August 20, 2014
ES-3521

Earth Solutions NW LLC

- Geotechnical Engineering
- Construction Monitoring
- Environmental Sciences

DGR Development, Inc.
18323 Bothell Everett Highway, Suite 210
Bothell, Washington 98012

Attention: Mr. Dominique Ruybal

Subject: Geotechnical Consulting Services
Griswold Nursery
Residential Short Plat
12643 Northeast 70th Street
Kirkland, Washington

Dear Mr. Ruybal:

Earth Solutions NW, LLC (ESNW) has prepared this letter providing geotechnical consulting services for the proposed residential development at the subject site. Preliminary site development recommendations, including a preliminary infiltration evaluation, are provided in this letter.

Project Description

We understand the site will be developed with nine residential structures, a stormwater detention vault, and associated improvements. Given the topographic change across the sites, grading activities will likely involve cuts and fills on the order of five feet or less to establish the final design grades.

Building construction is anticipated to consist of relatively lightly-loaded wood framing and either raised wood floors with crawlspaces or slab-on-grade floors. Perimeter foundation loading is expected to range from approximately 1 to 2 kips per foot. Slab-on-grade loading is expected to be on the order of 150 psf.

If the above design estimates 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.

Surface

The site is located on the southwest corner of the intersection between Northeast 70th Street and 128th Avenue Northeast in Kirkland, Washington. The approximate location of the property is illustrated on Plate 1 (Vicinity Map) included in this study. The site is rectangular in shape and consists of three tax parcels. The site, at the time of fieldwork, was being used as a plant nursery. The site is currently developed with a single-family residence, greenhouses, and associated improvements. The remainder of the site is comprised of general landscape areas and a gravel access road that runs through the property.

The existing site topography generally descends gently towards the north from the single-family residence location, which sits on a small scale ridge-like feature on the property, with a total elevation change on the order of eight to ten feet. The site topography also drops from the ridge feature towards the south approximately eight feet towards the southern property boundary.

Subsurface

A representative of ESNW observed, logged and sampled five test pits excavated at accessible locations using a trackhoe and operator provided by the client for the purposes of characterizing the subsurface conditions. The approximate locations of the test pits are depicted on the Test Pit Location Plan (Plate 2). Please refer to the test pit logs provided in Appendix A for a detailed description of the subsurface conditions.

Topsoil

Topsoil was encountered at all of the test pit locations extending to depths of between about one to ten inches below existing grade. Topsoil is not suitable for use as structural fill nor should it be mixed with material to be used as structural fill. Topsoil or otherwise unsuitable material can be used in landscaping areas if desired.

Fill

Fill was not encountered at any of the test pit locations. There is the potential for limited amounts of fill surrounding the existing improvements, at the top of the slope located adjacent to the residence, greenhouses, and existing road alignments. Fill soil may be suitable for use as structural fill; however a representative of ESNW should be retained during the construction phases of the site development to evaluate the suitability of using on-site soils for structural fill.

Native Soil

Underlying the topsoil and fill, native soils consisting primarily of medium dense to dense silty sand with gravel (Unified Soil Classification, SM), and poorly graded sand with silt and gravel (SP-SM) glacial till deposits were encountered extending to the maximum exploration depth of ten feet below existing grades. Dense conditions were generally encountered at approximately three feet in depth.

Geologic Setting

The referenced geologic map resource identifies glacial till (Qgt) deposits across the site and surrounding areas. The referenced SCS soil survey identifies Alderwood gravelly sandy loam series soils (AgC) across the entirety of the site. Alderwood series soils formed in glacial till and are assigned to the Hydrologic Soil Group B.

The soil conditions observed at the test pit locations are generally consistent with glacial till deposits.

Groundwater

Groundwater was not observed in the test pits during the fieldwork (August 2014). However, groundwater can perch and travel along the contact between the weathered and unweathered till. Seepage should be expected in grading activities at this site, particularly during the winter, spring and early summer months. 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 months.

Geologically Hazardous Areas

We reviewed Chapter 85 – Geologically Hazardous Areas of the Kirkland Zoning Code. The slope located off the south side of the existing residence is inclined at a gradient above 40 percent, and is approximately eight feet in elevation change from top to toe. This slope meets the criteria for potential landslide hazard designation based on the steepness of the slope; but is under the threshold based on elevation change. Both hazard areas are discussed below.

Landslide Potential

The site is underlain by dense glacial till deposits. This soil type is relatively stable with respect to landslide potential. No signs of recent movement such as slumps, scarps, bare soil or seeps were observed during our fieldwork. In our opinion, the steep slope area is stable in the current configuration. In our opinion, the risk of landslide resulting from the proposal will not increase provided the following recommendations and those detailed in this report are included in the final design.

- Foundation elements should maintain a minimum setback of 15 feet from the top of slopes inclined at 40 percent or greater and that are at least 10 feet in height. Foundations can be deepened to meet these criteria as long as the exposed foundation wall face maintains a horizontal setback of at least five feet from the top of the slope. ESNW must observe the subgrade to confirm conditions are as anticipated.

- Decks shall be designed to capture rainfall and convey to an approved discharge. This will require a waterproof membrane or similar configuration. Water must not pond above or flow over temporary or permanent slopes.

Erosion Hazards

While the KZC does not include the AgC series soil as a potential erosion hazard soil type, given the steep gradient on the slope south of the existing residence, this area should be considered sensitive with respect to erosion if grading plans do not call for removing this slope during mass grading operations. In our opinion, site grading plans and construction means and methods should ensure that erosion does not occur on the steep slope. Provided these conditions are maintained, in our opinion, the risk or erosion is no greater than the current potential.

Seismic Hazards

In our opinion, the risk of seismically-induced instability on the sloped area is low due to the presence of dense glacial till soil and the lack of an established shallow groundwater table.

Site Preparation and Earthwork

Site preparation activities will likely include removing existing structures and vegetation from the development envelope, installing temporary erosion control measures, and establishing grading limits. The primary geotechnical considerations during the proposed site preparation and earthwork activities will involve cut and fill activities, structural fill placement and compaction, underground utility installations, and final building and pavement area subgrade preparation.

Temporary Erosion Control

The primary construction entrance will be off the Northeast 70th Street frontage, where new paving areas are likely to be constructed for the road that is to allow for travel through the site and intersect with 128th Avenue Northeast. Temporary construction entrances and drive lanes, consisting of at least 12 inches of quarry spalls, can be considered in order to minimize off-site soil tracking and to provide a stable access entrance surface. Geotextile fabric may also be considered underlying the quarry spalls for greater stability of the temporary construction entrance.

Erosion control measures should consist of silt fencing placed around the site perimeter, or at a minimum, around the down gradient of the site perimeter. Soil stockpiles should be covered or otherwise protected to reduce soil erosion. Temporary sedimentation ponds or other approaches for controlling surface water runoff should be in place prior to beginning earthwork activities.

In-situ Soils

The moisture sensitivity of the native soil can generally be characterized as high. Localized areas of increased silt content within the sand may exist, and would likely increase the moisture sensitivity of the soils, potentially leading to rapid soil deterioration when exposed to excessive moisture. Successful use of the soil as structural fill will largely be dictated by the moisture content at the time of placement and compaction. If the on-site soils cannot be successfully compacted, the use of an imported soil may be necessary. In our opinion, a contingency should be included in the project scope to account for export of unsuitable soil and import of granular structural fill.

Imported Soils

Imported soil intended for use as structural fill should consist of a well-graded granular soil with a moisture content that is at or near 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 defined as the percent passing the Number 200 sieve, based on the minus three-quarter inch fraction.

Structural Fill

Structural fill is defined as compacted soil placed in foundation, slab-on-grade, and roadway areas. Fills placed to construct permanent slopes and throughout retaining wall and utility trench backfill areas are also considered structural fill. Soils placed in structural areas should be placed in loose lifts of 12 inches or less and compacted to a relative compaction of 95 percent, based on the laboratory maximum dry density as determined by the Modified Proctor Method (ASTM D1557). Additionally, more stringent compaction specifications may be required for utility trench backfill zones, depending on the responsible utility district or jurisdiction.

Preliminary Storm Vault Design

Vault foundations should be supported on competent native soil or crushed rock placed atop competent native soil. Final storm vault designs must incorporate adequate buffer space from property boundaries such that temporary excavations to construct the vault structure can be successfully completed. Perimeter drains should be installed around the vault and conveyed to an approved discharge point. The presence of perched groundwater seepage should be anticipated during excavation activities for the vault.

The following parameters can be used for preliminary stormwater vault design:

• Allowable soil bearing capacity (dense native soil)	5,000 psf
• Active earth pressure (unrestrained)	35 pcf
• Active earth pressure (unrestrained, hydrostatic)	80 pcf
• At-rest earth pressure (restrained)	55 pcf
• At-rest earth pressure (restrained, hydrostatic)	100 pcf
• Coefficient of friction	0.40
• Passive earth pressure	300 pcf
• Seismic surcharge	6H* (active condition) 12H* (at-rest condition)

*Where H equals the retained height

Retaining walls should be backfilled with free-draining material or suitable sheet drainage that extends along the height of the walls. The upper one foot of the wall backfill can consist of a less permeable soil, if desired. A perforated drain pipe should be placed along the base of the wall and connected to an approved discharge location. If the elevation of the vault bottom is such that gravity flow to an outlet is not possible, the portion of the vault below the drain should be designed to include hydrostatic pressure. Design values accounting for hydrostatic pressure are included above.

ESNW should observe grading operations for the vault and the subgrade conditions prior to concrete forming and pouring to confirm conditions are as anticipated, and to provide supplemental recommendations as necessary. Additionally, ESNW should be contacted to review final vault designs to confirm that appropriate geotechnical parameters have been incorporated.

Foundations

The proposed residential buildings may be supported on conventional continuous and spread footing foundations bearing on competent native soils, re-compacted fill soils, or new structural fill. In general, native soils suitable for support of foundations should be encountered at depths of approximately three feet below existing grades. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of the soils to the specifications of structural fill, or overexcavation and replacement with a suitable structural fill material, will be necessary. Organic material exposed at foundation subgrade elevations must be removed and grades restored with structural fill.

Provided foundations will be supported as described above, the following parameters can be used for preliminary design:

- Allowable soil bearing capacity — 2,500 psf
- Passive earth pressure — 300 pcf (equivalent fluid)
- Coefficient of friction — 0.40

A one-third increase in the allowable soil bearing capacity can assumed for short-term wind and seismic loading conditions. The above passive pressure and friction values include a factor-of-safety of 1.5. With structural loading as expected, total settlement in the range of one inch and differential settlement of about one-half inch is anticipated. The majority of the settlements should occur during construction, as dead loads are applied.

Slab-On-Grade Floors

Slab-on-grade floors for the proposed residential buildings constructed at this site should be supported on a firm and unyielding subgrade. Where feasible, the native soils exposed at the slab-on-grade subgrade level can likely be compacted in place to the specifications of structural fill. Unstable or yielding areas of the subgrade should be recompacted or overexcavated and replaced with suitable structural fill prior to construction of the slab.

A capillary break consisting of a minimum of 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 manufacturer's specifications.

Drainage

Perched groundwater should be anticipated in deeper site excavations, such as utility trench areas, depending on the time of year grading operations take place. Temporary measures to control surface water runoff and groundwater during construction would likely involve interceptor trenches and sumps. ESNW should be consulted during preliminary grading to identify areas of seepage and to provide recommendations to reduce the potential for instability related to seepage effects.

Finish grades must be designed to direct surface drain water away from structures and slopes. Water must not be allowed to pond above or flow over slopes.

Footing drains should be installed along the base of foundations and conveyed to an approved discharge.

Infiltration Feasibility

Infiltration of stormwater runoff from downspouts on the subject site can be pursued in our opinion; being mindful that the site is underlain by glacial till material. Glacial till soil demonstrates a severely reduced capacity for infiltration; and if infiltration is to be pursued a contingency must be made to allow for overflow of any drywells or infiltration trenches. ESNW can provide further recommendations for design of infiltration facilities if desired.

LIMITATIONS

The recommendations and conclusions provided in this report 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 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.

We trust this letter meets your current needs. If you have any questions, or if additional information is required, please call.

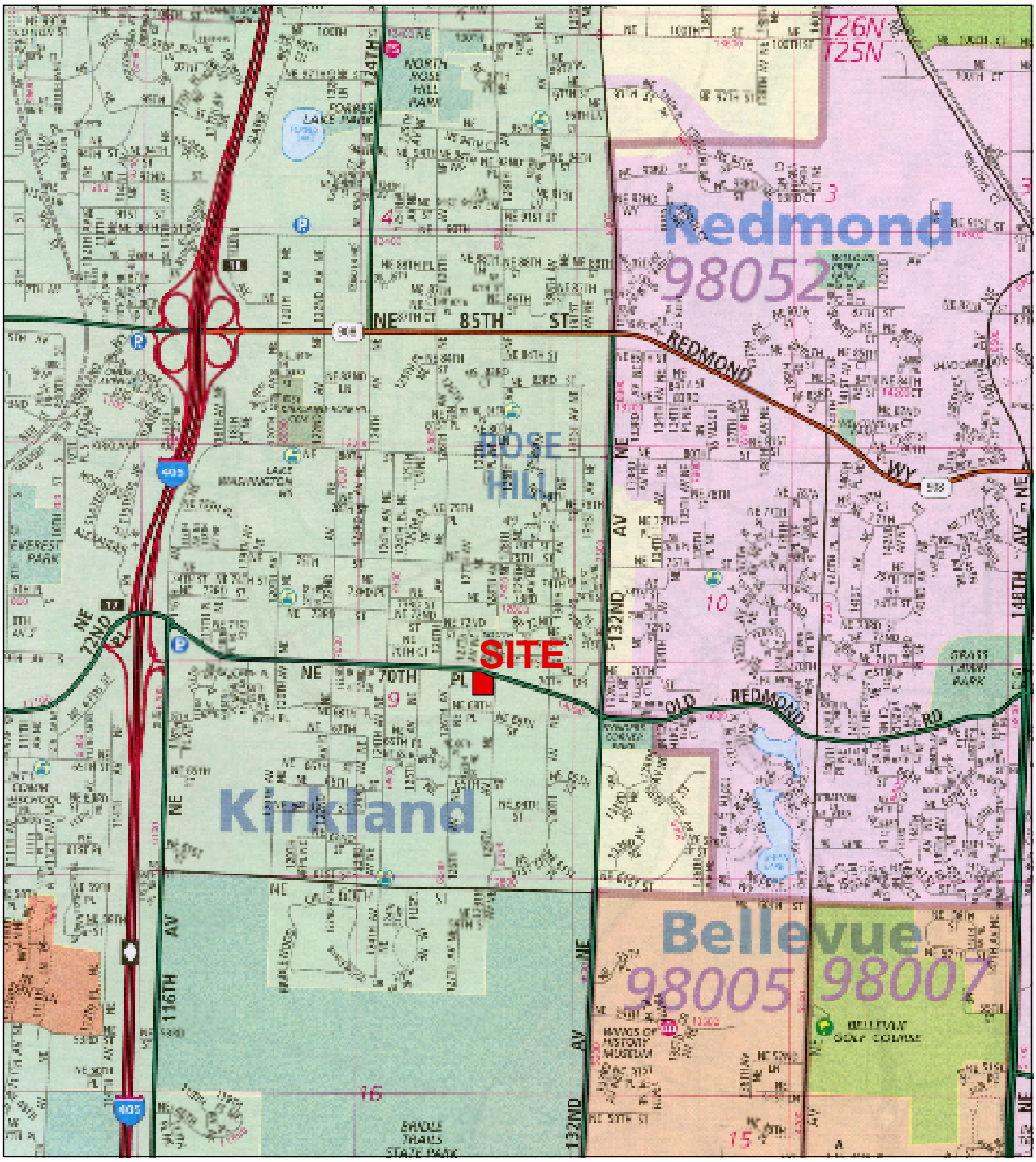
Sincerely,

EARTH SOLUTIONS NW, LLC

Stephen H. Avril
Staff Geologist

Kyle R. Campbell, P.E.
Principal

Attachments: Plate 1 – Vicinity Map
Plate 2 – Test Pit Location Plan
Test Pit Logs
Grain Size Distribution



Reference:
King County, Washington
Map 536
By The Thomas Guide
Rand McNally
32nd Edition

NORTH

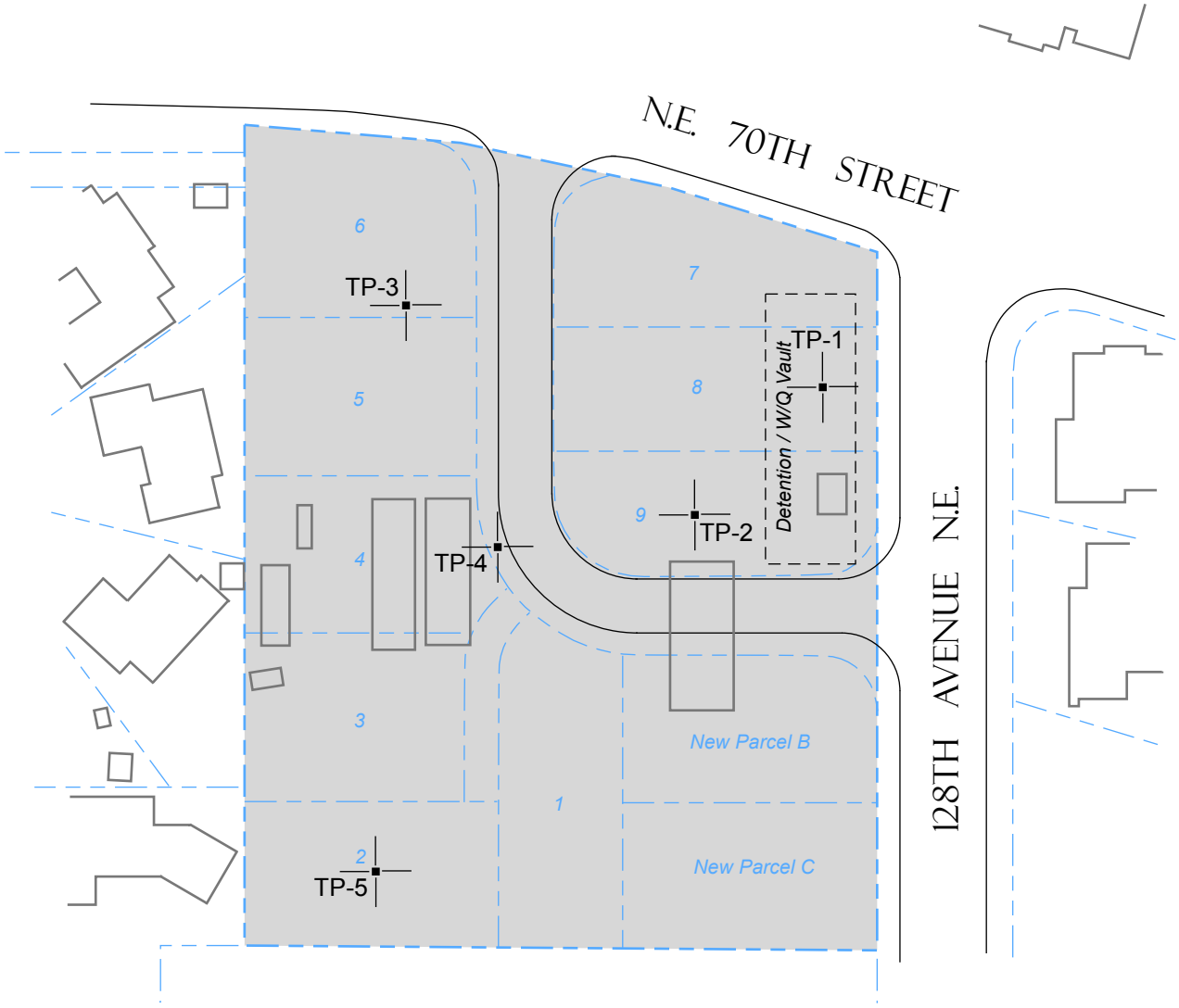
Earth Solutions NW LLC

Geotechnical Engineering, Construction Monitoring and Environmental Sciences

Vicinity Map
Griswold Plat
Kirkland, Washington

Drwn.	GLS	Date	08/19/2014	Proj. No.	3521
Checked	SSR	Date	Aug. 2014	Plate	1

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.



LEGEND

TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-3521, Aug. 2014

Subject Site

Existing Building

4 — Proposed Lot Number

NORTH

1"=80'

0 40 80 160

Scale in Feet

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.

Earth Solutions NW LLC

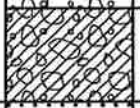
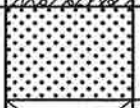
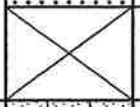
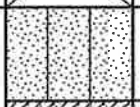
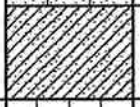
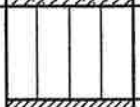
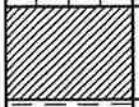
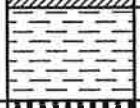
Geotechnical Engineering, Construction Monitoring and Environmental Sciences

Test Pit Location Plan
Griswold Plat
Kirkland, Washington

Drwn.	GLS	Date	08/19/2014	Proj. No.	3521
Checked	SSR	Date	Aug. 2014	Plate	2

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
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-1

CLIENT DGR Development
PROJECT NAME Griswold Plat
PROJECT NUMBER 3521
PROJECT LOCATION Kirkland, Washington
DATE STARTED 8/8/14 **COMPLETED** 8/8/14
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Client Provided
GROUND WATER LEVELS:
EXCAVATION METHOD _____
AT TIME OF EXCAVATION ---
LOGGED BY SHA **CHECKED BY** SSR
AT END OF EXCAVATION ---
NOTES Depth of Topsoil & Sod 10": moss
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL	0.5	TOPSOIL
		MC = 25.20%			Brown silty SAND with gravel, medium dense, moist (Weathered Till)
			SM		-becomes dense
5		MC = 4.80% MC = 2.90%		5.0	
			SP-SM		Brown poorly graded SAND with silt, dense, moist -becomes slightly cemented
10				10.0	
					Test pit terminated at 10.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 10.0 feet.

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Fax: 425-449-4711

TEST PIT NUMBER TP-2

CLIENT DGR Development
PROJECT NAME Griswold Plat
PROJECT NUMBER 3521
PROJECT LOCATION Kirkland, Washington
DATE STARTED 8/8/14 **COMPLETED** 8/8/14
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Client Provided
GROUND WATER LEVELS:
EXCAVATION METHOD _____
AT TIME OF EXCAVATION ---
LOGGED BY SHA **CHECKED BY** SSR
AT END OF EXCAVATION ---
NOTES Depth of Topsoil & Sod 12": wood chips
AFTER EXCAVATION —

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		TOPSOIL
				1.0	Brown silty SAND with gravel, medium dense, moist (Weathered Till)
		MC = 11.10%	SM		
					-becomes dense and unweathered
		MC = 8.30%			
5		MC = 5.90%		5.0	
					Test pit terminated at 5.0 feet below existing grade. No groundwater encountered during excavation.
					Bottom of test pit at 5.0 feet.

Earth Solutions NW
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Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-3

CLIENT DGR Development
PROJECT NAME Griswold Plat
PROJECT NUMBER 3521
PROJECT LOCATION Kirkland, Washington
DATE STARTED 8/8/14 **COMPLETED** 8/8/14
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Client Provided
GROUND WATER LEVELS:
EXCAVATION METHOD _____
AT TIME OF EXCAVATION ---
LOGGED BY SHA **CHECKED BY** SSR
AT END OF EXCAVATION ---
NOTES Depth of Topsoil & Sod 10": mulch
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		TOPSOIL
					1.0
			SM		Brown silty SAND with gravel, medium dense, moist (Weathered Till)
					-becomes dense and unweathered
5		MC = 5.90%			
					6.0
					Test pit terminated at 6.0 feet below existing grade. No groundwater encountered during excavation.
					Bottom of test pit at 6.0 feet.

Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-4

CLIENT DGR Development
PROJECT NAME Griswold Plat
PROJECT NUMBER 3521
PROJECT LOCATION Kirkland, Washington
DATE STARTED 8/8/14 **COMPLETED** 8/8/14
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Client Provided
GROUND WATER LEVELS:
EXCAVATION METHOD _____
AT TIME OF EXCAVATION ---
LOGGED BY SHA **CHECKED BY** SSR
AT END OF EXCAVATION ---
NOTES Depth of Topsoil & Sod 8": mulch
AFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		0.5 TOPSOIL
		MC = 11.10% Fines = 12.10%	SM		Brown silty SAND, medium dense, moist [USDA Classification: brown SAND] -cobbles -becomes dense -weathered till
5		MC = 11.60%			5.0 Test pit terminated at 5.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 5.0 feet.

GENERAL BH / TP / WELL 3521.GPJ GINT US.GDT 8/19/14

Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-5

CLIENT DGR Development
PROJECT NAME Griswold Plat
PROJECT NUMBER 3521
PROJECT LOCATION Kirkland, Washington
DATE STARTED 8/8/14 **COMPLETED** 8/8/14
GROUND ELEVATION _____ **TEST PIT SIZE** _____
EXCAVATION CONTRACTOR Client Provided
GROUND WATER LEVELS:
EXCAVATION METHOD _____
AT TIME OF EXCAVATION —
LOGGED BY SHA **CHECKED BY** SSR
AT END OF EXCAVATION —
NOTES Depth of Topsoil & Sod 4": bare soil
AFTER EXCAVATION —

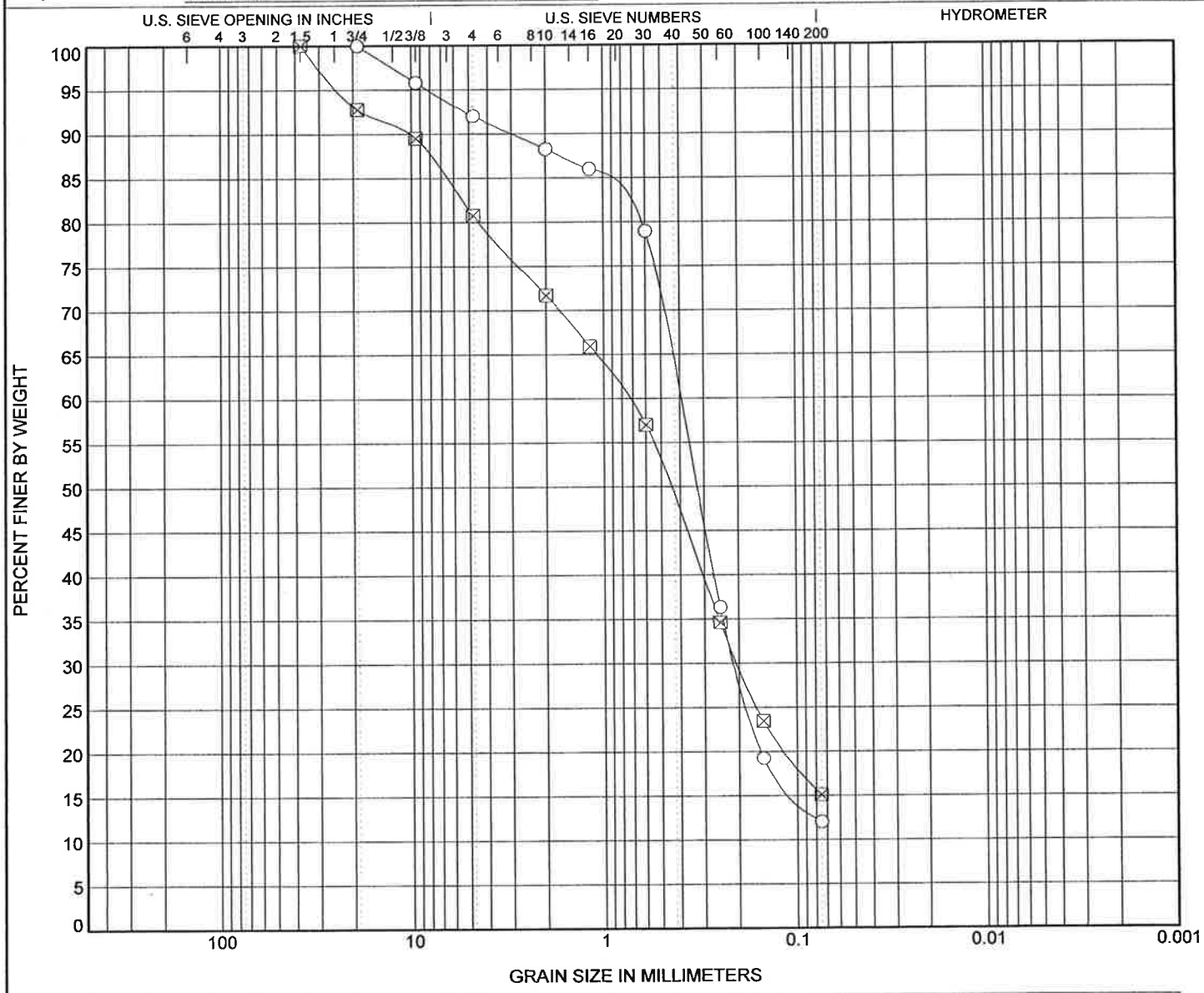
DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		0.5 TOPSOIL
					Brown silty SAND with gravel, dense, moist (Weathered Till)
		MC = 10.20%	SM		-becomes dense to very dense and unweathered
5					
		MC = 8.80% Fines = 15.10%			6.0 [USDA Classification: gray gravelly loamy SAND]
					Test pit terminated at 6.0 feet below existing grade. No groundwater encountered during excavation.
					Bottom of test pit at 6.0 feet.

GRAIN SIZE DISTRIBUTION

Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, WA 98005
Telephone: 425-284-3300

CLIENT DGR Development **PROJECT NAME** Griswold Plat

PROJECT NUMBER ES-3521 **PROJECT LOCATION** Kirkland



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
○	TP-4	1.0ft.	USDA: Brown Sand. USCS: SM.				1.71	6.60
☒	TP-5	6.0ft.	USDA: Gray Gravelly Loamy Sand. USCS: SM w Gravel.					

	Specimen Identification		D100	D60	D30	D10			%Silt	%Clay
○	TP-4	1.0ft.	19	0.406	0.207				12.1	
☒	TP-5	6.0ft.	37.5	0.754	0.202				15.1	

GRAIN SIZE ES-3521.GPJ GINT US LAB.GDT 8/13/14