Earth
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NW LLC

Geotechnical Engineering
Construction Observation/Testing
Environmental Services

GEOTECHNICAL ENGINEERING STUDY
PROPOSED INDUSTRIAL WAREHOUSE DEVELOPMENT
IDEAL INDUSTRIAL PARK
14805, 14821, 14919 AND 14925 SMOKEY POINT BOULEVARD
MARYSVILLE, WASHINGTON

ES-7602.02

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PREPARED FOR

WATER STATION TECHNOLOGY
C/O MR. RYAN WEAR

September 6, 2022

Adam Z. Shier, L.G.
Project Geologist

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09/06/2022

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are <u>not</u> final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are <u>Not</u> Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will <u>not</u> of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are <u>not</u> building-envelope or mold specialists.***

GEOPROFESSIONAL
BUSINESS
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Earth Solutions NW LLC

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

September 6, 2022
ES-7602.02

Water Station Technology
c/o Mr. Ryan Wear
2732 Grand Avenue, Suite 122
Everett, Washington 98201

Dear Mr. Wear:

Earth Solutions NW, LLC (ESNW) is pleased to present this report titled "Geotechnical Engineering Study, Proposed Industrial Warehouse Development, Ideal Industrial Park, 14805, 14821, 14919, and 14925 Smokey Point Boulevard, Marysville, Washington." Subsurface conditions throughout the proposed development area of the site are comprised primarily of medium dense poorly-graded sand with gravel and poorly graded sand with silt alluvial deposits. The planned development will likely include a series of industrial warehouse structures, utility improvements and asphalt paved parking and drive lanes.

In our opinion, provided the recommendations in this study are incorporated into the final design, the proposed development is feasible from a geotechnical standpoint. The proposed industrial building structures can be supported on conventional foundations bearing on at least two feet of structural fill. Subsurface investigation completed as part of this study identified recessional outwash sands (Marysville Sand) underlying the entirety of the site. We understand development plans will involve raising the site grade by several feet to facilitate underground utility installations and related access road and building lot infrastructure. Structural fill placed to establish finish site grades will also likely provide support for the industrial building foundations.

Although plans are still being developed, site stormwater is expected to be accommodated onsite through infiltration into the underlying native sand deposits. Based on the findings of this geotechnical study and our experience with adjacent projects, the native recessional sands possess relatively consistent infiltration characteristics acceptable for infiltration designs. On this basis, it is our professional opinion that development as proposed is feasible from a geotechnical standpoint.

Geotechnical recommendations for earthwork, foundations, retaining walls, drainage, and other pertinent elements for project design are provided in this report. We appreciate the opportunity to be of service to you on this project. If you have any questions regarding the content of this geotechnical engineering study, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

Adam Z. Shier, L.G.
Project Geologist

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INTRODUCTION

General

This geotechnical engineering study (study) was prepared for the proposed industrial warehouse development to be constructed directly southeast of the intersection between Smokey Point Boulevard and 150th Place Northeast, in Marysville, Washington. The purpose of this study was to provide geotechnical recommendations for the proposed development. Our scope of services for completing this geotechnical engineering study included the following:

- Test pits to characterize soil and groundwater conditions;
- Laboratory testing of soil samples collected at the test pit locations;
- Conducting engineering analyses, and;
- Preparation of this report.

The following documents were reviewed as part of the preparation of this study:

- Maryville Municipal Code, Chapter 22E.010 Article IV: Geologic Hazard Areas.
- Preliminary Site Plan, provided by the client, dated July 8, 2022.
- Web Soil Survey (WSS) online resource, maintained by the Natural Resources Conservation Service under the United States Department of Agriculture.
- McKibben Property Geotechnical Investigation, prepared by Materials Testing & Consulting, Inc., Project No.: 18B107, dated May 16, 2018.
- Geologic Hazards Map, City of Marysville, Washington, May 2014.
- Geologic Map of the Arlington West, 7.5 Minute Quadrangle, Snohomish County, Washington, by James P. Minard, 1985.
- Snohomish County Geologic Hazards Seismic Hazard Areas Map, dated February 1, 2016.
- Liquefaction Susceptibility Map of Snohomish County, Washington, prepared by Palmer, S.P. et al., endorsed by the Washington State Department of Natural Resources, dated September 2004.

Project Description

At the time of this report preparation, final construction plans had not been prepared; however, based on conceptual plans, we understand construction of a series of up to five industrial warehouses structures and related site infrastructure improvements is planned for the subject property. Building footprint areas will vary, but will likely range between roughly 17,000 to 86,000 square feet. Site earthwork will involve structural fill placement across the entirety of the subject property. We anticipate grades will be raised on the order of four feet to establish subgrade elevations for the future building pads and surrounding pavement areas. Subsequent to the fill placement and related mass grading activities, underground utility installations will be completed. Additionally, it is expected that infiltration facilities will be utilized for purposes of accommodating site stormwater.

Building construction will likely consist of either concrete tilt-up or metal framed structures. In any case, foundations will likely be positioned such that building footings will derive support atop the new structural fill used to raise overall site grades. Although final building loads were not available at the time of our report, we anticipate perimeter wall loads will be on the order of 4 to 6 kips per lineal foot and column loading of roughly 80 to 120 kips. Depending on usage, we estimate building slab loading to be on the order of 350 to 500 psf.

If the above design assumptions are incorrect or change, ESNW should be contacted to review the recommendations in this report. ESNW should review the final design to confirm that our geotechnical recommendations have been incorporated into the final design.

SITE CONDITIONS

Surface

The subject property is located directly southeast of the intersection between Smokey Point Boulevard and 150th Place Northeast, in Marysville, Washington. The property consists of six tax parcels (Snohomish County Parcel Nos. 310533-002-015-00, -022-00, -023-00, -024-00, -025-00, and 310533-003-006-00) totaling about 10.15 acres. The approximate location of the subject property is depicted on the Vicinity Map (Plate 1). The property is currently occupied by a series of single-family residences, outbuildings, access drives, and associated improvements. The subject site is bordered to the east and south by undeveloped parcels, to the west by Smokey Point Boulevard, and to the north by 150th Place Northeast. Topography throughout the site is generally flat with little to no topographic relief. Vegetation is comprised primarily of field grass and sparse tree cover primarily around the site margins.

Subsurface

A representative of ESNW observed, logged, and sampled six test pits at accessible locations within the property boundaries, on August 16, 2022 using a machine and operator retained by our firm. The test pits were completed to assess and classify the site soils and to characterize the groundwater conditions within areas proposed for new development. The maximum exploration depth was approximately nine feet below the existing ground surface (bgs).

The approximate locations of the test pits are depicted on Plate 2 (Test Pit Location Plan). Please refer to the test pit logs provided in Appendix A for a more detailed description of subsurface conditions. Representative soil samples collected at our exploration sites were analyzed in general accordance with Unified Soil Classification System (USCS) and USDA methods and procedures.

Topsoil and Fill

Topsoil was encountered at the test pit locations in the upper approximately 6 to 15 inches. The topsoil was generally characterized as a dark brown, organic-rich topsoil with minimal root intrusions.

Fill was encountered in 4 of 10 test pits advanced within the property boundaries, and generally consisted of silty sand and silty gravel soils. Where encountered, the fill was observed extending no deeper than about two feet bgs. It should be noted that existing fill intended for reuse as structural fill should be evaluated for suitability by ESNW at the time of placement and compaction and should generally be free of organic and other deleterious material.

Native Soil

Underlying topsoil and the identified areas of limited fill, the native soils encountered in each of the test pits consisted primarily of silty sand, poorly graded sand with gravel, and poorly graded sand with silt (USCS:SM, SP, and SP-SM). The native soils were generally in a medium dense condition extending to a maximum exploration depth of nine feet bgs.

Geologic Setting

The referenced geologic map resource identifies Marysville Sand Member (Qvrm) deposits throughout the site and the immediate surrounding areas. Marysville Sand Member deposits are a result of meltwater alluvium from the receding Vashon Glacier member. The USDA Web Soil Survey identifies Norma sandy loam (Map Unit: 39) across the site. Norma series soils formed in alluvium and floodplain, and deposits may present a slight erosion hazard and slow runoff.

Based on the conditions observed at the test pit locations, site soil conditions are consistent with alluvial deposits.

Groundwater

The local groundwater table was encountered at varying depths of between about six and eight feet bgs at the majority of the test pit locations during our exploration. Where groundwater was encountered, moderate to heavy caving was observed within the test pits. Based on the conditions observed during our fieldwork. Groundwater seepage rates and elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. In general, groundwater flow rates are higher during the wetter winter, spring, and early summer months.

Groundwater monitoring piezometers were installed at six of the test pit locations to allow for groundwater level monitoring. ESNW will monitor the groundwater levels within the wells through the 2022 / 2023 winter season and will provide an update once the program has been completed.

Geologically Hazardous Areas

As part of this study, the site and proposed development areas were evaluated for the presence of geologic hazard areas. We reviewed Chapter 22E.010 Article IV: Geologic Hazard Areas of the Marysville Municipal Code; geologic hazards were evaluated based on publicly available maps provided by the City of Marysville and our field observations. Based on our evaluation, no geologic hazard areas (landslide, seismic, or liquefaction) were present on the subject site or within 300 feet.

DISCUSSION AND RECOMMENDATIONS

General

Based on the results of our study, construction of the proposed industrial warehouse development is feasible from a geotechnical standpoint. The primary geotechnical considerations associated with the proposed development include structural fill placement and compaction, building foundation subgrade preparation, infiltration facility design and construction, and preparation of the site pavement area subgrade. Building foundations should be supported on a subgrade consisting of at least two feet of well compacted structural fill. Given the proposed grading activities that will include new structural fill placement and overall raising of site grades, it is expected that structural fill suitable for foundation support will be exposed at subgrade elevations throughout the majority of the site. With respect to onsite infiltration, the identified Marysville Sand deposits are generally considered acceptable for infiltration facility designs. Further study, however, will be needed to characterize seasonal high groundwater levels and an acceptable design infiltration rate. Recommendations for infiltration facility design, site preparation, structural fill placement, foundations, and other pertinent geotechnical recommendations are provided in the following sections of this study.

This geotechnical engineering study has been prepared for the exclusive use of Water Station Technology c/o Mr. Ryan Wear and their representatives. The study has been prepared specifically for the subject project. No warranty, expressed or implied, is made. This study has been prepared in a manner consistent with the level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area.

Site Preparation and Earthwork

Initial site preparation activities will consist of installing temporary erosion control measures, establishing grading limits, and site clearing. Subsequent earthwork activities will involve mass grading work, structural fill placement, underground utility installations, and final grading to establish building pad and access roadway subgrade areas.

Temporary Erosion Control

The following temporary erosion and sediment control (TESC) measures should be considered:

- Silt fencing should be placed around the site perimeter, where appropriate.

- Temporary construction entrances and drive lanes should be constructed with at least six inches of quarry spalls to minimize off-site soil tracking and provide a stable access entrance surface. A woven geotextile fabric may be placed underneath the quarry spalls to provide greater stability, if needed.

- When not in use, soil stockpiles should be covered or otherwise protected. Soil stockpiles should never be placed near the top of any slope.

- Temporary measures for controlling surface water runoff, such as interceptor trenches, sumps, or interceptor swales, should be installed prior to beginning earthwork activities.

- Dry soils disturbed during construction should be wetted to minimize dust.

- When appropriate, permanent planting or hydroseeding will help to stabilize site soils.

Additional TESC measures or BMPs, as specified by the project design team and indicated on the plans, should be incorporated into construction activities. TESC measures must be actively maintained and modified during construction as site conditions require and should be coordinated through the site erosion control lead, where applicable.

Stripping

Topsoil was generally encountered, on average, within the upper six to nine inches of existing grades at the test pit locations, with variable areas of about 15 inches of topsoil. It should be noted that only minimal stripping (if any) can be considered for areas of the site receiving four feet or more of new structural fill. Elsewhere, and including major access roadways and utility alignments the organic-rich topsoil should be stripped and segregated into a stockpile for later use on site or to haul off site. The material remaining immediately below the topsoil may have some root zones and will likely be variable in composition, density, and/or moisture content. The material exposed after initial topsoil stripping will likely not be suitable for direct structural support in situ and will likely need to be compacted in place or stripped and stockpiled for reuse as fill; depending on the time of year stripping occurs, the soil exposed below the topsoil may be too wet to compact and may need to be aerated or treated. ESNW should observe initial stripping activities to provide recommendations regarding stripping depths and material suitability.

Grading

Loose or unstable areas of subgrade exposed prior to mass grading and structural fill placement may require overexcavation and/or recompaction prior to fill placement. Structural fill material should consist of a suitable granular soil compacted to structural fill specifications as described in the following sections.

Imported Soil

Development plans propose raising site grades by several feet to establish finish grades for the proposed construction. As such, imported fill is expected to be necessary to accomplish the planned grade modifications. Imported soil intended for use as structural fill should consist of a well-graded, granular soil with a moisture content that is at (or slightly above) the optimum level. During wet weather conditions, imported soil intended for use as structural fill should consist of a well-graded, granular soil with a fines content of 5 percent or less (where the fines content is defined as the percent passing the Number 200 sieve, based on the minus three-quarter-inch fraction). In any case, the planned fill utilized to modify existing grades should be compacted to the specifications described below.

Structural Fill

Structural fill is defined as compacted soil placed in foundation subgrade, slab-on-grade, roadway, permanent slope, retaining wall, and utility trench backfill areas. The following recommendations are provided for soils intended for use as structural fill:

• Moisture content	At or slightly above optimum
• Relative compaction (minimum)	95 percent (Modified Proctor)*
• Loose lift thickness (maximum)	12 inches

* *A minimum relative compaction of 90 percent may be feasible in some fill areas, such as areas of relatively deep fills or non-structural areas. ESNW should be consulted to review the suitability of 90-percent relative compaction on a case-by-case basis.*

The on-site soil may not be suitable for use as structural fill unless a suitable moisture content is achieved at the time of placement and compaction. If the on-site soil cannot achieve the above specifications, use of an imported structural fill material will likely be necessary. With respect to underground utility installations and backfill, local jurisdictions may dictate the compaction requirements and backfill material (particularly in public right-of-ways).

Foundations

Building foundations should be supported on a subgrade consisting of at least two feet of well compacted structural fill. Given the proposed grading activities that will include new structural fill placement and overall raising of site grades, it is expected that structural fill suitable for foundation support will generally be exposed at subgrade elevations throughout the majority of the site. In any case, and provided foundation support consisting of at least two feet of well compacted structural fill, the following may be considered for foundation designs:

• Allowable bearing capacity	2,500 psf
• Coefficient of base friction	0.40
• Passive resistance	300 pcf (equivalent fluid)*

* *Assumes foundations backfilled with structural fill or poured neat against competent soils.*

For short-term wind and seismic loading, a one-third increase in the allowable soil bearing capacity may be assumed. A factor-of-safety of 1.5 has been applied to the friction and passive resistance values.

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

Slab-on-Grade Floors

Slab-on-grade floors for the proposed structures should be supported on a well-compacted, firm, and unyielding subgrade. Unstable or yielding areas of the subgrade should be recompacted or overexcavated and replaced with suitable structural fill prior to slab construction.

A capillary break consisting of at least four inches of free-draining crushed rock or gravel should be placed below the slab. The free-draining material should have a fines content of 5 percent or less (percent passing the Number 200 sieve, based on the minus three-quarter-inch fraction). In areas where slab moisture is undesirable, installation of a vapor barrier below the slab should be considered. If a vapor barrier is to be utilized, it should be a material specifically designed for use as a vapor barrier and should be installed in accordance with the specifications of the manufacturer.

Retaining Walls

Retaining walls must be designed to resist earth pressures and applicable surcharge loads. The following parameters may be used for design:

• Active earth pressure (unrestrained condition)	35 pcf (equivalent fluid)
• At-rest earth pressure (restrained condition)	55 pcf
• Traffic surcharge (passenger vehicles)	70 psf (rectangular distribution)*
• Passive earth pressure	300 pcf (equivalent fluid)
• Coefficient of friction	0.40
• Seismic surcharge	6H psf** (active condition)

* *Where applicable.*
** *Where H equals the retained height (in feet).*

The above design parameters are based on a level backfill condition and level grade at the wall toe. Revised design values will be necessary if sloping grades are to be used above or below retaining walls. Additional surcharge loading from adjacent foundations, sloped backfill, or other relevant loads should be included in the retaining wall design.

Retaining walls should be backfilled with free-draining material that extends along the height of the wall and a distance of at least 18 inches behind the wall. The upper 12 inches of the wall backfill may consist of a less permeable soil, if desired. A perforated drainpipe should be placed along the base of the wall and connected to an approved discharge location. A typical retaining wall drainage detail is provided on Plate 3. If drainage is not provided, hydrostatic pressures should be included in the wall design.

Excavations and Slopes

Excavation activities are likely to expose medium dense native soil. Based on the soil conditions observed at the test pit locations, the following allowable temporary slope inclinations, as a function of horizontal to vertical (H:V) inclination, may be used. The applicable Federal Occupation Safety and Health Administration and Washington Industrial Safety and Health Act soil classifications are also provided:

• Native (recessional outwash) soil deposits	1.5H:1V (Type C)
• Areas containing groundwater seepage	1.5H:1V (Type C)

Permanent slopes should be planted with vegetation to enhance stability and to minimize erosion, and should maintain a gradient of 2H:1V or flatter. The presence of perched groundwater may cause localized sloughing of temporary slopes. An ESNW representative should observe temporary and permanent slopes to confirm the slope inclinations are suitable for the exposed soil conditions and to provide additional excavation and slope recommendations as necessary. If the recommended temporary slope inclinations cannot be achieved, temporary shoring may be necessary to support excavations.

Seismic Design

The 2018 International Building Code (2018 IBC) recognizes the most recent edition of the Minimum Design Loads for Buildings and Other Structures manual (ASCE 7-16) for seismic design, specifically with respect to earthquake loads. Based on the soil conditions encountered at the test pit locations, the parameters and values provided below are recommended for seismic design per the 2018 IBC.

Parameter	**Value**
Site Class	D*
Mapped short period spectral response acceleration, S_S (g)	1.079
Mapped 1-second period spectral response acceleration, S_1 (g)	0.385
Short period site coefficient, F_a	1.068
Long period site coefficient, F_v	1.915†
Adjusted short period spectral response acceleration, S_{MS} (g)	1.153
Adjusted 1-second period spectral response acceleration, S_{M1} (g)	0.737†
Design short period spectral response acceleration, S_{DS} (g)	0.769
Design 1-second period spectral response acceleration, S_{D1} (g)	0.492†

* *Assumes medium dense native soil conditions, encountered to a maximum depth of 9.0 feet bgs during the August 2022 field exploration, remain medium dense to at least 100 feet bgs.*

† *Values assume F_v (Table 11.4-2 in ASCE 7-16) may be determined using linear interpolation for purposes of calculating S_{D1} for use in response spectrum construction and considers use of the exception in Section 11.4.8.*

Further discussion between the project structural engineer, the project owner, and ESNW may be prudent to determine the possible impacts to the structural design due to increased earthquake load requirements under the exceptions stated in Section 11.4.8 of ASCE 7-16. ESNW can provide additional consulting services to aid with design efforts, including supplementary geotechnical and geophysical investigation, upon request.

Liquefaction is a phenomenon where saturated or loose soil suddenly loses internal strength and behaves as a fluid. This behavior is in response to increased pore water pressures resulting from an earthquake or another intense ground shaking. In our opinion, site susceptibility to liquefaction may be considered low. The depth of the regional groundwater table and the relatively medium dense characteristics of the native soil were the primary bases for this opinion.

Drainage

In general, groundwater levels are generally higher during the wetter, winter months. With respect to the anticipated development activities, groundwater should be expected in underground utility and deeper site excavations. It should be noted that groundwater elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. With respect to underground utilities, temporary dewatering of trench excavations should be expected for the deeper installations. Perimeter foundation drains should be installed around the outside of the proposed building structures. Plate 3 depicts a typical drainage pipe detail for sections of the building where foundation walls will be constructed. Plate 4 depicts a typical drainage detail for a conventional shallow footing condition. Final grades should slope away from the building perimeters such that ponding does not develop adjacent to the building.

Infiltration Evaluation (Preliminary)

At this time, design of the site stormwater facilities has not been completed. In our opinion infiltration trench galleries, infiltration swales and ponds can be considered. Final design of the stormwater facilities will need to demonstrate adequate separation between the infiltration surface and the seasonal high groundwater table. At this time, groundwater levels and fluctuations are continuing to be monitored. Our infiltration evaluation was completed in general accordance with the 2019 Surface Water Management Manual for Western Washington (SWMMWW), as adopted by the city of Marysville. As indicated in the *Subsurface* section of this study, native soils encountered during our fieldwork were characterized primarily as alluvial deposits. The results of USDA textural analyses performed on representative soil samples indicate native soils at depth consist primarily of slightly gravelly sand, gravelly sand, and sand with fines contents ranging from 0.9 to 14.6 percent. On this basis, the following can be considered for preliminary designs:

- Infiltration facilities are to maintain the required separation (per the drainage manual) between the seasonal high groundwater level and bottom of facility. Seasonal groundwater level monitoring is currently ongoing.

- Assuming facility interface with the Marysville Sands underlying the site, preliminary design may assume an allowable infiltration rate of 1.5 in./hr.

- Final infiltration rate determination must be derived from in situ testing. Such testing is best accomplished once facility designs (and elevations) have been determined.

ESNW should review final infiltration design plans and provide supplement recommendations for design, as necessary. The preliminary infiltration recommendations provided in this section should be confirmed during the appropriate phase of design and/or construction through in-situ testing and direct observation of the exposed soil conditions at the time of facility installation.

Utility Trench Backfill

In general, the sand deposits identified throughout the site are considered suitable for support of utilities. However, due to the cohesionless nature of the native soils, caving of excavations along trench alignments should be expected. On this basis, some remediation of the trench bottom may be needed where loose or disturbed conditions are exposed. Additionally, due to the relatively shallow groundwater table elevation, dewatering of trench excavations should be expected. In general, the on-site soils observed at the test sites should generally be suitable for reuse as structural backfill. Moisture conditioning of the soils may be necessary at some locations prior to use as structural fill. Utility trench backfill should be placed and compacted to the specifications of structural fill provided in this report, or to the applicable specifications of the city or county jurisdictions, as appropriate.

Pavement Sections

The performance of site pavements is largely related to the condition of the underlying subgrade. To ensure adequate pavement performance, the subgrade should be in a firm and unyielding condition when subjected to proofrolling with a loaded dump truck. Structural fill in pavement areas should be compacted to the specifications detailed in the *Site Preparation and Earthwork* section of this report. In addition, the upper one foot of pavement subgrade should be compacted to a relative compaction of at least 95 percent. It is possible that soft, wet, or otherwise unsuitable subgrade areas may still exist after base grading activities. Areas containing unsuitable or yielding subgrade conditions may require remedial measures, such as overexcavation and thicker crushed rock or structural fill sections, prior to pavement.

For relatively lightly loaded pavements subjected to automobiles and occasional truck traffic, the following sections may be considered:

- Two inches of asphalt concrete (AC) placed over four inches of crushed rock base (CRB), or;

- Two inches of AC placed over three inches of asphalt-treated base (ATB).

Heavier traffic areas (such as access drives) generally require thicker pavement sections depending on site usage, pavement life expectancy, and site traffic. For preliminary design purposes, the following pavement sections for heavy traffic areas may be considered:

- Three inches of AC placed over six inches of CRB, or;

- Three inches of AC placed over four and one-half inches of ATB.

The AC, ATB, and CRB materials should conform to WSDOT specifications. ESNW can provide pavement section design recommendations for truck traffic areas and right-of-way improvements, upon request. Additionally, City of Marysville Road standards may supersede the recommendations provided in this report.

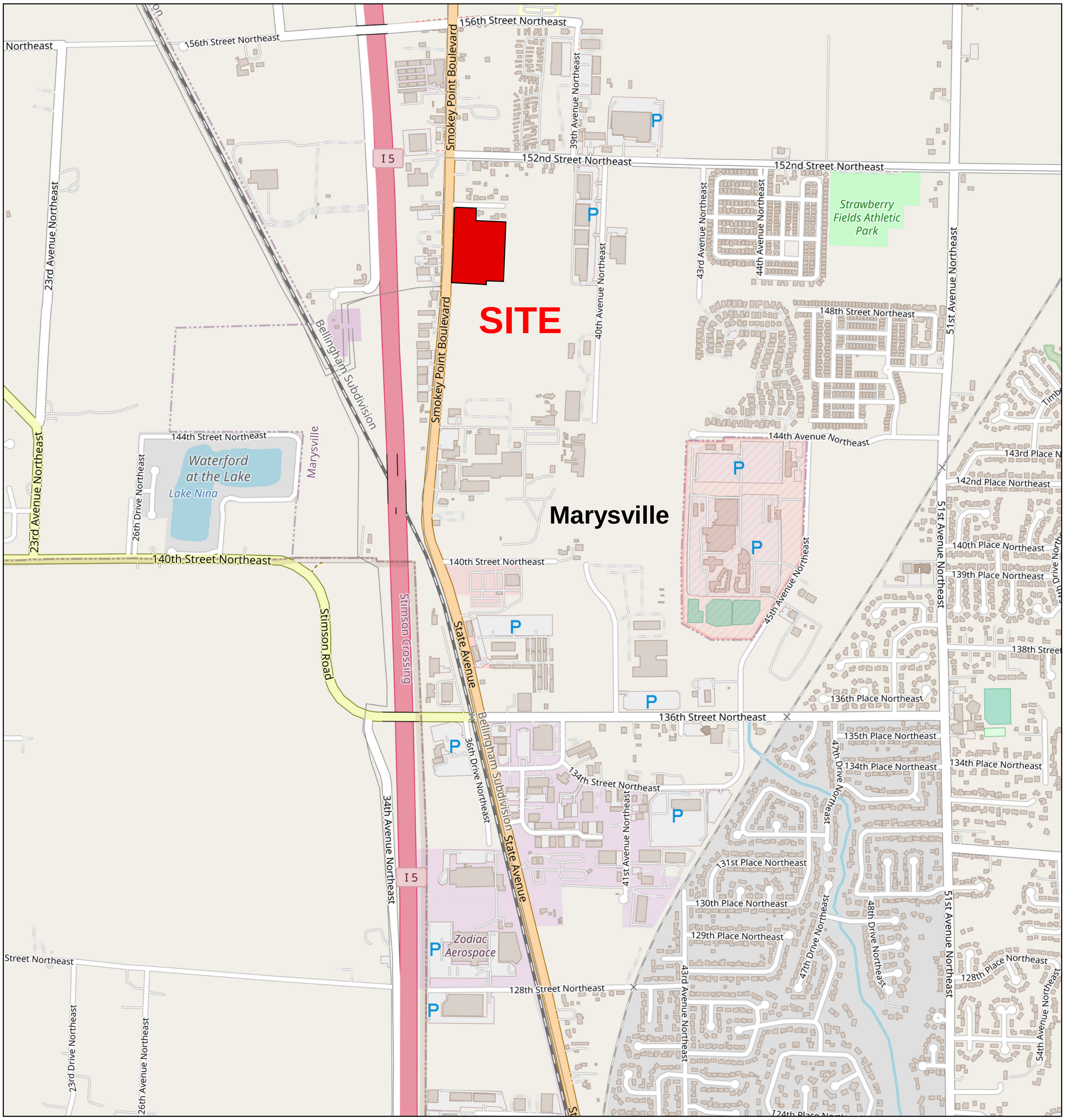
Rigid pavement/apron areas may consist of five inches of fiber-reinforced concrete supported on at least six inches of crushed rock base.

LIMITATIONS

The recommendations and conclusions provided in this geotechnical engineering study are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. A warranty is not expressed or implied. Variations in the soil and groundwater conditions observed at the test pit locations may exist and may not become evident until construction. ESNW should reevaluate the conclusions in this geotechnical engineering study if variations are encountered.

Additional Services

ESNW should have an opportunity to review the final design with respect to the geotechnical recommendations provided in this report. ESNW should also be retained to provide testing and consultation services during construction.



Reference:
Snohomish County, Washington
OpenStreetMap.org

NORTH

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

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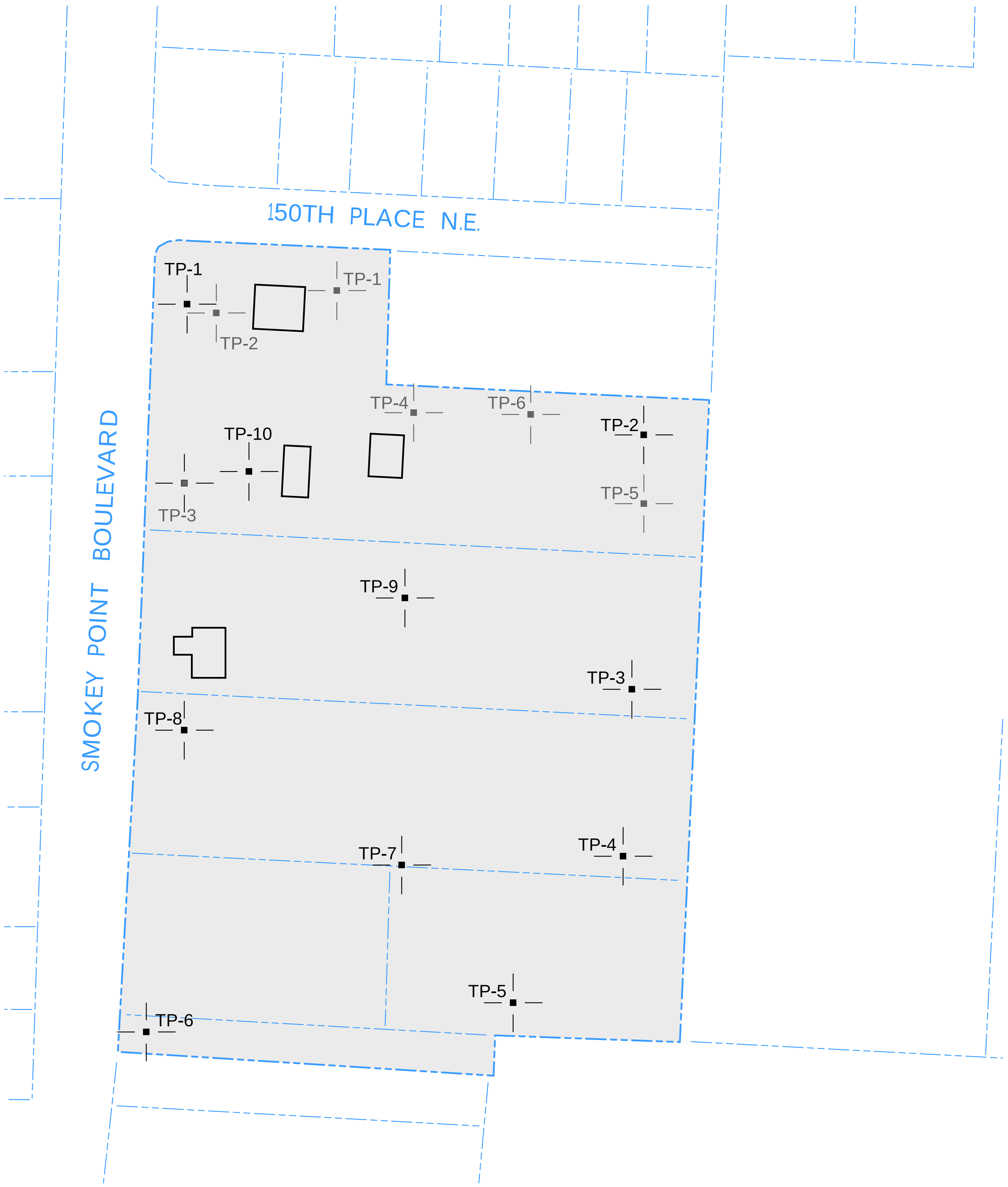
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
Ideal Industrial Park
Marysville, Washington

Drwn. MRS	Date 09/02/2022	Proj. No. 7602.02
Checked AZS	Date Sept. 2022	Plate 1



LEGEND

TP-1 ✛	Approximate Location of ESNW Test Pit, Proj. No. ES-7602.02, Aug. 2022
TP-1 ✛	Approximate Location of Materials Testing & Consulting Test Pit, Proj. No. 18B107, April, 2018
▨	Subject Site
☐	Existing Building

NORTH

NOT - TO - SCALE

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Test Pit Location Plan
Ideal Industrial Park
Marysville, Washington

Earth Solutions NWLLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

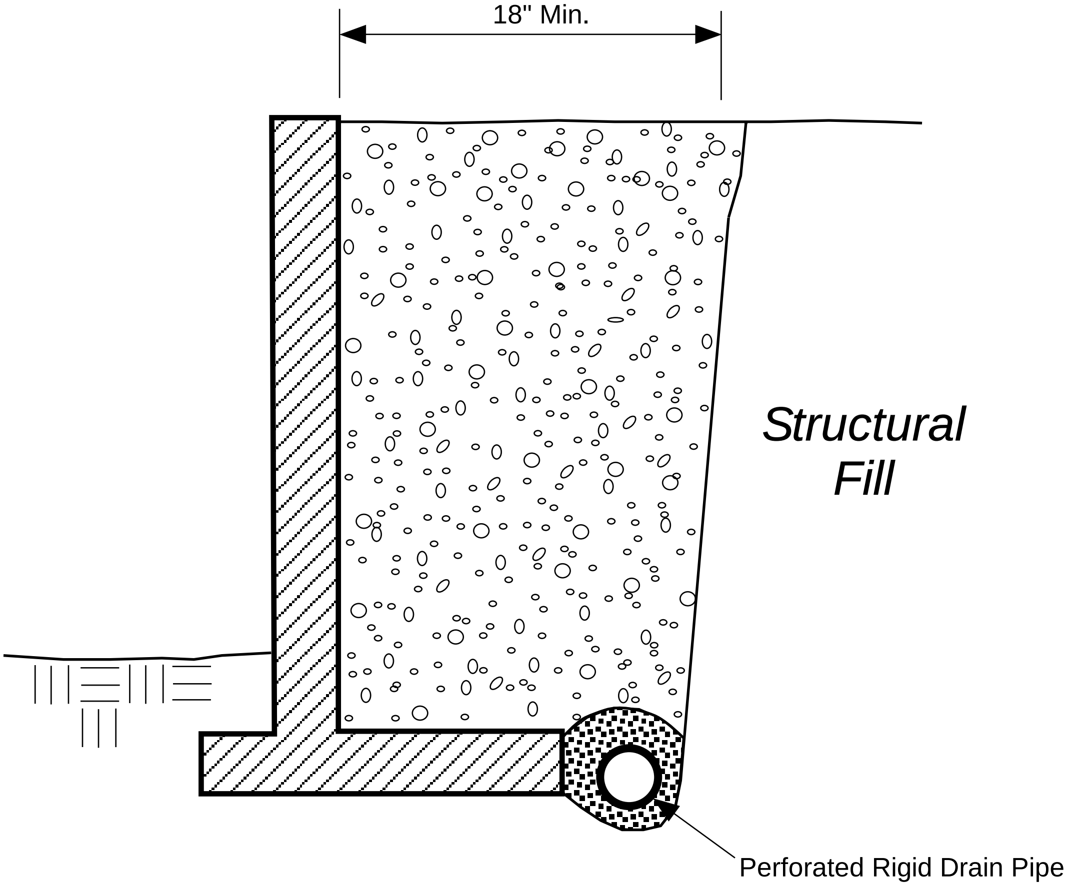
Drwn. By
MRS

Checked By
AZS

Date
09/02/2022

Proj. No.
7602.02

Plate
2



NOTES:

- Free-draining Backfill should consist of soil having less than 5 percent fines. Percent passing No. 4 sieve should be 25 to 75 percent.
- Sheet Drain may be feasible in lieu of Free-draining Backfill, per ESNW recommendations.
- Drain Pipe should consist of perforated, rigid PVC Pipe surrounded with 1-inch Drain Rock.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

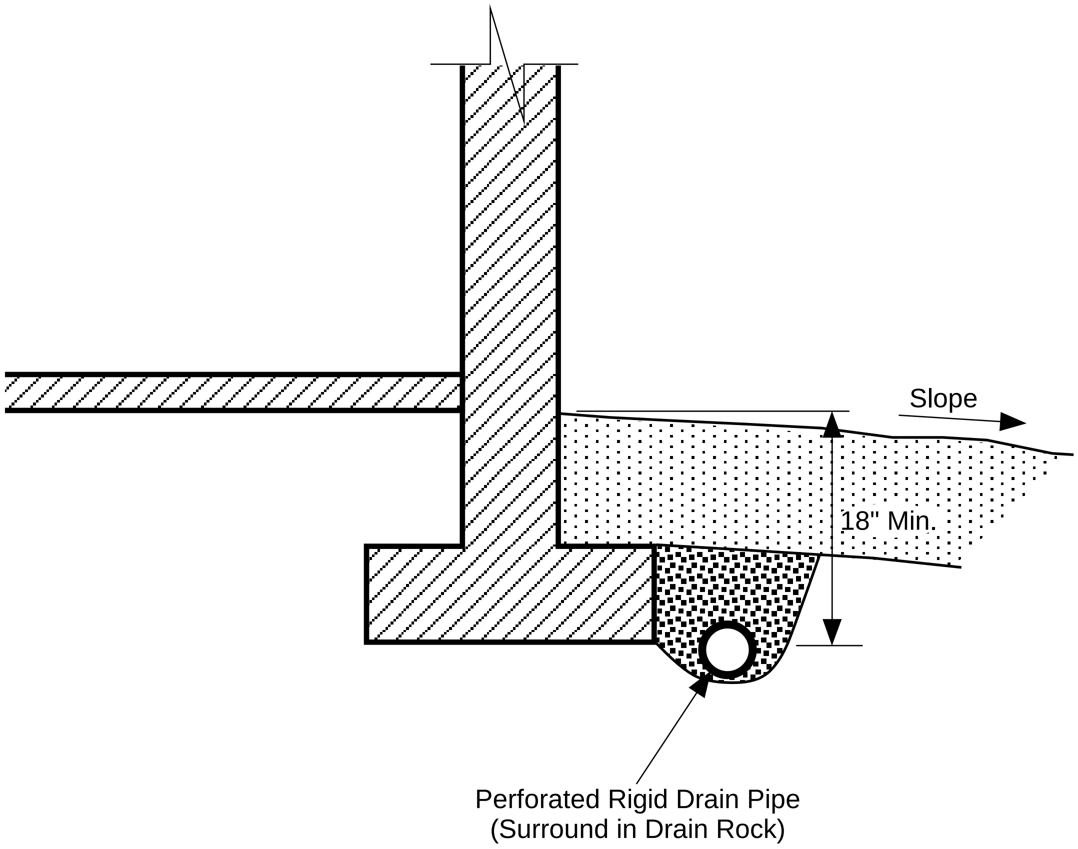
LEGEND:

○	Free-draining Structural Backfill
▩	1-inch Drain Rock

Earth Solutions NW LLC
Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Retaining Wall Drainage Detail
Ideal Industrial Park
Marysville, Washington

Drwn. MRS	Date 09/02/2022	Proj. No. 7602.02
Checked AZS	Date Sept. 2022	Plate 3



NOTES:

- Do NOT tie roof downspouts to Footing Drain.
- Surface Seal to consist of 12" of less permeable, suitable soil. Slope away from building.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

░	Surface Seal: native soil or other low-permeability material.
▓	1-inch Drain Rock

Earth Solutions NWLLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Footing Drain Detail
Ideal Industrial Park
Marysville, Washington

Drwn. MRS	Date 09/02/2022	Proj. No. 7602.02
Checked AZS	Date Sept. 2022	Plate 4

Appendix A

Subsurface Exploration
Test Pit Logs

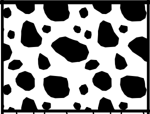
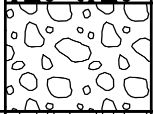
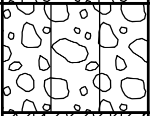
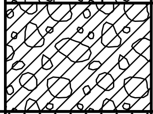
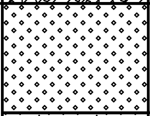
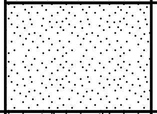
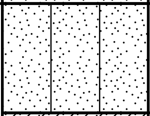
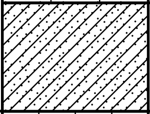
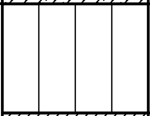
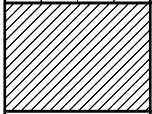
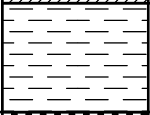
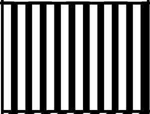
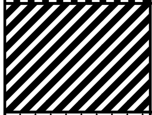
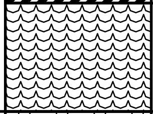
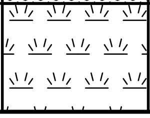
ES-7602.02

Subsurface conditions at the subject site were explored on August 16, 2022 by excavating 10 test pits using a trackhoe and operator retained by ESNW. The approximate locations of the test pits are illustrated on Plate 2 of this study. The test pit logs are provided in this Appendix. The maximum exploration depth was approximately nine feet bgs.

The final logs represent the interpretations of the field logs and the results of laboratory analyses. The stratification lines on the logs represent the approximate boundaries between soil types. In actuality, the transitions may be more gradual.

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

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

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW, LLC
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Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-1

PAGE 1 OF 1

PROJECT NUMBER ES-7602.02

PROJECT NAME Ideal Industrial Park

DATE STARTED 8/16/22 **COMPLETED** 8/16/22

GROUND ELEVATION

EXCAVATION CONTRACTOR NW Excavating

LATITUDE 48.1326 **LONGITUDE** -122.18292

LOGGED BY AZS **CHECKED BY** RAC

GROUND WATER LEVEL:

NOTES

∇ **AT TIME OF EXCAVATION** 6.5 ft

SURFACE CONDITIONS Field Grass

AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			TPSL		Dark brown TOPSOIL (Fill)
			SM	0.7	Gray silty SAND, medium dense to dense, moist (Fill)
			SP-SM	2.0	Brown poorly graded SAND with silt, medium dense, moist to wet [USDA Classification: slightly gravelly SAND]
2.5		MC = 14.6% Fines = 8.4%			
		MC = 17.1%			-moderate caving from 4.5' to BOH
5.0					
					-becomes gray
					∇
7.5					
		MC = 11.6%		8.0	-groundwater table

Test pit terminated at 8.0 feet below existing grade. Groundwater table encountered at 7.5 feet during excavation. Caving observed from 4.5 feet to BOH.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

GENERAL BH / TP / WELL - 7602-2.GPJ - GRAPHICS TEMPLATE WITH LAT AND LONG.GDT - 9/6/22

Earth Solutions NW, LLC
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Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-2

PAGE 1 OF 1

PROJECT NUMBER ES-7602.02

PROJECT NAME Ideal Industrial Park

DATE STARTED 8/16/22 **COMPLETED** 8/16/22

GROUND ELEVATION

EXCAVATION CONTRACTOR NW Excavating

LATITUDE 48.13221 **LONGITUDE** -122.8095

LOGGED BY AZS **CHECKED BY** RAC

GROUND WATER LEVEL:

NOTES

▽ **AT TIME OF EXCAVATION** 6.5 ft

SURFACE CONDITIONS Field Grass

AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			TPSL	0.6	Dark brown TOPSOIL (Fill)
			SM	1.0	Gray silty SAND, medium dense, moist (Fill) -iron oxide staining
			SP		Brown poorly graded SAND with gravel, medium dense, moist to wet
		MC = 15.4%			
2.5					-becomes gray
		MC = 14.7%			-moderate caving 4.5' to BOH
5.0					
					▽ -groundwater table
7.5					[USDA Classification: gravelly SAND]
		MC = 17.8% Fines = 0.9%		8.0	

Test pit terminated at 8.0 feet below existing grade. Groundwater table encountered at 6.5 feet during excavation. Caving observed from 4.5 feet to BOH.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-3

PAGE 1 OF 1

PROJECT NUMBER ES-7602.02
PROJECT NAME Ideal Industrial Park
DATE STARTED 8/16/22 **COMPLETED** 8/16/22
GROUND ELEVATION
EXCAVATION CONTRACTOR NW Excavating
LATITUDE 48.13154 **LONGITUDE** -122.1811
LOGGED BY AZS **CHECKED BY** RAC
GROUND WATER LEVEL:
NOTES
▽ **AT TIME OF EXCAVATION** 6.5 ft
SURFACE CONDITIONS Field Grass
AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
0.0			TPSL		0.8	Dark brown TOPSOIL
2.5		MC = 17.5%	SM		4.0	Tan/brown silty SAND, medium dense, moist
5.0		MC = 19.5%	SP			Gray poorly graded SAND with gravel, medium dense, moist to wet -moderate caving to BOH
7.5					▽	-groundwater table, saturated
		MC = 27.6%			9.0	

Test pit terminated at 9.0 feet below existing grade. Groundwater table encountered at 6.5 feet during excavation. Caving observed from 5.0 feet to BOH.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-4

PAGE 1 OF 1

PROJECT NUMBER ES-7602.02

PROJECT NAME Ideal Industrial Park

DATE STARTED 8/16/22 **COMPLETED** 8/16/22

GROUND ELEVATION

EXCAVATION CONTRACTOR NW Excavating

LATITUDE 48.13096 **LONGITUDE** -122.18123

LOGGED BY AZS **CHECKED BY** RAC

GROUND WATER LEVEL:

NOTES

∇ **AT TIME OF EXCAVATION** 6 ft

SURFACE CONDITIONS Field Grass

AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			TPSL	0.5	Dark brown TOPSOIL
			SM	2.0	Brown silty SAND, medium dense, moist -iron oxide staining
2.5		MC = 19.2%	SP-SM		Gray poorly graded SAND with silt, medium dense, moist to wet -moderate caving to BOH
5.0					
				∇	-groundwater table [USDA Classification: slightly gravelly SAND]
		MC = 21.1% Fines = 5.5%		7.0	

Test pit terminated at 7.0 feet below existing grade. Groundwater table encountered at 6.0 feet during excavation. Caving observed from 3.0 feet to BOH.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-5

PAGE 1 OF 1

PROJECT NUMBER ES-7602.02

PROJECT NAME Ideal Industrial Park

DATE STARTED 8/16/22 **COMPLETED** 8/16/22

GROUND ELEVATION

EXCAVATION CONTRACTOR NW Excavating

LATITUDE 48.13058 **LONGITUDE** -122.18146

LOGGED BY AZS **CHECKED BY** RAC

GROUND WATER LEVEL:

NOTES

▽ **AT TIME OF EXCAVATION** 7 ft

SURFACE CONDITIONS Field Grass

AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			TPSL	1.0	Dark brown TOPSOIL
			SP		Brown poorly graded SAND with gravel, medium dense, moist to wet
		MC = 8.4%			
2.5					-becomes gray
					-moderate caving to BOH
5.0		MC = 14.6%			
7.5					▽ -groundwater table
		MC = 23.6%		8.0	

Test pit terminated at 8.0 feet below existing grade. Groundwater table encountered at 7.0 feet during excavation. Caving observed from 4.0 feet to BOH.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

TEST PIT NUMBER TP-6

PAGE 1 OF 1

PROJECT NUMBER ES-7602.02

PROJECT NAME Ideal Industrial Park

DATE STARTED 8/16/22 **COMPLETED** 8/16/22

GROUND ELEVATION

EXCAVATION CONTRACTOR NW Excavating

LATITUDE 48.13048 **LONGITUDE** -122.18295

LOGGED BY AZS **CHECKED BY** RAC

GROUND WATER LEVEL:

NOTES

∇ **AT TIME OF EXCAVATION** 7 ft

SURFACE CONDITIONS Field Grass

AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			TPSL	0.5	Dark brown TOPSOIL, roots
			SM	2.0	Tan silty SAND, loose to medium dense, moist
2.5		MC = 4.9% Fines = 2.0%	SP		Brown poorly graded SAND with gravel, medium dense, moist to wet [USDA Classification: gravelly SAND]
		MC = 15.3%			-becomes gray
5.0					
7.5					∇ -groundwater table
		MC = 15.2%		8.5	

Test pit terminated at 8.0 feet below existing grade. Groundwater table encountered at 7.0 feet below existing grade. Caving observed from 5.0 feet to BOH.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-7

PAGE 1 OF 1

PROJECT NUMBER ES-7602.02

PROJECT NAME Ideal Industrial Park

DATE STARTED 8/16/22 **COMPLETED** 8/16/22

GROUND ELEVATION

EXCAVATION CONTRACTOR NW Excavating

LATITUDE 48.13102 **LONGITUDE** -122.18202

LOGGED BY AZS **CHECKED BY** RAC

GROUND WATER LEVEL:

NOTES

▽ **AT TIME OF EXCAVATION** 6 ft

SURFACE CONDITIONS Ground Cover

AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			SM		Brown silty SAND, medium dense, moist
				1.5	Brown poorly graded SAND with gravel, medium dense, moist to wet
		MC = 8.8%			
2.5					
					-becomes gray
			SP		
5.0					
		MC = 16.3%			▽ -groundwater table
				6.5	

Test pit terminated at 6.5 feet below existing grade. Groundwater table encountered at 6.0 feet during excavation. No caving observed.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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15365 N.E. 90th Street, Suite 100
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TEST PIT NUMBER TP-8

PAGE 1 OF 1

PROJECT NUMBER ES-7602.02

PROJECT NAME Ideal Industrial Park

DATE STARTED 8/16/22 **COMPLETED** 8/16/22

GROUND ELEVATION

EXCAVATION CONTRACTOR NW Excavating

LATITUDE 48.13136 **LONGITUDE** -122.18287

LOGGED BY AZS **CHECKED BY** RAC

GROUND WATER LEVEL:

NOTES

▽ **AT TIME OF EXCAVATION** 8 ft

SURFACE CONDITIONS Gravel

AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			GM	1.5	Gray silty GRAVEL, dense, moist (Fill)
			TPSL	2.5	Dark brown TOPSOIL
2.5		MC = 12.6%	SP		Tan poorly graded SAND with gravel, medium dense, moist to wet
					-becomes gray
5.0		MC = 17.3%			
					-moderate caving to BOH
7.5					
		MC = 11.4%		8.5	▽ -groundwater table

Test pit terminated at 8.5 feet below existing grade. Groundwater table encountered at 8.0 feet during excavation. Caving observed from 5.5 feet to BOH.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-9

PAGE 1 OF 1

PROJECT NUMBER ES-7602.02

PROJECT NAME Ideal Industrial Park

DATE STARTED 8/16/22 **COMPLETED** 8/16/22

GROUND ELEVATION

EXCAVATION CONTRACTOR NW Excavating

LATITUDE 48.13171 **LONGITUDE** -122.18196

LOGGED BY AZS **CHECKED BY** RAC

GROUND WATER LEVEL:

NOTES

▽ **AT TIME OF EXCAVATION** 6.5 ft

SURFACE CONDITIONS Field Grass

AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			TPSL	1.5	Dark brown TOPSOIL
			SM	2.0	Tan silty SAND, medium dense, moist
2.5		MC = 8.8%	SP	5.0	Brown poorly graded SAND with gravel, medium dense, moist -becomes gray
5.0		MC = 24.8% Fines = 14.6%	SM	7.5	Gray silty SAND, medium dense, moist -moderate caving to BOH [USDA Classification: SAND] ▽ -groundwater table
7.5		MC = 19.1%			

Test pit terminated at 7.5 feet below existing grade. Groundwater table encountered at 6.5 feet during excavation. Caving observed from 5.0 feet to BOH.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-10

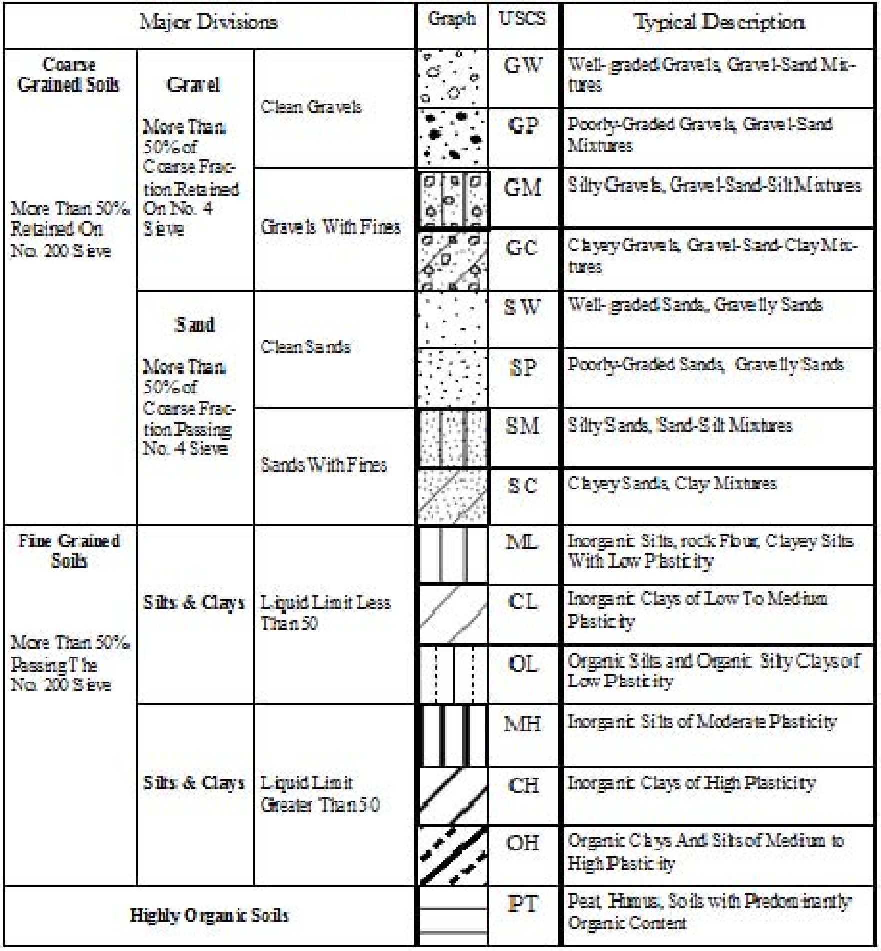
PROJECT NUMBER ES-7602.02
PROJECT NAME Ideal Industrial Park
DATE STARTED 8/16/22 **COMPLETED** 8/16/22
GROUND ELEVATION
EXCAVATION CONTRACTOR NW Excavating
LATITUDE 48.13212 **LONGITUDE** -122.18263
LOGGED BY AZS **CHECKED BY** RAC
GROUND WATER LEVEL:
NOTES
▽ **AT TIME OF EXCAVATION** 7 ft
SURFACE CONDITIONS Field Grass
AFTER EXCAVATION

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
0.0			TPSL	▨	0.6	Dark brown TOPSOIL (Fill)
			SM	▨	1.5	Gray silty SAND, medium dense, moist (Fill)
			SP	░		Brown poorly graded SAND, medium dense, moist to wet
2.5		MC = 7.7%		░		
5.0		MC = 16.9%		░		-becomes gray
7.5				░	▽	-groundwater table
		MC = 12.3%		░	8.0	

Test pit terminated at 8.0 feet below existing grade. Groundwater table encountered at 7.0 feet during excavation. Caving observed from 4.5 feet to BOH.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

Unified Soil Classification System Chart



Major Divisions			Graph	USCS	Typical Description
Coarse Grained Soils More Than 50% Retained On No. 200 Sieve	**Gravel** More Than 50% of Coarse Fraction Retained On No. 4 Sieve	Clean Gravels		GW	Well-graded Gravels, Gravel-Sand Mixtures
				GP	Poorly-Graded Gravels, Gravel-Sand Mixtures
		Gravels With Fines		GM	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sand More Than 50% of Coarse Fraction Passing No. 4 Sieve	Clean Sands		SW	Well-graded Sands, Gravelly Sands
				SP	Poorly-Graded Sands, Gravelly Sands
		Sands With Fines		SM	Silty Sands, Sand-Silt Mixtures
				SC	Clayey Sands, Clay Mixtures
Fine Grained Soils More Than 50% Passing The No. 200 Sieve	Silts & Clays	Liquid Limit Less Than 50		ML	Inorganic Silts, rock Flour, Clayey Silts With Low Plasticity
				CL	Inorganic Clays of Low To Medium Plasticity
				OL	Organic Silts and Organic Silty Clays of Low Plasticity
	Silts & Clays	Liquid Limit Greater Than 50		MH	Inorganic Silts of Moderate Plasticity
				CH	Inorganic Clays of High Plasticity
				OH	Organic Clays And Silts of Medium to High Plasticity
Highly Organic Soils				PT	Peat, Humus, Soils with Predominantly Organic Content

Sampler Symbol Description

- ◪ Standard Penetration Test (SPT)
- ▥ Shelby Tube
- ☒ Grab or Bulk
- ☰ California (3.0" O.D.)
- ■ Modified California (2.5" O.D.)

Stratigraphic Contact

- — Distinct Stratigraphic Contact Between Soil Strata
- ╲ Gradual Change Between Soil Strata
- - - - Approximate location of stratigraphic change

- ▼ Groundwater observed at time of exploration
- ▽ Measured groundwater level in exploration, well, or piezometer
- ◆ Perched water observed at time of exploration

Modifiers

Description	%
Trace	>5
Some	5-12
With	>12

Soil Consistency

Granular Soils		Fine-grained Soils	
Density	*SPT Blowcount*	*Consistency*	*SPT Blowcount*
Very Loose	0-4	Very Soft	0-2
Loose	4-10	Soft	2-4
Medium Dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very Dense	> 50	Very Stiff	15-30
		Hard	> 30

Grain Size

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		> 12"	> 12"	Larger than a basketball
Cobbles		3 - 12"	3 - 12"	Fist to basketball
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb to fist
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea to thumb
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock salt to pea
	Medium	#40 - #10	0.017 - 0.079"	Sugar to rock salt
	Fine	#200 - #40	0.0029 - 0.017"	Flour to Sugar
Fines		Passing #200	< 0.0029"	Flour and smaller

Materials Testing & Consulting, Inc.
777 Chrysler Drive
Burlington, WA 98233

Exploration Log Key
McKibben Property
3500 Block, 150th Place NE
Marysville, WA

FIGURE
3

Materials Testing and Consulting
Burlington, WA
Geotechnical and Environmental Engineering

Log of Test Pit TP-1

McKibben Property Geotechnical Investigation
3500 Block, 150th Place NE
Marysville, Washington

MTC #: 18B107

Date Started : 4/6/2018
Date Completed : 4/6/2018
Sampling Method : Grab Samples
Location : North-central Property; See Map
Logged By : KQ/MF

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML-OL		SANDY SILT, soft, damp, organic rich (roots, grass), trace charcoal. Dark BROWN **TOPSOIL** 2" thick layer of gray silty sand with charcoal at base of horizon.				
	SP		SAND, poorly graded, trace silt and gravel, dense, damp becoming wet with depth, highly oxidized and heavily mottled, transitions to unweathered at base. REDDISH-BROWN **WEATHERED OUTWASH SAND** **CEC=7.9meq/100g; OC=6.2%**		☒		
2 4	SP		SAND, poorly graded, trace silt and gravel, medium-dense to dense, wet to saturated, medium- to coarse-grained sand. Medium GRAY **OUTWASH SAND**	▼	☒ ☒		
6 8 10			T.D. 6.0' BPG Terminated at planned depth. Groundwater stable @ 2.4' BPG within 2 hours of open test pit. Caving @ 4.0" BPG.				

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Log of Test Pit TP-2

McKibben Property Geotechnical Investigation
3500 Block, 150th Place NE
Marysville, Washington

MTC #: 18B107

Date Started : 4/6/2018
Date Completed : 4/6/2018
Sampling Method : Grab Samples
Location : Northwest Property Corner; See Map
Logged By : KQ/MF

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	OL-ML		SANDY SILT, soft, damp, organic rich (roots, grass), trace charcoal. Dark BROWN **TOPSOIL**				
	SP-SM		Sand, poorly graded, with silt, medium dense, damp, heavy organics, charcoal and roots. Dark GRAY and BLACK **BURN DEBRIS**		☒	10.5	24.7
2	SP		SAND, poorly graded, trace silt and gravel, dense to very-dense, damp to saturated at depth of horizon, predimonantly medium-grained sand, oxidixzed and mottled throughout. REDDISH-BROWN to Medium BROWN **WEATHERED OUTWASH SAND** Coarse-grained sand.	▼	☒	3.9	23.5
4	SP		SAND, poorly graded, trace silt and gravel, medium-dense, saturated, predominantly medium-grained sand. Medium GRAY **OUTWASH SAND**				
6			T.D. 5.5' BPG Terminated at planned depth. Groundwater stable @ 2.5' BPG within 2 hours of open test pit. Caving @ 4.5' BPG.				
8							
10							

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Log of Test Pit TP-3

McKibben Property Geotechnical Investigation
3500 Block, 150th Place NE
Marysville, Washington

MTC #: 18B107

Date Started : 4/6/2018
Date Completed : 4/6/2018
Sampling Method : Grab Samples
Location : Southwest Property Corner; See Map
Logged By : KQ/MF

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	SM-OL		SILTY SAND, trace gravel, loose, damp, organic rich (roots, grass). Dark BROWN **TOPSOIL**				
2	SP-SM		SAND, poorly graded, with silt, rare gravel, medium-dense to dense, damp to wet with depth, predimonantly medium-grained sand, oxidixzed and heavily mottled throughout, transitions to unweathered at base. REDDISH-BROWN to Light BROWN **WEATHERED OUTWASH SAND**	▼	☒	5.8	22.7
4	SP-SM		SAND, poorly graded, with silt, medium-dense, saturated, predominantly medium-grained sand, faint mottling in upper 0.9' of horizon. Medium GRAY **OUTWASH SAND**		☒	5.1	22.8
6			T.D. 6.0' BPG Terminated at planned depth. Groundwater stable @ 2.3' BPG within 1 hour of open test pit. Caving @ 4.3' BPG.				
8							
10							

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Geotechnical and Environmental Engineering

Log of Test Pit TP-4

McKibben Property Geotechnical Investigation
3500 Block, 150th Place NE
Marysville, Washington

MTC #: 18B107

Date Started : 4/6/2018
Date Completed : 4/6/2018
Sampling Method : Grab Samples
Location : South-central Property; See Map
Logged By : KQ/MF

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	OL-ML		SANDY SILT, soft, damp, organic rich (roots, grass), thin layer of 1 1/4" gravel at surface. Dark BROWN **TOPSOIL**				
2	SP-SM		SAND, poorly graded, with silt, medium-dense to dense, damp to wet with depth, trace organics in upper horizon, oxidization staining in upper 0.8 feet of horizon, heavily mottled below staining. REDDISH-BROWN to Medium BROWN **WEATHERED OUTWASH SAND**	▼	☒		
4 6	SP		SAND, poorly graded, some silt, medium-dense, saturated, predominantly medium-grained sand, faint mottling in upper horizon. Medium GRAY **OUTWASH SAND**		☒	1.3	27.5
8 10			T.D. 6.5' BPG Terminated at planned depth. Groundwater stable @ 2.9' BPG within 1 hour of open test pit. Caving @ 4.0' BPG.				

Materials Testing and Consulting
Burlington, WA

Geotechnical and Environmental Engineering

Log of Test Pit TP-5

McKibben Property Geotechnical Investigation
3500 Block, 150th Place NE
Marysville, Washington

MTC #: 18B107

Date Started : 4/6/2018
Date Completed : 4/6/2018
Sampling Method : Grab Samples
Location : Southeast Property Corner; See Map
Logged By : KQ/MF

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	OL-ML		SANDY SILT, soft, damp, organic rich (roots, grass), thin layer of 1 1/4" gravel at surface. Dark BROWN **TOPSOIL** 2" Gray Sandy Silt at base of horizon.				
2	SP-SM		SAND, poorly graded, with silt, trace gravel, medium-dense to dense, damp to wet with depth, oxidization stainingin upper 0.7 feet of horizon, heavily mottled below staining. REDDISH-BROWN to Medium BROWN **CEC=5.6meq/100g; OC=4.5%** **WEATHERED OUTWASH SAND**		☒		
4 6	SP		SAND, poorly graded, trace to some silt, medium-dense, saturated, predominantly medium-grained sand. Medium GRAY **OUTWASH SAND** Sand coarsens with depth.	▼	☒ ☒		
8 10			T.D. 7.2' BPG Terminated at planned depth. Groundwater stable @ 3.2' BPG within 1 hour of open test pit. Caving @ 3.0' BPG.				

Materials Testing and Consulting
Burlington, WA
Geotechnical and Environmental Engineering

Log of Test Pit TP-6

McKibben Property Geotechnical Investigation
3500 Block, 150th Place NE
Marysville, Washington

MTC #: 18B107

Date Started : 4/6/2018
Date Completed : 4/6/2018
Sampling Method : Grab Samples
Location : East-central Property; See Map
Logged By : KQ/MF

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML-SM		SANDY SILT to SILTY SAND, trace gravel, soft, damp, organic rich (roots), thin layer of 1 1/4" gravel at surface. Dark GRAY to Dark BROWN **TOPSOIL** 2" Gray Silty Sand at base of horizon.				
2	SP-SM		SAND, poorly graded, with silt, dense, damp to wet with depth, trace roots with oxidation rinds, oxidization staining in upper 0.6 feet of horizon, moderately mottled below staining. REDDISH-BROWN to Medium BROWN **WEATHERED OUTWASH SAND**		☒	7.8	22.5
4	SP		SAND, poorly graded, some silt, medium-dense, saturated, predominantly medium-grained sand. Medium GRAY **OUTWASH SAND**	▼	☒	3.6	22.9
			Sand coarsens with depth.				
6							
					☒	1.7	20.7
8			T.D. 7.5' BPG Terminated at planned depth. Groundwater stable @ 3.6' BPG within 1 hour of open test pit. Caving @ 3.4' BPG.				
10							

Appendix B

Laboratory Test Results

ES-7602.02

Earth Solutions NW, LLC
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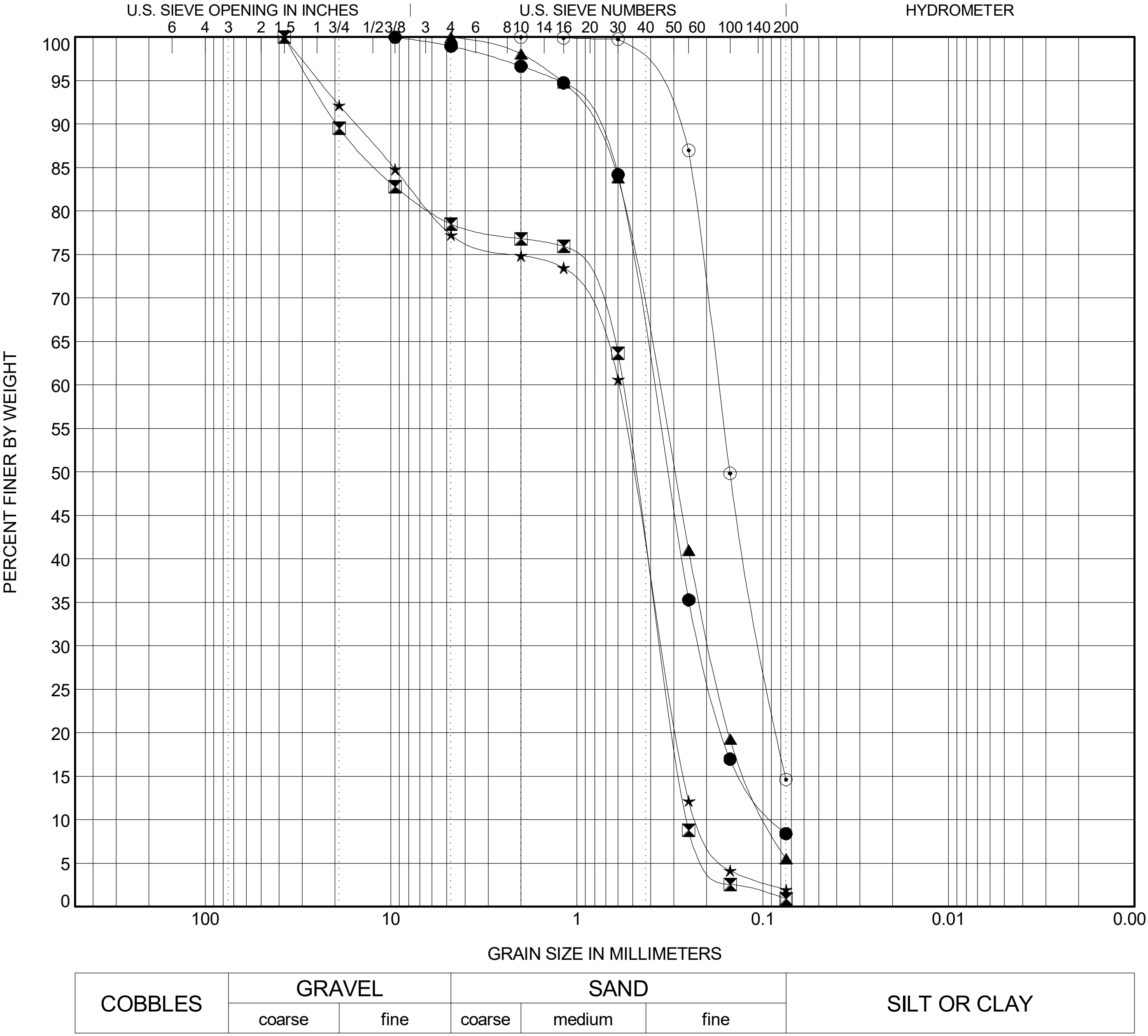
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-7602.02 **PROJECT NAME** Ideal Industrial Park



Specimen Identification			Classification	Cc	Cu
●	**TP-01**	**2.50ft.**	**USDA: Brown Slightly Gravelly Sand. USCS: SP-SM.**	**1.40**	**4.56**
⧗	**TP-02**	**8.00ft.**	**USDA: Gray Gravelly Sand. USCS: SP with Gravel.**	**0.85**	**2.22**
▲	**TP-04**	**7.00ft.**	**USDA: Gray Slightly Gravelly Sand. USCS: SP-SM.**	**1.08**	**3.92**
★	**TP-06**	**2.50ft.**	**USDA: Brown Gravelly Sand. USCS: SP with Gravel.**	**0.92**	**2.73**
⊙	**TP-09**	**5.00ft.**	**USDA: Gray Sand. USCS: SM.**		

Specimen Identification			D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	**TP-01**	**2.5ft.**	**9.5**	**0.389**	**0.216**	**0.085**				**8.4**	
⧗	**TP-02**	**8.0ft.**	**37.5**	**0.566**	**0.351**	**0.255**				**0.9**	
▲	**TP-04**	**7.0ft.**	**4.75**	**0.368**	**0.193**	**0.094**				**5.5**	
★	**TP-06**	**2.5ft.**	**37.5**	**0.593**	**0.345**	**0.218**				**2.0**	
⊙	**TP-09**	**5.0ft.**	**2**	**0.172**	**0.101**					**14.6**	

Sieve Report

Project: McKibben Property Geotech
Project #: 18B107
Client: Phil McKibben
Source: TP-2 @ 1.8'
Sample#: B18-0340

Date Received: 17-Apr-18
Sampled By: K. Quillan / M. Furman
Date Tested: 19-Apr-18
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01, 1366.02

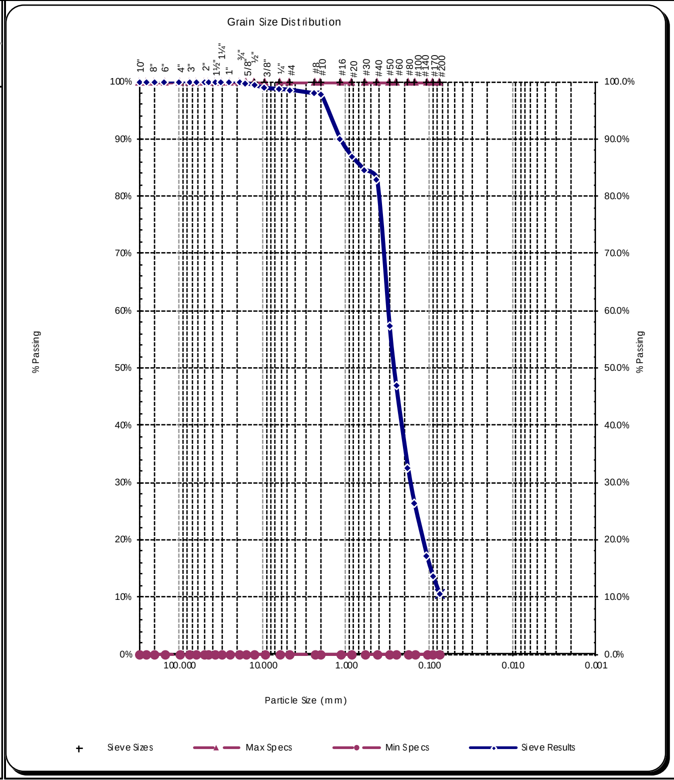
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ = 0.036 mm	% Gravel = 1.5%	Coeff. of Curvature, C_C = 1.26
$D_{(10)}$ = 0.071 mm	% Sand = 88.0%	Coeff. of Uniformity, C_U = 4.40
$D_{(15)}$ = 0.096 mm	% Silt & Clay = 10.5%	Fineness Modulus = 1.46
$D_{(30)}$ = 0.168 mm	Liquid Limit = n/a	Plastic Limit = n/a
$D_{(50)}$ = 0.265 mm	Plasticity Index = n/a	Moisture %, as sampled = 24.7%
$D_{(60)}$ = 0.313 mm	Sand Equivalent = n/a	Req'd Sand Equivalent =
$D_{(90)}$ = 1.173 mm	Fracture %, 1 Face = n/a	Req'd Fracture %, 1 Face =
Dust Ratio = 8/63	Fracture %, 2+ Faces = n/a	Req'd Fracture %, 2+ Faces =

ASTM C-136, ASTM D-6913

Sieve Size		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
US	Metric				
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	99%	99%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		90%	100.0%	0.0%
#20	0.850		87%	100.0%	0.0%
#30	0.600		85%	100.0%	0.0%
#40	0.425	83%	83%	100.0%	0.0%
#50	0.300		57%	100.0%	0.0%
#60	0.250		47%	100.0%	0.0%
#80	0.180		33%	100.0%	0.0%
#100	0.150	26%	26%	100.0%	0.0%
#140	0.106		17%	100.0%	0.0%
#170	0.090		14%	100.0%	0.0%
#200	0.075	10.5%	10.5%	100.0%	0.0%



Comments: ______________________

Reviewed by: ______________________

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Lab Sample: TP-2 @ 1.8'** McKibben Property 3500 Block, 150th Place NE Marysville, WA	**FIGURE** **4**

Sieve Report

Project: McKibben Property Geotech
Project #: 18B107
Client: Phil McKibben
Source: TP-2 @ 3.0'
Sample#: B18-0341

Date Received: 17-Apr-18
Sampled By: K. Quillan / M. Furman
Date Tested: 19-Apr-18
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SP, Poorly graded Sand
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01, 1366.02

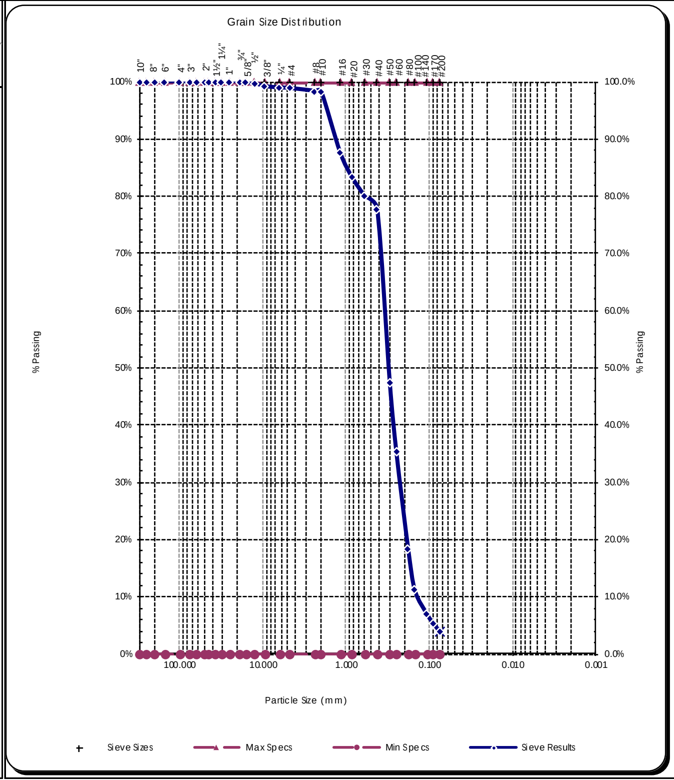
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.086 mm	% Gravel =	1.2%	Coeff. of Curvature, C_C =	1.07
$D_{(10)}$ =	0.138 mm	% Sand =	94.9%	Coeff. of Uniformity, C_U =	2.54
$D_{(15)}$ =	0.166 mm	% Silt & Clay =	3.9%	Fineness Modulus =	1.78
$D_{(30)}$ =	0.228 mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.310 mm	Plasticity Index =	n/a	Moisture %, as sampled =	23.5%
$D_{(60)}$ =	0.352 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	1.366 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	5/99	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		88%	100.0%	0.0%
#20	0.850		83%	100.0%	0.0%
#30	0.600		80%	100.0%	0.0%
#40	0.425	78%	78%	100.0%	0.0%
#50	0.300		47%	100.0%	0.0%
#60	0.250		35%	100.0%	0.0%
#80	0.180		18%	100.0%	0.0%
#100	0.150	11%	11%	100.0%	0.0%
#140	0.106		7%	100.0%	0.0%
#170	0.090		5%	100.0%	0.0%
#200	0.075	3.9%	3.9%	100.0%	0.0%



Comments: ____________________

Reviewed by: ____________________

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Lab Sample: TP-2 @ 3.0'** McKibben Property 3500 Block, 150th Place NE Marysville, WA	**FIGURE** **5**

Sieve Report

Project: McKibben Property Geotech
Project #: 18B107
Client: Phil McKibben
Source: TP-3 @ 1.8'
Sample#: B18-0413

Date Received: 9-May-18
Sampled By: K. Quillan / M. Furman
Date Tested: 11-May-18
Tested By: A. Eifrig

ASTM D-2487 Unified Soils Classification System
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01, 1366.02

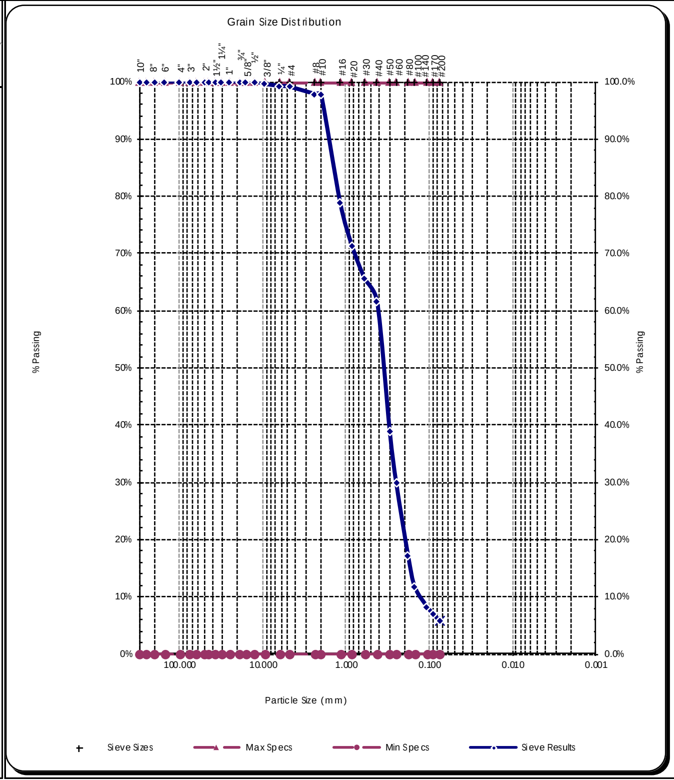
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.065 mm	% Gravel =	0.9%	Coeff. of Curvature, C_C =	1.18
$D_{(10)}$ =	0.129 mm	% Sand =	93.3%	Coeff. of Uniformity, C_U =	3.24
$D_{(15)}$ =	0.168 mm	% Silt & Clay =	5.8%	Fineness Modulus =	2.09
$D_{(30)}$ =	0.251 mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.361 mm	Plasticity Index =	n/a	Moisture %, as sampled =	22.7%
$D_{(60)}$ =	0.416 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	1.666 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	3/32	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs	Specs
US	Metric			Max	Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		79%	100.0%	0.0%
#20	0.850		71%	100.0%	0.0%
#30	0.600		66%	100.0%	0.0%
#40	0.425	62%	62%	100.0%	0.0%
#50	0.300		39%	100.0%	0.0%
#60	0.250		30%	100.0%	0.0%
#80	0.180		17%	100.0%	0.0%
#100	0.150	12%	12%	100.0%	0.0%
#140	0.106		8%	100.0%	0.0%
#170	0.090		7%	100.0%	0.0%
#200	0.075	5.8%	5.8%	100.0%	0.0%



Comments: ______________________________

Reviewed by: ______________________________

Materials Testing & Consulting, Inc.
777 Chrysler Drive
Burlington, WA 98233

Lab Sample: TP-3 @ 1.8'
McKibben Property
3500 Block, 150th Place NE
Marysville, WA

FIGURE
6

Sieve Report

Project: McKibben Property Geotech
Project #: 18B107
Client: Phil McKibben
Source: TP-3 @ 3.5'
Sample#: B18-0342

Date Received: 17-Apr-18
Sampled By: K. Quillan / M. Furmar
Date Tested: 19-Apr-18
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SP-SM, Poorly graded Sand with Silt
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01, 1366.02

ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

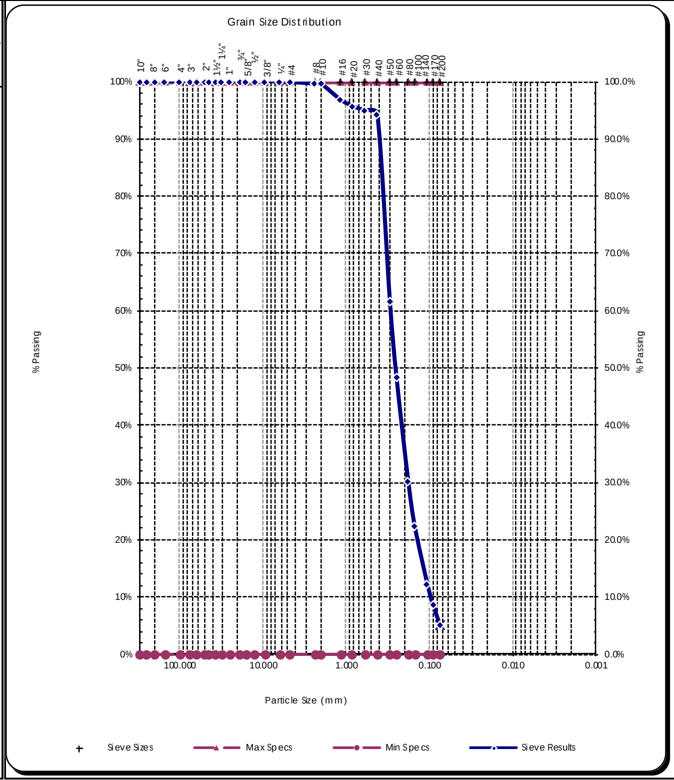
$D_{(5)}$ = 0.073 mm
$D_{(10)}$ = 0.096 mm
$D_{(15)}$ = 0.118 mm
$D_{(30)}$ = 0.180 mm
$D_{(50)}$ = 0.256 mm
$D_{(60)}$ = 0.294 mm
$D_{(90)}$ = 0.409 mm
Dust Ratio = 5/92

% Gravel = 0.2%
% Sand = 94.7%
% Silt & Clay = 5.1%
Liquid Limit = n/a
Plasticity Index = n/a
Sand Equivalent = n/a
Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a

Coeff. of Curvature, C_C = 1.14
Coeff. of Uniformity, C_U = 3.05
Fineness Modulus = 1.25
Plastic Limit = n/a
Moisture %, as sampled = 22.8%
Req'd Sand Equivalent =
Req'd Fracture %, 1 Face =
Req'd Fracture %, 2+ Faces =

ASTM C-136, ASTM D-6913

Sieve Size		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
US	Metric				
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		97%	100.0%	0.0%
#20	0.850		96%	100.0%	0.0%
#30	0.600		95%	100.0%	0.0%
#40	0.425	94%	94%	100.0%	0.0%
#50	0.300		62%	100.0%	0.0%
#60	0.250		48%	100.0%	0.0%
#80	0.180		30%	100.0%	0.0%
#100	0.150	22%	22%	100.0%	0.0%
#140	0.106		12%	100.0%	0.0%
#170	0.090		9%	100.0%	0.0%
#200	0.075	5.1%	5.1%	100.0%	0.0%



Comments: ________________

Reviewed by: ________________

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	Lab Sample: TP-3 @ 3.5' McKibben Property 3500 Block, 150th Place NE Marysville, WA	FIGURE 7

Sieve Report

Project: McKibben Property Geotech
Project #: 18B107
Client: Phil McKibben
Source: TP-4 @ 4.3'
Sample#: B18-0343

Date Received: 17-Apr-18
Sampled By: K. Quillan / M. Furmar
Date Tested: 19-Apr-18
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SP, Poorly graded Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01, 1366.02

ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

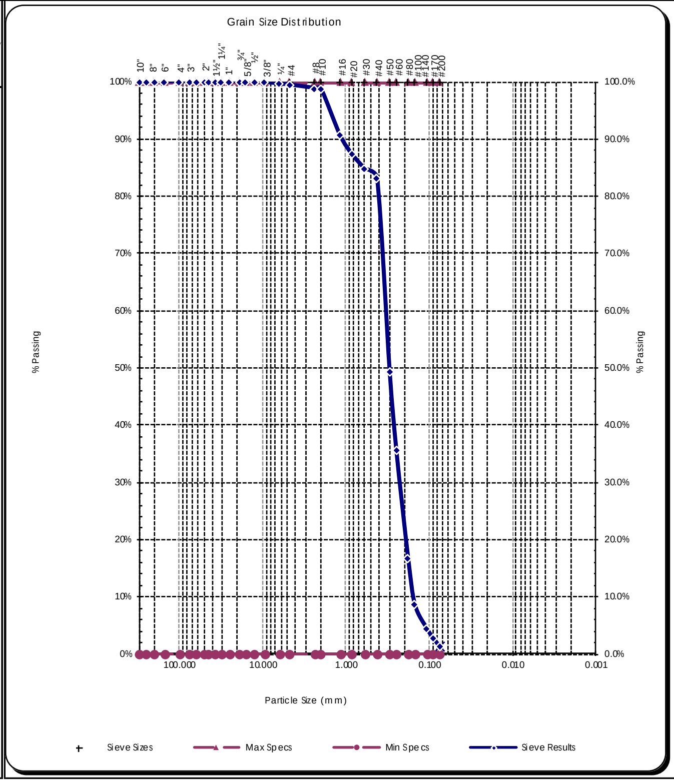
$D_{(5)}$ = 0.113 mm
$D_{(10)}$ = 0.155 mm
$D_{(15)}$ = 0.174 mm
$D_{(30)}$ = 0.229 mm
$D_{(50)}$ = 0.303 mm
$D_{(60)}$ = 0.340 mm
$D_{(90)}$ = 1.123 mm
Dust Ratio = 1/65

% Gravel = 0.6%
% Sand = 98.2%
% Silt & Clay = 1.3%
Liquid Limit = n/a
Plasticity Index = n/a
Sand Equivalent = n/a
Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a

Coeff. of Curvature, C_C = 0.99
Coeff. of Uniformity, C_U = 2.19
Fineness Modulus = 1.69
Plastic Limit = n/a
Moisture %, as sampled = 27.5%
Req'd Sand Equivalent =
Req'd Fracture %, 1 Face =
Req'd Fracture %, 2+ Faces =

ASTM C-136, ASTM D-6913

Sieve Size		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
US	Metric				
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		91%	100.0%	0.0%
#20	0.850		87%	100.0%	0.0%
#30	0.600		85%	100.0%	0.0%
#40	0.425	83%	83%	100.0%	0.0%
#50	0.300		49%	100.0%	0.0%
#60	0.250		36%	100.0%	0.0%
#80	0.180		17%	100.0%	0.0%
#100	0.150	9%	9%	100.0%	0.0%
#140	0.106		4%	100.0%	0.0%
#170	0.090		3%	100.0%	0.0%
#200	0.075	1.3%	1.3%	100.0%	0.0%



Comments: ______________________________

Reviewed by: ______________________________

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Lab Sample: TP-4 @ 4.3'** McKibben Property 3500 Block, 150th Place NE Marysville, WA	**FIGURE** **8**

Sieve Report

Project: McKibben Property Geotech
Project #: 18B107
Client: Phil McKibben
Source: TP-6 @ 1.7'
Sample#: B18-0414

Date Received: 9-May-18
Sampled By: K. Quillan / M. Furman
Date Tested: 11-May-18
Tested By: A. Eifrig

ASTM D-2487 Unified Soils Classification System
SP-SM, Poorly graded Sand with Silt
Sample Color:
brown

Certificate #: 1366.01, 1366.02

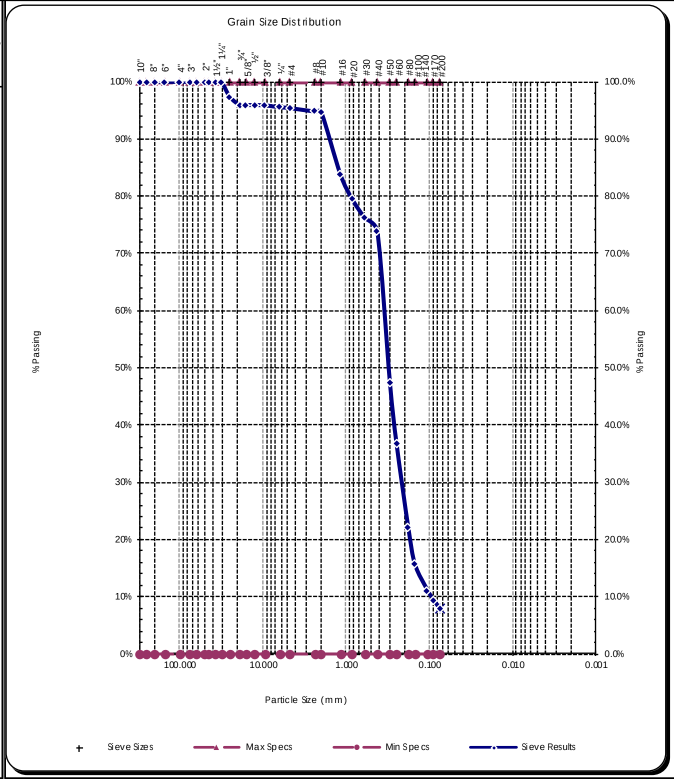
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ = 0.048 mm	% Gravel = 4.6%	Coeff. of Curvature, C_C = 1.38
$D_{(10)}$ = 0.096 mm	% Sand = 87.6%	Coeff. of Uniformity, C_U = 3.75
$D_{(15)}$ = 0.144 mm	% Silt & Clay = 7.8%	Fineness Modulus = 1.95
$D_{(30)}$ = 0.218 mm	Liquid Limit = n/a	Plastic Limit = n/a
$D_{(50)}$ = 0.312 mm	Plasticity Index = n/a	Moisture %, as sampled = 22.5%
$D_{(60)}$ = 0.360 mm	Sand Equivalent = n/a	Req'd Sand Equivalent =
$D_{(90)}$ = 1.644 mm	Fracture %, 1 Face = n/a	Req'd Fracture %, 1 Face =
Dust Ratio = 7/66	Fracture %, 2+ Faces = n/a	Req'd Fracture %, 2+ Faces =

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	97%	97%	100.0%	0.0%
3/4"	19.00	96%	96%	100.0%	0.0%
5/8"	16.00		96%	100.0%	0.0%
1/2"	12.50	96%	96%	100.0%	0.0%
3/8"	9.50	96%	96%	100.0%	0.0%
1/4"	6.30		96%	100.0%	0.0%
#4	4.75	95%	95%	100.0%	0.0%
#8	2.36		95%	100.0%	0.0%
#10	2.00	95%	95%	100.0%	0.0%
#16	1.18		84%	100.0%	0.0%
#20	0.850		79%	100.0%	0.0%
#30	0.600		76%	100.0%	0.0%
#40	0.425	74%	74%	100.0%	0.0%
#50	0.300		47%	100.0%	0.0%
#60	0.250		37%	100.0%	0.0%
#80	0.180		22%	100.0%	0.0%
#100	0.150	16%	16%	100.0%	0.0%
#140	0.106		11%	100.0%	0.0%
#170	0.090		9%	100.0%	0.0%
#200	0.075	7.8%	7.8%	100.0%	0.0%



Comments: ____________________

Reviewed by: ____________________

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Lab Sample: TP-6 @ 1.7'** McKibben Property 3500 Block, 150th Place NE Marysville, WA	**FIGURE** **9**

Sieve Report

Project: McKibben Property Geotech
Project #: 18B107
Client: Phil McKibben
Source: TP-6 @ 3.5'
Sample#: B18-0344

Date Received: 17-Apr-18
Sampled By: K. Quillan / M. Furman
Date Tested: 19-Apr-18
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SP, Poorly graded Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01, 1366.02

ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

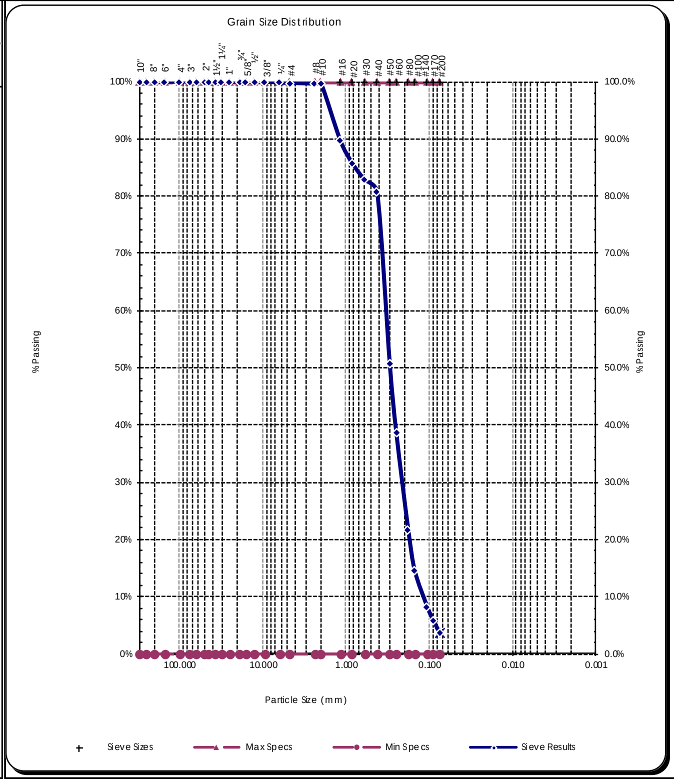
$D_{(5)}$ = 0.084 mm
$D_{(10)}$ = 0.119 mm
$D_{(15)}$ = 0.152 mm
$D_{(30)}$ = 0.214 mm
$D_{(50)}$ = 0.297 mm
$D_{(60)}$ = 0.339 mm
$D_{(90)}$ = 1.198 mm
Dust Ratio = 4/89

% Gravel = 0.2%
% Sand = 96.1%
% Silt & Clay = 3.6%
Liquid Limit = n/a
Plasticity Index = n/a
Sand Equivalent = n/a
Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a

Coeff. of Curvature, C_C = 1.14
Coeff. of Uniformity, C_U = 2.85
Fineness Modulus = 1.63
Plastic Limit = n/a
Moisture %, as sampled = 22.9%
Req'd Sand Equivalent =
Req'd Fracture %, 1 Face =
Req'd Fracture %, 2+ Faces =

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		90%	100.0%	0.0%
#20	0.850		86%	100.0%	0.0%
#30	0.600		83%	100.0%	0.0%
#40	0.425	81%	81%	100.0%	0.0%
#50	0.300		51%	100.0%	0.0%
#60	0.250		39%	100.0%	0.0%
#80	0.180		22%	100.0%	0.0%
#100	0.150	15%	15%	100.0%	0.0%
#140	0.106		8%	100.0%	0.0%
#170	0.090		6%	100.0%	0.0%
#200	0.075	3.6%	3.6%	100.0%	0.0%



Comments: ______________________________

Reviewed by: ______________________________

Materials Testing & Consulting, Inc.
777 Chrysler Drive
Burlington, WA 98233

Lab Sample: TP-6 @ 3.5’
McKibben Property
3500 Block, 150th Place NE
Marysville, WA

FIGURE
10

Sieve Report

Project: McKibben Property Geotech
Project #: 18B107
Client: Phil McKibben
Source: TP-6 @ 7.0'
Sample#: B18-0345

Date Received: 17-Apr-18
Sampled By: K. Quillan / M. Furman
Date Tested: 19-Apr-18
Tested By: M. Carrillo

ASTM D-2487 Unified Soils Classification System
SP, Poorly graded Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01, 1366.02

ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

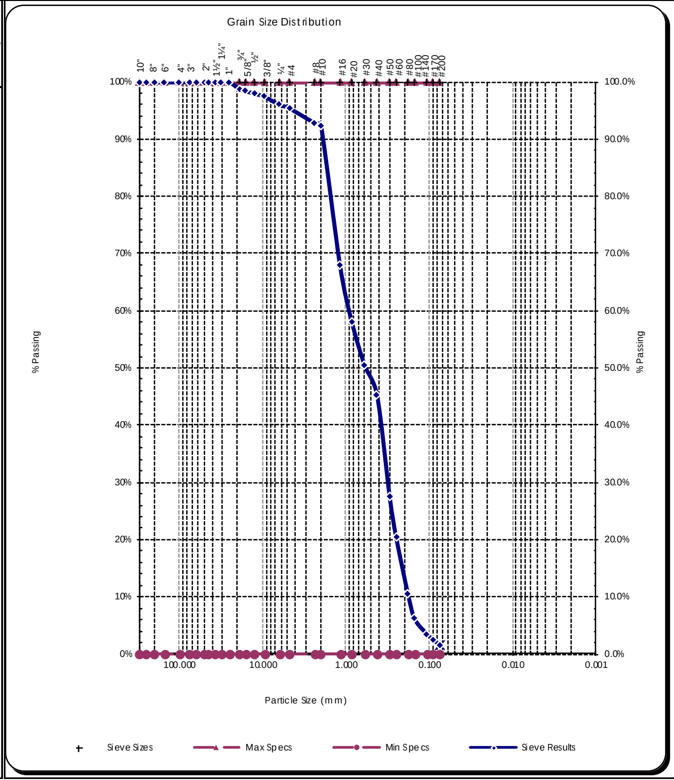
$D_{(5)}$ = 0.130 mm
$D_{(10)}$ = 0.177 mm
$D_{(15)}$ = 0.212 mm
$D_{(30)}$ = 0.317 mm
$D_{(50)}$ = 0.581 mm
$D_{(60)}$ = 0.916 mm
$D_{(90)}$ = 1.919 mm
Dust Ratio = 2/55

% Gravel = 4.6%
% Sand = 93.8%
% Silt & Clay = 1.7%
Liquid Limit = n/a
Plasticity Index = n/a
Sand Equivalent = n/a
Fracture %, 1 Face = n/a
Fracture %, 2+ Faces = n/a

Coeff. of Curvature, C_C = 0.62
Coeff. of Uniformity, C_U = 5.18
Fineness Modulus = 2.63
Plastic Limit = n/a
Moisture %, as sampled = 20.7%
Req'd Sand Equivalent =
Req'd Fracture %, 1 Face =
Req'd Fracture %, 2+ Faces =

ASTM C-136, ASTM D-6913

Sieve Size		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
US	Metric				
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	99%	99%	100.0%	0.0%
5/8"	16.00		98%	100.0%	0.0%
1/2"	12.50	98%	98%	100.0%	0.0%
3/8"	9.50	97%	97%	100.0%	0.0%
1/4"	6.30		96%	100.0%	0.0%
#4	4.75	95%	95%	100.0%	0.0%
#8	2.36		93%	100.0%	0.0%
#10	2.00	92%	92%	100.0%	0.0%
#16	1.18		68%	100.0%	0.0%
#20	0.850		58%	100.0%	0.0%
#30	0.600		51%	100.0%	0.0%
#40	0.425	45%	45%	100.0%	0.0%
#50	0.300		28%	100.0%	0.0%
#60	0.250		20%	100.0%	0.0%
#80	0.180		10%	100.0%	0.0%
#100	0.150	6%	6%	100.0%	0.0%
#140	0.106		4%	100.0%	0.0%
#170	0.090		3%	100.0%	0.0%
#200	0.075	1.7%	1.7%	100.0%	0.0%



Comments: ______________________________

Reviewed by: ______________________________

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777 Chrysler Drive
Burlington, WA 98233

Lab Sample: TP-6 @ 7.0'
McKibben Property
3500 Block, 150th Place NE
Marysville, WA

FIGURE
11

Report Distribution

ES-7602.02

<u>EMAIL ONLY</u>

Water Station Technology
c/o Mr. Ryan Wear
2732 Grand Avenue, Suite 122
Everett, Washington 98201

<u>EMAIL ONLY</u>

Land Technologies, Inc.
18820 – 3rd Avenue Northeast
Arlington, Washington 98223

Attention: Mr. Merle Ash