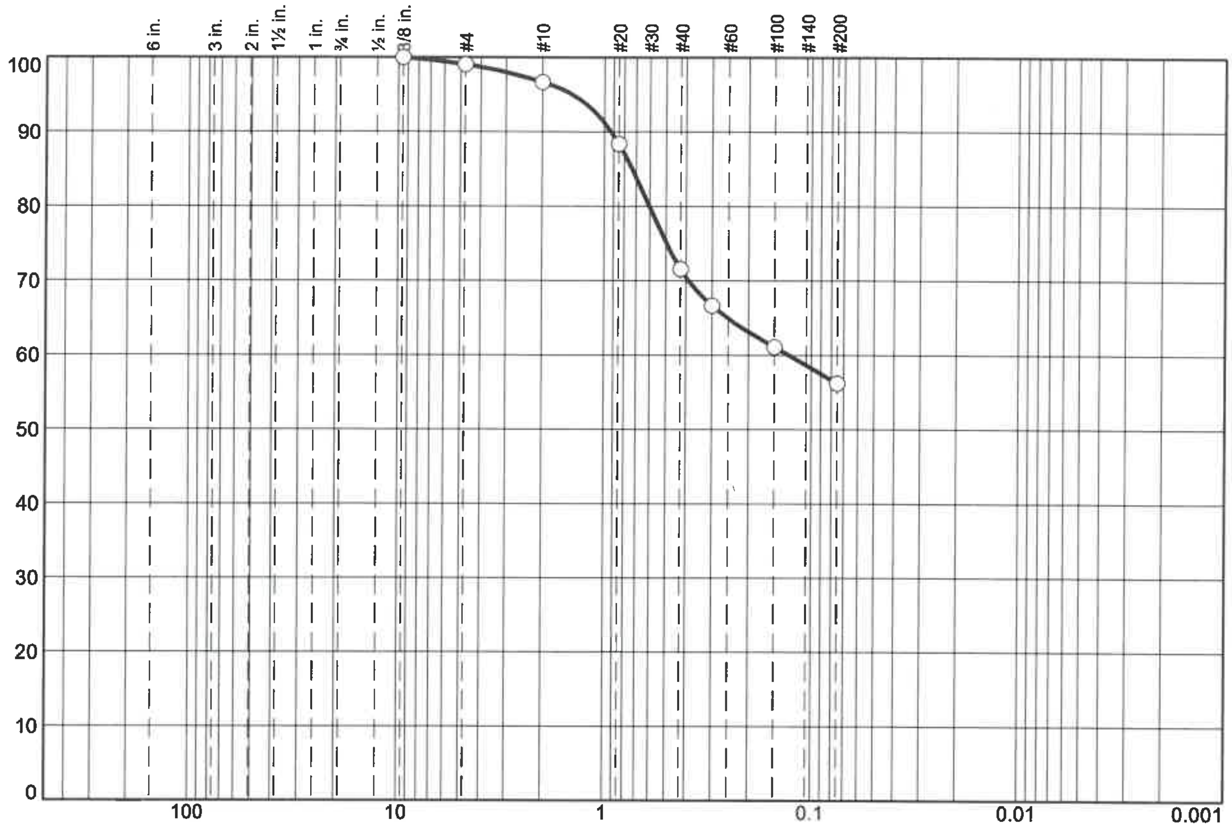
Location: TP-2
Sample Number: S220-0044 **Depth:** @ 2.0'-3.5' **Date:** 2-3-20

ALLWEST TESTING & ENGINEERING, INC.
Spokane, WA

Client: Simpson Engineers, Inc.
Project: Farmer's Strong and Austin Plat
Project No: 219-360G **Reviewed by:** AE

Tested By: D.Schmitz **Checked By:** A.Eliason

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	2	25	16	56	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	99		
#10	97		
#20	88		
#40	72		
#50	67		
#100	61		
#200	56		

* (no specification provided)

Soil Description

Sandy lean clay

Atterberg Limits

PL= 15 LL= 33 PI= 18

Coefficients

D_{90}= 0.9266 D_{85}= 0.7332 D_{60}= 0.1278
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(7)

Remarks

B.Borer sampled 1-9-20

Location: TP-5
Sample Number: S220-0045 **Depth:** @ 1.5'-6.0' **Date:** 2-3-20

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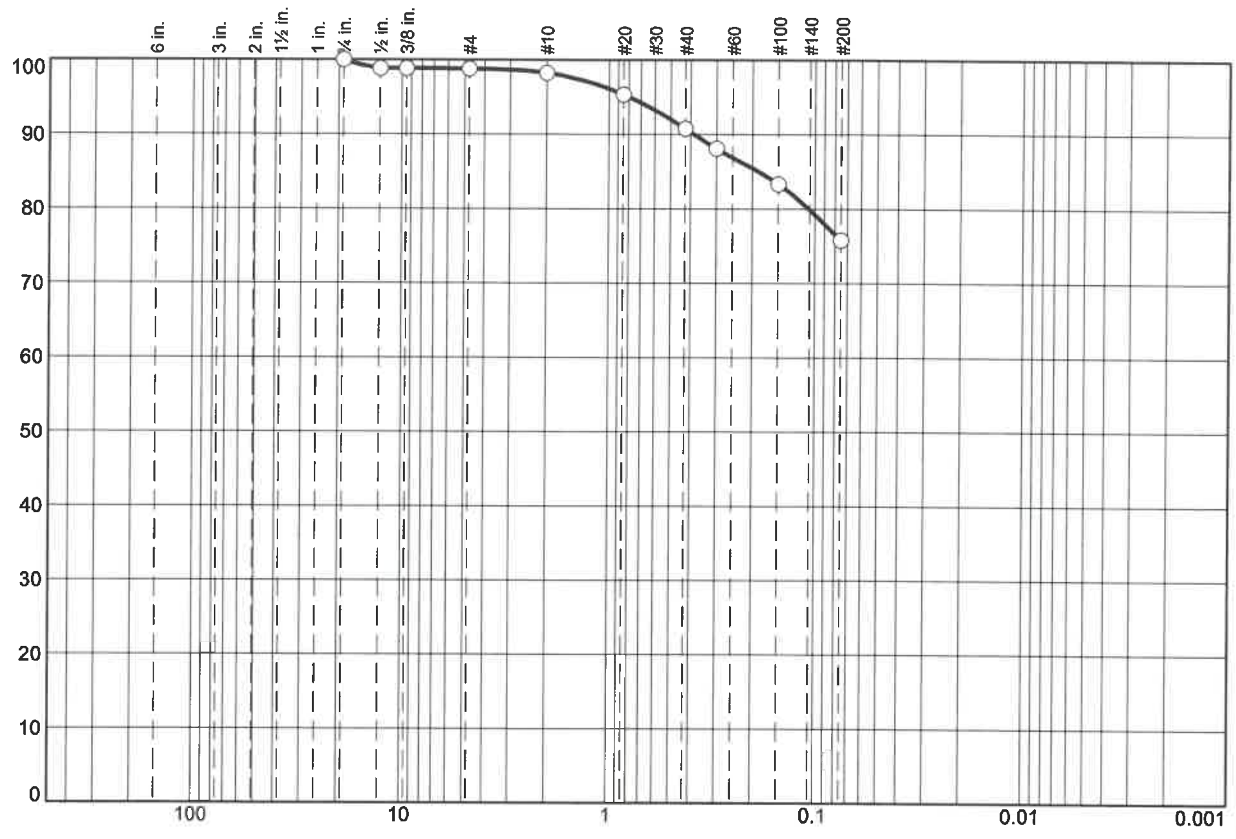
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	1	7	15	76	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
1/2"	99		
3/8"	99		
#4	99		
#10	98		
#20	95		
#40	91		
#50	88		
#100	83		
#200	76		

* (no specification provided)

Soil Description

Silt with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3848 D_{85}= 0.1861 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Organic content: 4.6%
B.Borer sampled 1-9-20

Location: TP-6
Sample Number: S220-0046 **Depth:** @ 0.0'-1.5' **Date:** 2-3-20

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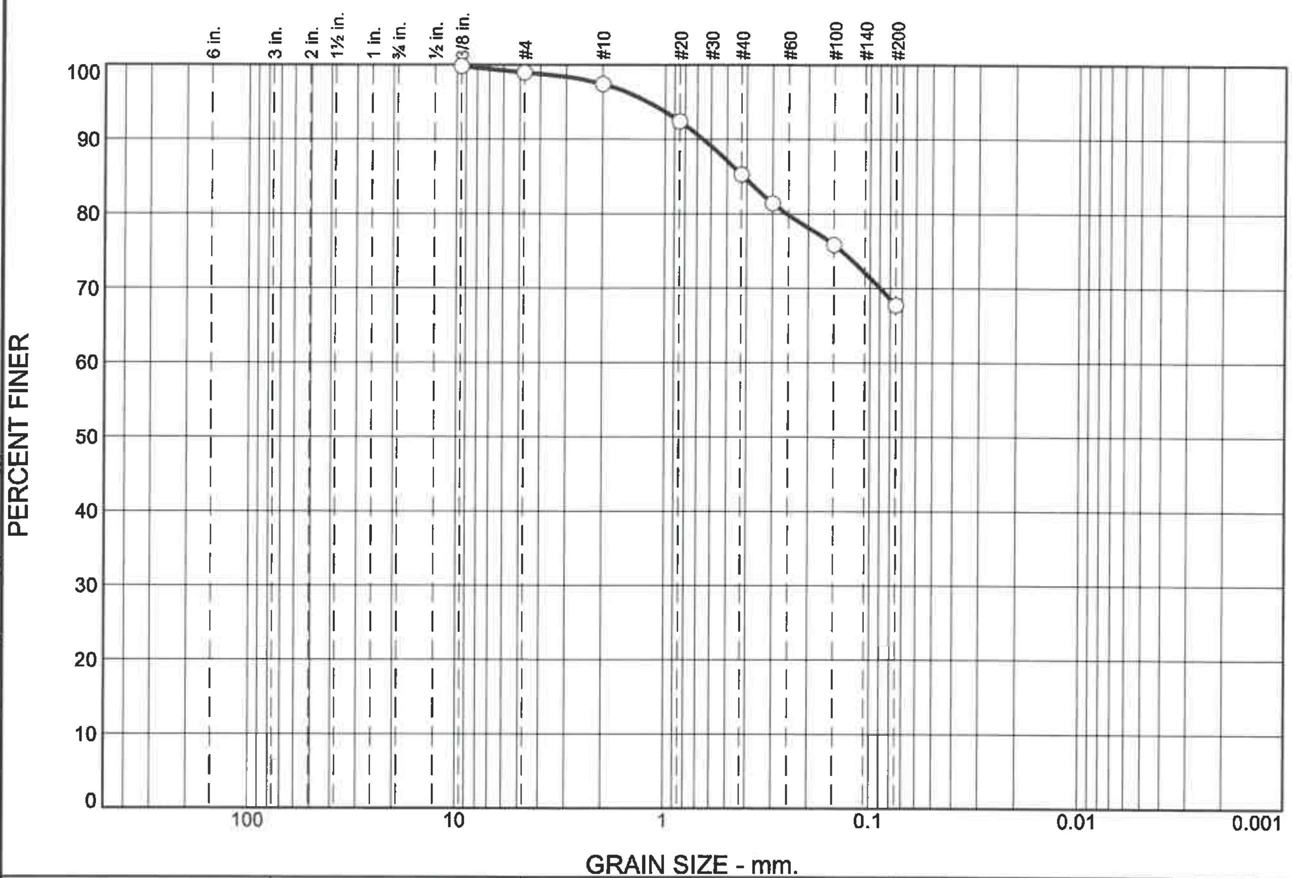
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			2	12	17	68	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	99		
#10	97		
#20	92		
#40	85		
#50	81		
#100	76		
#200	68		

* (no specification provided)

Soil Description

Sandy silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.6560 D_{85}= 0.4155 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

B.Borer sampled 1-9-20

Location: TP-7
Sample Number: S220-0047 **Depth:** @ 1.0'-3.0' **Date:** 2-3-20

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Spokane, WA

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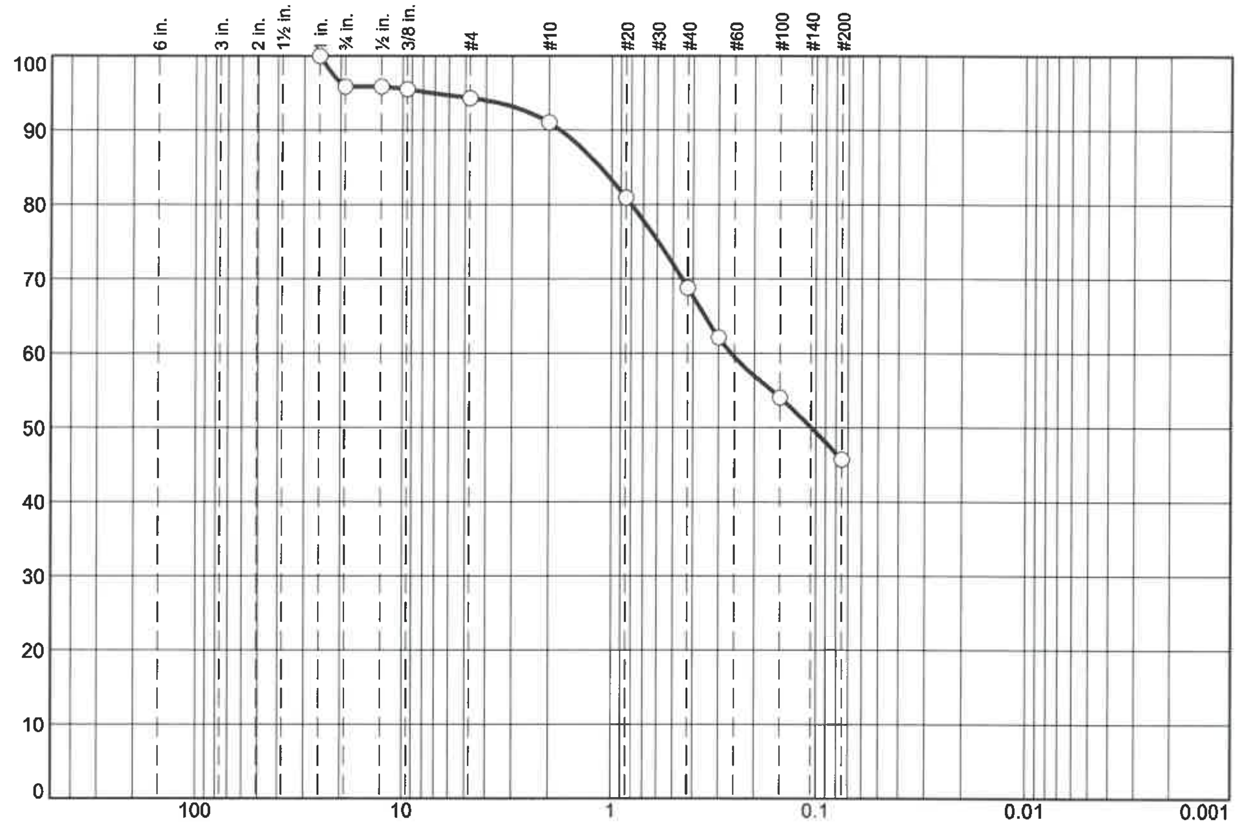
Tested By: D.Schmitz **Checked By:** A.Eliason

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	4	2	3	22	23	46	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	96		
1/2"	96		
3/8"	96		
#4	94		
#10	91		
#20	81		
#40	69		
#50	62		
#100	54		
#200	46		

* (no specification provided)

Soil Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.7629 D_{85}= 1.1293 D_{60}= 0.2604
D_{50}= 0.1053 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

B.Borer sampled 1-9-20

Location: TP-8
Sample Number: S220-0048 **Depth:** @ 2.5'-5.5' **Date:** 2-3-20

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Tested By: D.Schmitz **Checked By:** A.Eliason