INVENT WORKSHOP

Architects that Build
114 Alaskan Way S, Suite 200
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206.497.9603
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March 10, 2015

Attention: City of Bellevue Planning Dept.

Project: 5455 Pleasure Point Ln SE,
Bellevue, Wa 98006
Parcel # 682870-0035

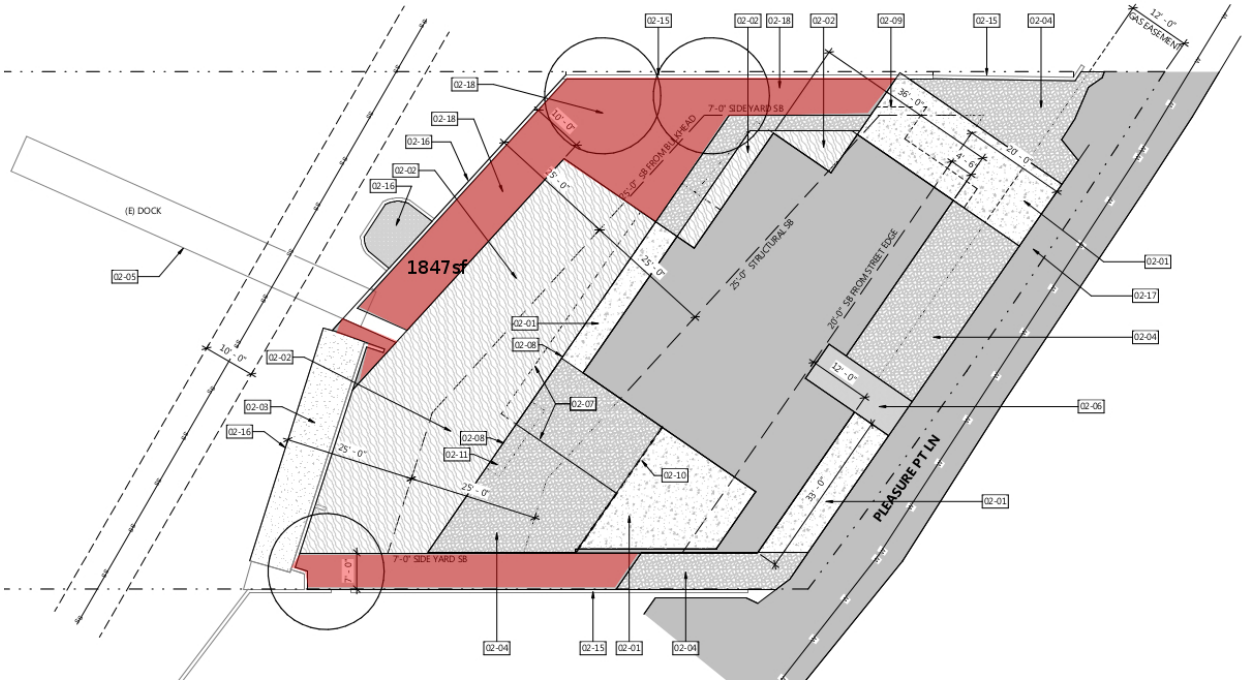
PROJECT NARRATIVE

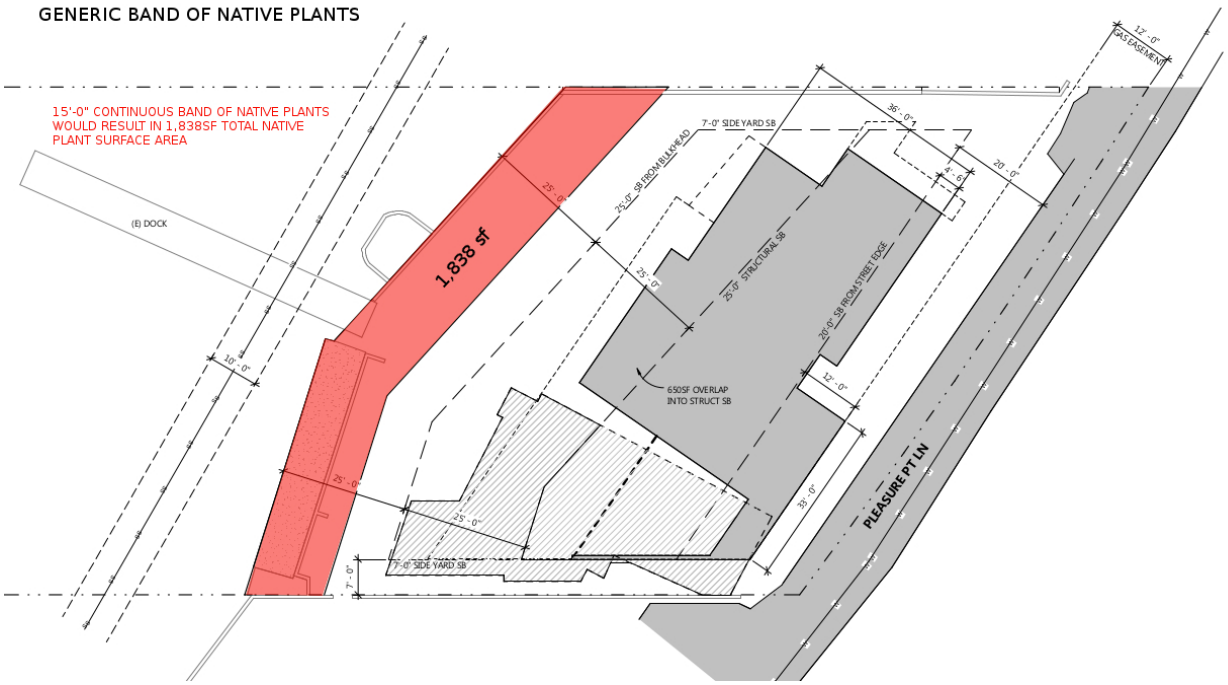
Michael and Amanda Chan propose a new private residence for parcel 682870-0035, on 5455 Pleasure Point Ln SE in Bellevue, Washington. The site is within the designated Shoreline of the State and is regulated under the shoreline code for the City of Bellevue. The structure will be type 5 construction, with 3 story massing. They propose a 1,230 sf daylight basement facing the lake with a finish floor elevation similar to the highwater mark of the lake bulkhead on the property. The second story will abut the private road leading to the property and will have a final floor elevation similar to that street. This level is comprised of 2,229sf conditioned living space and a 926 sf garage / utility space- unconditioned. The third story will be comprised of an 1,604sf master suite and childrens bedrooms.

The project proposal includes the total demolition of the existing home on the property currently, which is non conforming to the waterfront structural setback. The impacts and proposed mitigation to critical areas are illustrated below.

The 15’-0” continuous native planting band along the bulkhead:

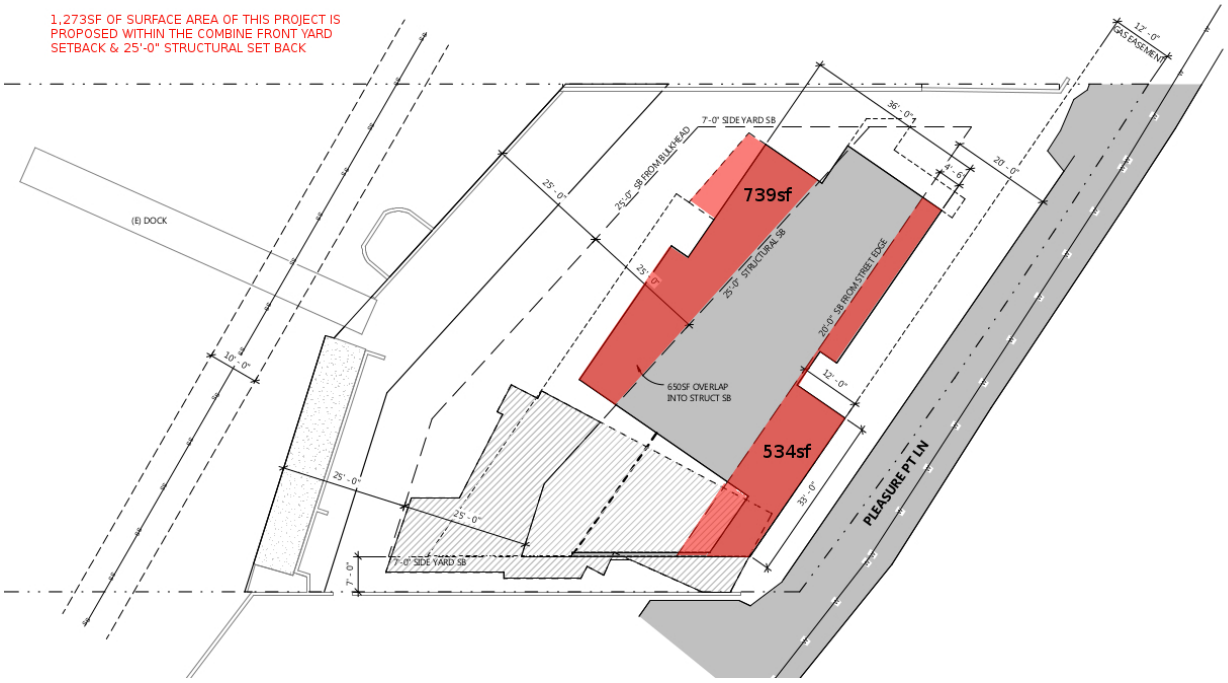
- As illustrated in the first image below, we propose a continuous band of native plants, resulting in 1,851sf of surface area; which is slightly an improvement over a generically applied 15’ wide continuous band along the bulkhead as the code intends. See illustrations below. In addition to merely providing the same net area we also propose to maintain 10’ width over 20% of the length of the band and greater than 16’ wide for the remaining southern portion.



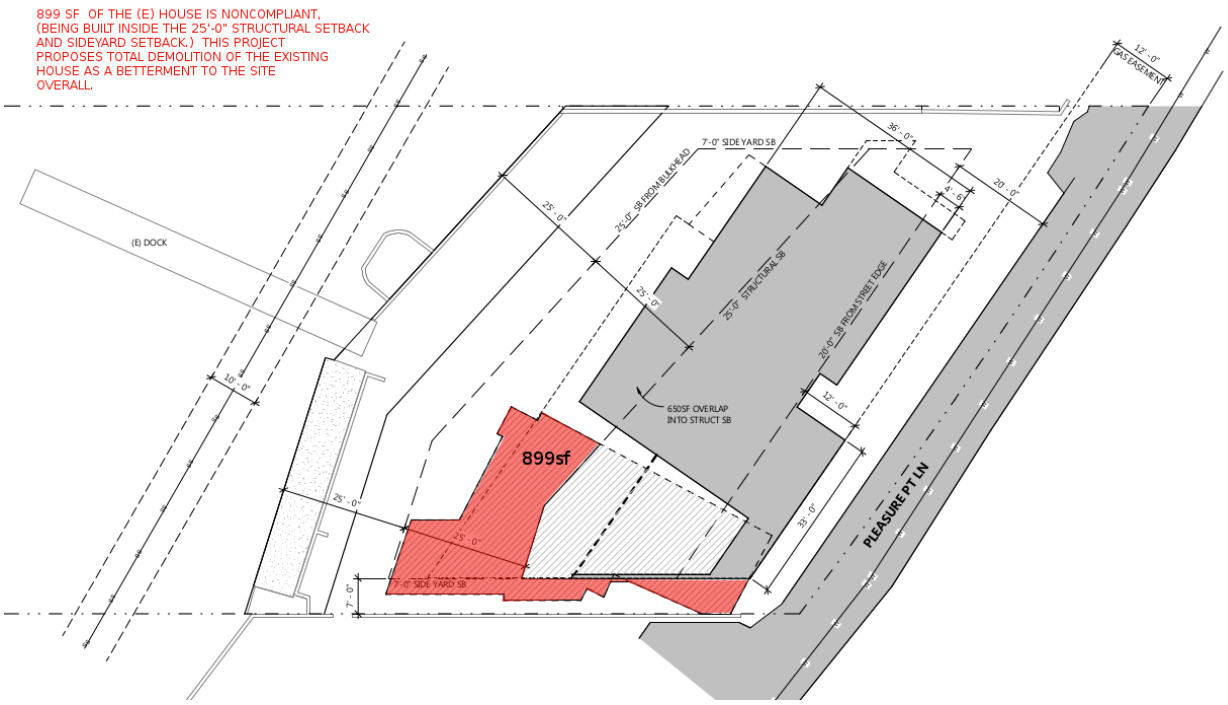


Offsetting the encroachment of the new house footprint:

- 1,273 sf surface area of this project is proposed within the combine front yard setback, and 25'-0" waterfront structural setback. See illustration below.



- 1st proposed betterment: 899 sf of the existing house is noncompliant, being built inside the 25'-0" structural setback and side yard setback. See illustration below. We propose the total demolition of the existing house and that the areas which are not in compliance be converted to a non structural use such as a deck and landscape paving.



Chan Residence Replacement
Critical Areas Report

Prepared for

The City of Bellevue
450 110th Ave. NE / P.O. Box 90012
Bellevue, WA 98009

Prepared by

Northwest
Environmental Consulting, LLC

3639 Palatine Ave N
Seattle, WA 98103
206-234-2520

November 2014

Table of Contents

Introduction

The Chan Family is planning on demolishing their existing home and constructing a new home on their waterfront property on Lake Washington. The site is within the designated Shoreline of the State and is regulated under the shoreline code for the City of Bellevue. The project is located at 5455 Pleasure Point Ln SE in Bellevue, Washington.

Critical Areas Regulations

The project is a residential re-development on an existing lot with an existing house and other improvements. The proposed project does not fit specifically to what is approved by the City of Bellevue (COB) Shoreline Code (20.25E.080N) and requires a variance. In order to have the project approved by the City of Bellevue variance process, a critical areas report must be submitted as part of an application for a specific development proposal. This report was prepared to meet the requirements of the COB Code (20.25H.250).

The City of Bellevue has established a 25-foot critical areas buffer from the shoreline of Lake Washington for structures and an additional 25 foot building setback from the 25-foot critical areas buffer.

Project Proposal

The Chan residence replacement will demolish the existing 2,800 square foot home and associated decks. A new 5,000 square foot home with a 926 square foot attached garage will be constructed in a new footprint. The new footprint will be constructed as close to Pleasure Point Lane as possible to place the house as far from the shore of Lake Washington as possible. The existing dock, bulkhead, and concrete pad along the bulkhead will remain unchanged.

Habitat Assessment

The property and adjacent properties are single-family homes. Vegetation consists of lawns and a few shrubs including Himalayan blackberry. Photos of the site are shown in Appendix A – Photos.

Existing Environmentally Critical Areas

The proposed project is on an approximately 12,000 square foot lot on the shore of Lake Washington. No wetlands or streams are present on the subject or adjacent properties. Steep slopes are present on the east side of Pleasure Point Lane and will not be encroached on. Lake Washington is a water of the United States and is designated as a Shoreline of the State.

Priority Species Use

Salmon species are present within Lake Washington, including species listed under the federal Endangered Species Act (ESA). Listed species include Puget Sound Chinook (threatened), Puget Sound steelhead (threatened), and bull trout (threatened). Other species of important local significance include kokanee, cutthroat trout, Coho salmon, and sockeye.

Impacts

The project will not directly impact Lake Washington. The project will increase impervious surfaces on the lot and will build a new house within 45 feet of Lake Washington in the 25- foot structural setback.

Direct Impacts

The proposed project will demolish an existing home on the lot and construct a new larger home on the parcel in a reconfigured footprint. The existing home footprint has 631 square feet within the existing 25-foot structural setback from Lake Washington. The proposed footprint will have 739 square feet increasing the non-conforming footprint within the 25-foot Lake Washington "no build" zone by 108 square feet.

Indirect Impacts

Indirect impacts include the potential for water quality impacts from runoff from the increase in impervious surfaces on the lot. The new house and other impervious surfaces will increase from 3,169 square feet to 5,640 square feet increasing the impervious surface on the 12,209 square feet lot by 2,471 square feet. The

impervious surface of the lot will meet the 50% development limit rule by 4% at 46%. An additional walkway will be constructed from the street to the front using pervious pavers. This walkway will be 156 square feet and is not included in the impervious surface calculations.

Impact to buffer functions and values

Impacts to the shoreline buffer will be temporary during construction as a result of disturbance of 8,000 square feet within and adjacent to the 25-foot buffer from demolition of the existing house and excavation of the new house foundation and other amenities proposed. Long term, the project will increase the amount of impervious surface in the buffer increasing the amount of water quantity coming from the site. The increase in pollution generating surface will be limited to 240 square feet from construction of a new driveway. The increased building footprint on the lot also removes the potential for critical areas buffer screening and habitat functions; however, the existing conditions are lawn that provides minimal habitat functions and no screening.

Overall impacts to functions and values of the existing shoreline buffer will be minimal, with the exception of the increase in impervious surface and 108 square feet of structure footprint within the buffer. Lake Washington is an exempt water body for water quantity input, so the impacts to the lake from the increase in runoff will be negligible. The proposed mitigation discussed below will enhance the buffer functions and values and will help improve water quality functions of the critical areas buffer.

Mitigation Strategy

Avoidance and Minimization

The parcel is a 12,209 square-foot parcel. Moving the house out of the shoreline zone is not feasible because the parcel is entirely within the 200-foot shoreline zone and is restricted to the east by Pleasure Point Lane making avoidance of critical areas buffers impossible. The proposed house replacement will minimize impacts by moving the house to the east side of the lot as much as practicable.

During construction, BMPs will be used to prevent turbid runoff from entering Lake Washington. All construction debris will be removed from the site and exposed soils will be stabilized.

Mitigation Approach

The City of Bellevue requires a minimum 10-foot strip of native plantings be planted along the shoreline. The property layout will not allow a 10-foot strip due to an existing 418 square foot concrete pad along the top of the bulkhead on the southwest corner of the property. This concrete pad is to remain along the waters edge.

To compensate for the concrete pad, additional building square foot area, and 108 square feet of building footprint in the 25-foot building setback, the Chan's project proposes a native planting area that is equivalent in square footage to a 15-foot native planting strip with a 16-foot strip along the existing concrete pad along the top of the bulkhead. The area of planting for this strip will be approximately 1,850 square feet. This is an increase of more than 50% over the minimal amount required of native plantings at this site.

The additional 626 square feet of planting area will offset the increase of structure footprint (108 square feet) and existing concrete pad (418 square feet) in the critical area buffer.

Shoreline Function and Values Improvements

The existing buffer along the shoreline of Lake Washington is bulkhead, concrete patio, and lawn. The existing house infringes within the 25-foot building setback by 631 square feet. The proposed project will plant an equivalent area of slightly more than a 15.5-foot setback from the bulkhead with native trees, shrubs, and groundcovers.

The larger planting area will increase the screening distance from the water, increase the area of the planted buffer allowing more time for surface water to filter and infiltrate before reaching Lake Washington increasing the water quality functions of the buffer.

These improvements will increase the buffer functions and values by creating a native buffer between the

house and Lake Washington that will increase screening, filtering of runoff, vertical natural structure along the lake edge and will provide some food sources for songbirds and other native fauna that use the Lake Washington shoreline.

Proposed Mitigation

Mitigation goals

Mitigation goals will include the following:

- Restore 1,850 square feet of Critical Area Buffer.
- Control yellow flag iris and other invasive plant species on the parcel.

Performance standards

Buffer plantings shall maintain a 100% survival for the first year and achieve 80% survival in years 2 and 3. For proper functioning, species diversity will be maintained. The planting areas will maintain a minimum of 2 tree species, 5 shrub species, and 5 ground cover species for the 3-year monitoring period.

Planting plan

Trees and shrubs will be containerized or bare root. The planting layouts, details, and quantities are shown in Appendix B – Planting plan

Schedule and Maintenance

Plantings shall be installed concurrently during demolition and construction of the new house or during late fall or winter months as long as the site preparation for the planting areas is completed concurrently with construction. Watering will be required for at least the first year after planting during the summer months.

Monitoring and Contingency

To ensure that the performance standards are met, plantings will be counted in August or September for survival for the first year. All dead plantings will be replaced so that 100% survival is reached for the first year. A sub sample can be completed to assure that the 100% survival is reached. In years 2 and 3 all shrub plantings will maintain an 80% survival rate for three years and tree plantings will maintain a 100% survival rate for a period of three years.

Yellow flag iris will be completely removed from the property by hand pulling in the spring before blooming for a period of 3 years. Himalayan blackberry, purple loosestrife, and English ivy will also be removed from property. No herbicides will be used within 15 feet of the waters edge to control invasive species.

Reporting

Monitoring reports shall be prepared and submitted to City of Bellevue annually on years 1-3

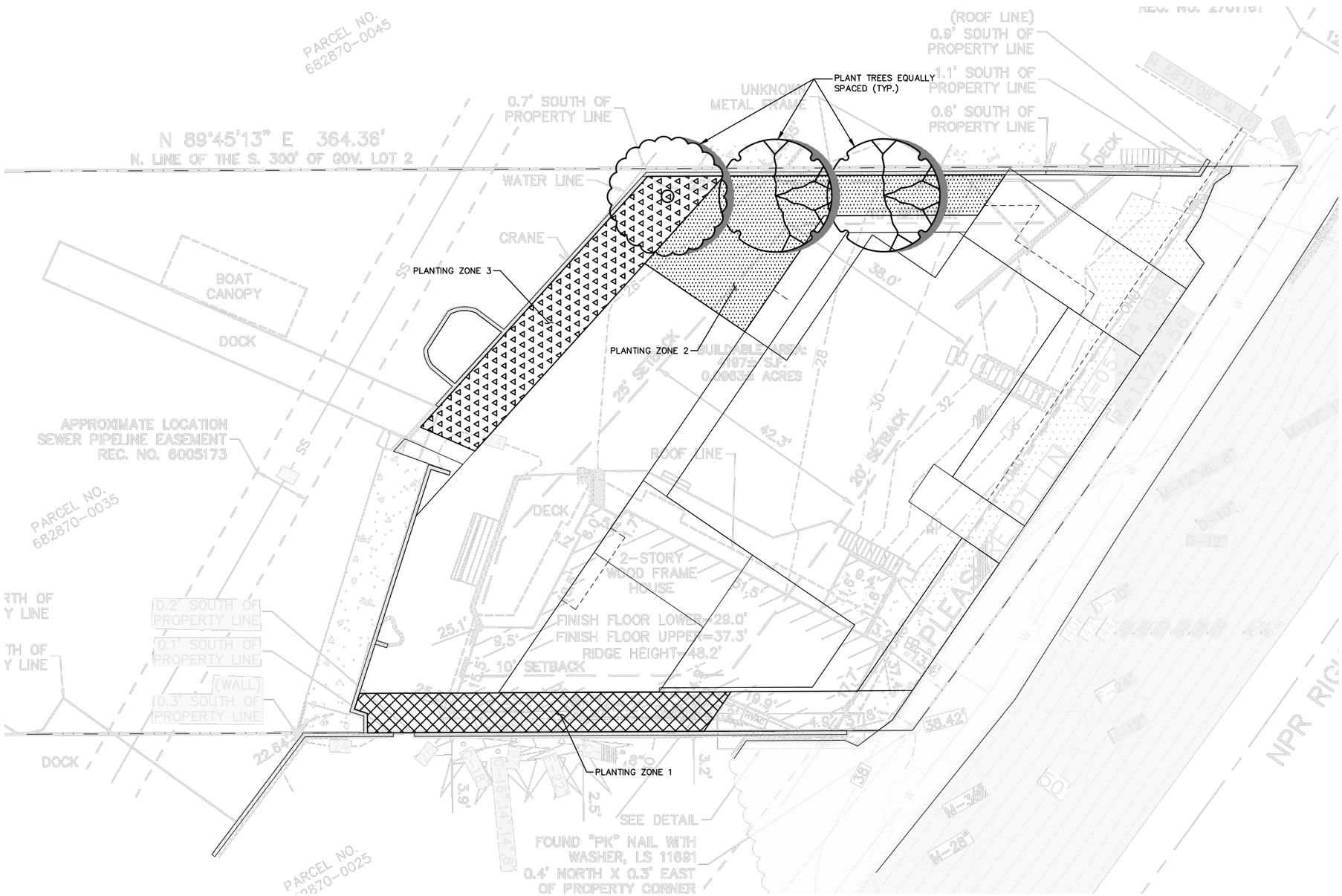
References

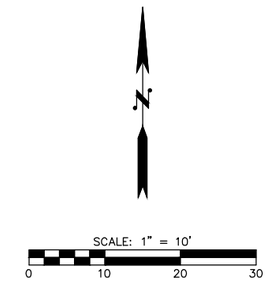
King County iMap. 2013. Interactive property and critical areas mapping tool. http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx. Queried September 28, 2013.

Washington Department of Fish and Wildlife. 2013. SalmonScape interactive mapping tool. http://fortress.wa.gov/dfw/gispublic/apps/salmonscape/default.htm. Queried September 28, 2013.

Figures

SEC. 20 , T. 24 N., R. 5 E., W.M.

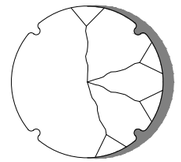




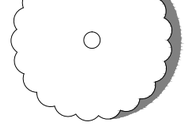
GENERAL NOTES:

1. FOR PLANTING LIST AND DETAILS SEE SHEET 2.
2. PLANTING GUIDE NOTES SHOULD BE FOLLOWED FOR EACH PLANTING ZONE.

LEGEND:



QUACKING ASPEN



SHORE PINE

PLANT NOTES:

ZONE 1 = 441 SQ FT
FOLLOW PLANTING GUIDE IN PLANTING MATERIAL LIST AND GENERAL NOTES FOR PLANT LAYOUTS.

ZONE 2 = 732 SQ FT
FOLLOW PLANTING GUIDE IN PLANTING MATERIAL LIST AND GENERAL NOTES FOR PLANT LAYOUTS.

ZONE 3 = 630 SQ FT
FOLLOW PLANTING GUIDE IN PLANTING MATERIAL LIST AND GENERAL NOTES FOR PLANT LAYOUTS.

811 Know what's below. Call before you dig.

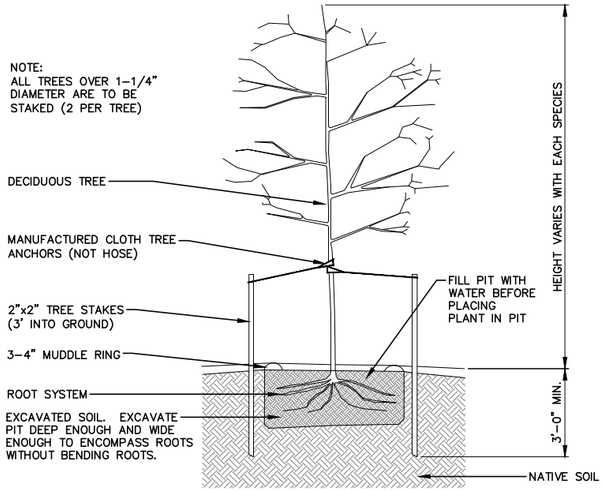
PRELIMINARY

FILE NAME: P:\10-140049 CHAN PLANTING PLAN\3 CADD\SHEETS\P_10-140049_PLANT.DWG
PLOT TIME: 11/4/2014 10:53 AM
USER NAME:RICHARD

DESIGNED BY BT DRAWN BY RDH CHECKED BY BT	OSBORN CONSULTING INCORPORATED	OSBORN CONSULTING, INC. 1800 112th Ave. NE, Suite 220E Ph (425) 451-4009 Bellevue, WA. 98004 Fax (425) 451-4901	NO.	DATE	REVISION	BY	Northwest Environmental Consulting, LLC

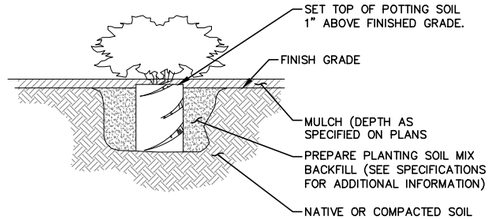
CHAN PLANTING PLAN
5455 PLEASURE PT LN BELLEVUE, WA 98006
PLANTING PLAN

JOB# / DWG	DATE
10-140049	OCT. 2014
SCALE	SHEET
H: 1"=10' V: N/A	1 of 2



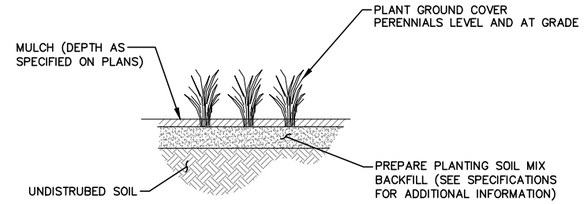
DECIDUOUS TREE PLANTING DETAIL

N.T.S.



SHRUB CONTAINER PLANTING DETAIL

N.T.S.

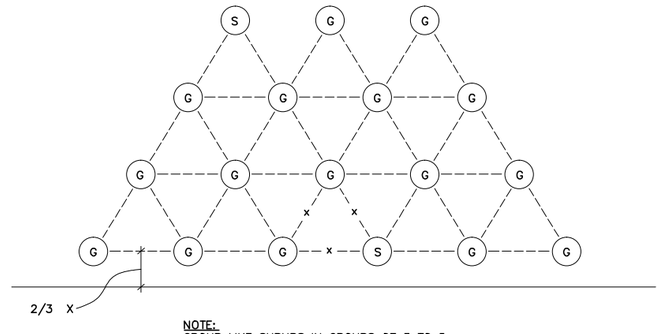


PERENNIAL AND GROUND COVER DETAIL

N.T.S.

PLANTING MATERIAL LIST

COMMON NAME	SCIENTIFIC NAME	SIZE	LIGHT NEEDS	SPACING	ZONE 1 QTY	ZONE 2 QTY	ZONE 3 QTY
TREES							
QUACKING ASPEN	*POPULUS TREMULOIDES*	CONTAINER	SUN	10 FT MIN		2	
SHORE PINE	*PINUS CONTORTA*	CONTAINER	SUN	10 FT MIN			1
SHRUBS							
RED FLOWERING CURRANT	*RIBES SANGUINEUM*	CONTAINER	SUN	6 FT		6	5
OCEAN SPRAY	*HOLODISCUS DISCOLOR*	CONTAINER	SUN-PART SUN	6 FT		6	4
SNOWBERRY	*SYMPHORICARPOS ALBUS*	CONTAINER	SUN-PART SUN	6 FT		6	4
INDIAN PLUM	*OEMLERIA CERASIFORMIS*	CONTAINER	SHADE	6 FT	5		
THIMBLEBERRY	*RUBUS PARVIFLORUS*	CONTAINER	SUN	6 FT		6	5
SHORT OREGON GRAPE	*BERBERIS NERVOSA*	CONTAINER	PART SHADE	6 FT	5		
GROUNDCOVER							
KINNIKINNICK	*ARCTOSTAPHYLOS UVA-URSI*	CONTAINER	SUN	2 FT		30	22
BLEEDING HEART	*DICENTRA FORMOSA*	CONTAINER	PART SHADE	2 FT	35		
WILD LILY OF THE VALLEY	*MAIANTHEMUM DILATATUM*	CONTAINER	PART SHADE	2 FT		30	22
WOOD-SORREL	*OXALIS OREGANA*	CONTAINER	PART SHADE	2 FT		30	22
WILD GINGER	*ASARUM CAUDATUM*	CONTAINER	SHADE	2 FT	35		
SWORD FERN	*POLYSTICHUM MUNITUM*	CONTAINER	PART SHADE	2 FT	10		
WILD STRAWBERRY	*FRAGARIA CHILOENSIS*	CONTAINER	SUN	2 FT		30	22
WESTERN IRIS	*IRIS TENAX*	CONTAINER	SUN	2 FT		30	22
WESTERN COLUMBINE	*AQUILEGIA FORMOSA*	CONTAINER	SUN	2 FT		30	22
SALAL	*GAULTHERIA SHALLON*	CONTAINER	SHADE	2 FT	10		
BIG-LEAF LUPINE	*LUPINUS POLYPHYLLUS*	CONTAINER	SUN			30	22
			TOTALS	**TREES**	**0**	**2**	**1**
				SHRUBS	**10**	**24**	**18**
				GROUNDCOVER	**90**	**210**	**154**



NOTE:
GROUP LIKE SHRUBS IN GROUPS OF 3 TO 5.
TREES SHOULD NOT BE PLACED NEXT TO EACH OTHER.

TYPICAL PLANT SPACING

X = PLANT SPACING (SEE PLANTING PLAN)

S = SHRUB

G = GROUNDCOVER

PRELIMINARY

Know what's **below.** Call before you dig.

FILE NAME: P:\10-140049 CHAN PLANTING PLAN\3 CADD\SHEETS\P_10-140049_PLANT.DWG
PLOT TIME: 11/4/2014 10:53 AM
USER NAME:RICHARD

DESIGNED BY	DRAWN BY	CHECKED BY
BT	RDH	BT

OSBORN CONSULTING INCORPORATED

OSBORN CONSULTING, INC.
1800 112th Ave. NE, Suite 220E Ph (425) 451-4009
Bellevue, WA. 98004 Fax (425) 451-4901

NO.	DATE	REVISION	BY

Northwest Environmental Consulting, LLC

CHAN PLANTING PLAN
5455 PLEASURE PT LN BELLEVUE, WA 98006
PLANT LIST AND DETAILS

JOB# / DWG	DATE
10-140049	OCT. 2014
SCALE	SHEET
H: N/A V: N/A	2 of 2

Photos

Photo 1 - Existing house and buffer.

Photo 2 - Shoreline conditions at the site.

GEOTECH
CONSULTANTS, INC.

13256 Northeast 20th Street, Suite 16
Bellevue, Washington 98005
(425) 747-5618 FAX (425) 747-8561

July 3, 2014

JN 14231

Michael Chan
5455 Pleasure Point Lane Southeast
Bellevue, Washington 98006

via email: ibchiro@gmail.com

Subject: **Transmittal Letter – Geotechnical Engineering Study**
Proposed Single-Family Residence
5455 Pleasure Point Lane Southeast
Bellevue, Washington

Dear Mr. Chan:

We are pleased to present this geotechnical engineering report for the residence to be constructed in Bellevue. The scope of our services consisted of exploring site surface and subsurface conditions, and then developing this report to provide recommendations for general earthwork and design criteria for foundations and retaining walls. This work was authorized by your acceptance of our proposal, P-8947, dated June 2, 2014.

The attached report contains a discussion of the study and our recommendations. Please contact us if there are any questions regarding this report, or for further assistance during the design and construction phases of this project.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

Thor Christensen, P.E.
Senior Engineer

cc: **Deontology** – Ryan Cornwall
via email: rcornwall@deonllc.com

TRC/MRM:at

GEOTECHNICAL ENGINEERING STUDY
Proposed Single-Family Residence
5455 Pleasure Point Lane Southeast
Bellevue, Washington

This report presents the findings and recommendations of our geotechnical engineering study for the site of the proposed residence to be located in Bellevue.

We were provided with a topographic survey of the site by BBA Land Surveying dated November 11, 2011. Development of the property is in the planning stage, and detailed plans were not made available to us. We have been provided with a preliminary sketch by Deontology that shows the proposed residence location. Based on that plan, we understand that the development will consist of a two-story residence with a basement that will daylight toward the northwest. The residence will have a setback of 20 feet from the southeast side of the property and at least 10 feet from the northern property line. We anticipate that an excavation of about 7 feet will be required for the foundation along the southeast edge of the residence.

We understand that the existing house will likely remain at the site, but in the future it may be removed to make room for another phase of development.

If the scope of the project changes from what we have described above, we should be provided with revised plans in order to determine if modifications to the recommendations and conclusions of this report are warranted.

SITE CONDITIONS

SURFACE

The Vicinity Map, Plate 1, illustrates the general location of the parallelogram-shaped site. The site is bordered to the east by Pleasure Point Land Southeast, to the west by Lake Washington, and to the north and south by residences.

The southern portion of the site is developed with a one-story house with a basement that daylights toward the west. We understand that the floor at the west side of the house dips slightly toward the west, a possible indication of past settlement. We observed a few diagonal cracks in a brick chimney near the northern corner of the residence, which are also indications of past settlement. There is a deck on the west side of the house, with a storage area below the deck. The storage area has been excavated a few feet below the surrounding grade, and we observed a few inches of standing water in the storage area.

The ground surface in the eastern 30 feet of the site slopes moderately down from Pleasure Point Lane Southeast toward the northwest, with a change in elevation of up to 8 feet. Continuing west, the site slopes slightly down toward the northwest to Lake Washington. A concrete bulkhead a few feet tall is located along the edge of the lake, and a dock extends from the site into the lake. The site is vegetated with grass lawn. There are no steep slopes within the site. A masonry block retaining wall is located along the south edge of the property, and supports soil south of the site. That wall increases in height toward the east, reaching a height of 10 feet near the southeast corner of the site house.

A retaining wall located in the eastern portion of the site has a height of a few feet. This wall has a northeast-southwest alignment and is located about 25 feet west of the north end of the eastern edge of the site. Some wall and roof framing are located over and northwest of the wall, at the apparent location of a former shed.

SUBSURFACE

The subsurface conditions were explored by excavating five test pits at the approximate locations shown on the Site Exploration Plan, Plate 2. Our exploration program was based on the proposed construction, anticipated subsurface conditions and those encountered during exploration, and the scope of work outlined in our proposal.

The test pits were excavated on June 25, 2014 with a small rubber-tracked excavator. A geotechnical engineer from our staff observed the excavation process, logged the test pits, and obtained representative samples of the soil encountered. "Grab" samples of selected subsurface soil were collected from the backhoe bucket. The Test Pit Logs are attached to this report as Plates 3 through 5.

Soil Conditions

The test pits encountered about a foot of topsoil that was underlain by native sand. The upper portion of the sand was loose, but it became medium-dense at a depth of about 2 to 4 feet. The medium-dense sand extended to the base of the explorations, at depths of 6 to 7.5 feet.

Our firm previously provided geotechnical services for a residential project two lots to the north. We observed similar native soils in the foundation excavations for that project.

Groundwater Conditions

Groundwater seepage was observed at a depth of 5.5 to 6 feet in two of the test pit explorations. Groundwater below the site is closely related to the adjacent Lake Washington, and we expect that groundwater below the site rises and falls as the lake level does. The test pits were completed in summer, when the lake is near its highest level. The level of the lake is typically lowered up to 2 feet during the winter months.

The stratification lines on the logs represent the approximate boundaries between soil types at the exploration locations. The actual transition between soil types may be gradual, and subsurface conditions can vary between exploration locations. The logs provide specific subsurface information only at the locations tested. The relative densities and moisture descriptions indicated on the test pit logs are interpretive descriptions based on the conditions observed during excavation.

The compaction of test pit backfill was not in the scope of our services. Loose soil will therefore be found in the area of the test pits. If this presents a problem, the backfill will need to be removed and replaced with structural fill during construction.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

THIS SECTION CONTAINS A SUMMARY OF OUR STUDY AND FINDINGS FOR THE PURPOSES OF A GENERAL OVERVIEW ONLY. MORE SPECIFIC RECOMMENDATIONS AND CONCLUSIONS ARE CONTAINED IN THE REMAINDER OF THIS REPORT. ANY PARTY RELYING ON THIS REPORT SHOULD READ THE ENTIRE DOCUMENT.

The test pits conducted for this study encountered native, medium-dense sand at depths of 2 to 4 feet. We recommend that the new house be supported on conventional footings excavated to the medium-dense sand. The footings should be excavated with a smooth bucket, and the prepared foundation subgrades should be compacted to a firm condition with a jumping jack compactor. The residence foundations should be cast directly on the compacted soils.

Temporary cut slopes in the sand soils should not be steeper than our recommendations. Cut slopes should not extend closer than 5 feet to the existing foundations, traveled roadways, or other settlement sensitive elements. It is prudent to cover the cut slopes with plastic regardless of weather conditions in order to prevent the sand from eroding or drying out.

Groundwater exists below the site at the elevation of the adjacent lake, which varies seasonally. Utility trench excavations may encounter groundwater and caving conditions, so the utility contractor should be prepared for such conditions.

The erosion control measures needed during the site development will depend heavily on the weather conditions that are encountered. We anticipate that a silt fence will be needed around the downslope sides of any cleared areas. Existing pavements, ground cover, and landscaping should be left in place wherever possible to minimize the amount of exposed soil. Rocked staging areas and construction access roads should be provided to reduce the amount of soil or mud carried off the property by trucks and equipment. Wherever possible, the access roads should follow the alignment of planned pavements. Trucks should not be allowed to drive off of the rock-covered areas. Cut slopes and soil stockpiles should be covered with plastic during wet weather. Following clearing or rough grading, it may be necessary to mulch or hydroseed bare areas that will not be immediately covered with landscaping or an impervious surface. On most construction projects, it is necessary to periodically maintain or modify temporary erosion control measures to address specific site and weather conditions.

The drainage and/or waterproofing recommendations presented in this report are intended only to prevent active seepage from flowing through concrete walls or slabs. Even in the absence of active seepage into and beneath structures, water vapor can migrate through walls, slabs, and floors from the surrounding soil, and can even be transmitted from slabs and foundation walls due to the concrete curing process. Water vapor also results from occupant uses, such as cooking and bathing. Excessive water vapor trapped within structures can result in a variety of undesirable conditions, including, but not limited to, moisture problems with flooring systems, excessively moist air within occupied areas, and the growth of molds, fungi, and other biological organisms that may be harmful to the health of the occupants. The designer or architect must consider the potential vapor sources and likely occupant uses, and provide sufficient ventilation, either passive or mechanical, to prevent a build up of excessive water vapor within the planned structure.

Geotech Consultants, Inc. should be allowed to review the final development plans to verify that the recommendations presented in this report are adequately addressed in the design. Such a plan review would be additional work beyond the current scope of work for this study, and it may include revisions to our recommendations to accommodate site, development, and geotechnical constraints that become more evident during the review process.

We recommend including this report, in its entirety, in the project contract documents. This report should also be provided to any future property owners so they will be aware of our findings and recommendations.

SEISMIC CONSIDERATIONS

In accordance with the International Building Code (IBC), the site class within 100 feet of the ground surface is best represented by Site Class Type D (Stiff Site Class). The site soils have a low potential for seismic liquefaction because of their medium-dense nature.

CONVENTIONAL FOUNDATIONS

The proposed structure can be supported on conventional continuous and spread footings bearing on undisturbed, medium-dense, native soil, or on structural fill placed above this competent native soil. **The General section contains recommendations for preparation of footing subgrades.** See the section entitled ***General Earthwork and Structural Fill*** for recommendations regarding the placement and compaction of structural fill beneath structures.

We recommend that continuous and individual spread footings have minimum widths of 12 and 16 inches, respectively. Exterior footings should also be bottomed at least 18 inches below the lowest adjacent finish ground surface for protection against frost and erosion. The local building codes should be reviewed to determine if different footing widths or embedment depths are required. Footing subgrades must be cleaned of loose or disturbed soil prior to pouring concrete. Depending upon site and equipment constraints, this may require removing the disturbed soil by hand.

An allowable bearing pressure of 2,500 pounds per square foot (psf) is appropriate for footings supported on competent native soil. A one-third increase in this design bearing pressure may be used when considering short-term wind or seismic loads. For the above design criteria, it is anticipated that the total post-construction settlement of footings founded on competent native soil, or on structural fill up to 5 feet in thickness, will be about one-inch, with differential settlements on the order of one-half-inch in a distance of 30 feet along a continuous footing with a uniform load.

Lateral loads due to wind or seismic forces may be resisted by friction between the foundation and the bearing soil, or by passive earth pressure acting on the vertical, embedded portions of the foundation. For the latter condition, the foundation must be either poured directly against relatively

level, undisturbed soil or be surrounded by level, well-compacted fill. We recommend using the following ultimate values for the foundation's resistance to lateral loading:

PARAMETER	ULTIMATE VALUE
Coefficient of Friction	0.45
Passive Earth Pressure	350 pcf

Where: (i) pcf is pounds per cubic foot, and (ii) passive earth pressure is computed using the equivalent fluid density.

If the ground in front of a foundation is loose or sloping, the passive earth pressure given above will not be appropriate. We recommend maintaining a safety factor of at least 1.5 for the foundation's resistance to lateral loading, when using the above ultimate values.

FOUNDATION AND RETAINING WALLS

Retaining walls backfilled on only one side should be designed to resist the lateral earth pressures imposed by the soil they retain. The following recommended parameters are for walls that restrain level backfill:

PARAMETER	VALUE
Active Earth Pressure *	35 pcf
Passive Earth Pressure	350 pcf
Coefficient of Friction	0.45
Soil Unit Weight	130 pcf

Where: (i) pcf is pounds per cubic foot, and (ii) active and passive earth pressures are computed using the equivalent fluid pressures.
*** For a restrained wall that cannot deflect at least 0.002 times its height, a uniform lateral pressure equal to 10 psf times the height of the wall should be added to the above active equivalent fluid pressure.**

The design values given above do not include the effects of any hydrostatic pressures behind the walls and assume that no surcharges, such as those caused by slopes, vehicles, or adjacent foundations will be exerted on the walls. If these conditions exist, those pressures should be added to the above lateral soil pressures. Where sloping backfill is desired behind the walls, we will need to be given the wall dimensions and the slope of the backfill in order to provide the appropriate design earth pressures. The surcharge due to traffic loads behind a wall can typically be accounted for by adding a uniform pressure equal to 2 feet multiplied by the above active fluid density. Heavy construction equipment should not be operated behind retaining and foundation walls within a distance equal to the height of a wall, unless the walls are designed for the additional lateral pressures resulting from the equipment.

The values given above are to be used to design only permanent foundation and retaining walls that are to be backfilled, such as conventional walls constructed of reinforced concrete or masonry. It is not appropriate to use the above earth pressures and soil unit weight to back-calculate soil strength parameters for design of other types of retaining walls, such as soldier pile, reinforced

earth, modular or soil nail walls. We can assist with design of these types of walls, if desired. The passive pressure given is appropriate only for a shear key poured directly against undisturbed native soil, or for the depth of level, well-compacted fill placed in front of a retaining or foundation wall. The values for friction and passive resistance are ultimate values and do not include a safety factor. We recommend a safety factor of at least 1.5 for overturning and sliding, when using the above values to design the walls. Restrained wall soil parameters should be utilized for a distance of 1.5 times the wall height from corners or bends in the walls. This is intended to reduce the amount of cracking that can occur where a wall is restrained by a corner.

Wall Pressures Due to Seismic Forces

The surcharge wall loads that could be imposed by the design earthquake can be modeled by adding a uniform lateral pressure to the above-recommended active pressure. The recommended surcharge pressure is 7**H** pounds per square foot (psf), where **H** is the design retention height of the wall. Using this increased pressure, the safety factor against sliding and overturning can be reduced to 1.2 for the seismic analysis.

Retaining Wall Backfill and Waterproofing

Backfill placed behind retaining or foundation walls should be coarse, free-draining structural fill containing no organics. This backfill should contain no more than 5 percent silt or clay particles and have no gravel greater than 4 inches in diameter. The percentage of particles passing the No. 4 sieve should be between 25 and 70 percent. If the native sand is used as backfill, a minimum 12-inch width of free-draining gravel or a drainage composite similar to Miradrain 6000 should be placed against the backfilled retaining walls. The gravel or drainage composites should be hydraulically connected to the foundation drain system. For increased protection, drainage composites should be placed along cut slope faces, and the walls should be backfilled entirely with free-draining soil. The later section entitled ***Drainage Considerations*** should also be reviewed for recommendations related to subsurface drainage behind foundation and retaining walls.

The purpose of these backfill requirements is to ensure that the design criteria for a retaining wall are not exceeded because of a build-up of hydrostatic pressure behind the wall. Also, subsurface drainage systems are not intended to handle large volumes of water from surface runoff. The top 12 to 18 inches of the backfill should consist of a compacted, relatively impermeable soil or topsoil, or the surface should be paved. The ground surface must also slope away from backfilled walls to reduce the potential for surface water to percolate into the backfill. Water percolating through pervious surfaces (pavers, gravel, permeable pavement, ect.) must also be prevented from flowing toward walls or into the backfill zone. The compacted subgrade below pervious surfaces and any associated drainage layer should therefore be sloped away. Alternatively, a membrane and subsurface collection system could be provided below a pervious surface.

It is critical that the wall backfill be placed in lifts and be properly compacted, in order for the above-recommended design earth pressures to be appropriate. The wall design criteria assume that the backfill will be well-compacted in lifts no thicker than 12 inches. The compaction of backfill near the walls should be accomplished with hand-operated equipment to prevent the walls from being overloaded by the higher soil forces that occur during compaction. The section entitled ***General Earthwork and Structural Fill*** contains additional recommendations regarding the placement and compaction of structural fill behind retaining and foundation walls.

The above recommendations are not intended to waterproof below-grade walls, or to prevent the formation of mold, mildew or fungi in interior spaces. Over time, the performance of subsurface drainage systems can degrade, subsurface groundwater flow patterns can change, and utilities can break or develop leaks. Therefore, waterproofing should be provided where future seepage through the walls is not acceptable. This typically includes limiting cold-joints and wall penetrations, and using bentonite panels or membranes on the outside of the walls. There are a variety of different waterproofing materials and systems, which should be installed by an experienced contractor familiar with the anticipated construction and subsurface conditions. Applying a thin coat of asphalt emulsion to the outside face of a wall is not considered waterproofing, and will only help to reduce moisture generated from water vapor or capillary action from seeping through the concrete. As with any project, adequate ventilation of basement and crawl space areas is important to prevent a build up of water vapor that is commonly transmitted through concrete walls from the surrounding soil, even when seepage is not present. This is appropriate even when waterproofing is applied to the outside of foundation and retaining walls. We recommend that you contact an experienced envelope consultant if detailed recommendations or specifications related to waterproofing design, or minimizing the potential for infestations of mold and mildew are desired.

The ***General***, ***Slabs-On-Grade***, and ***Drainage Considerations*** sections should be reviewed for additional recommendations related to the control of groundwater and excess water vapor for the anticipated construction.

SLABS-ON-GRADE

The building floors can be constructed as slabs-on-grade atop competent native soil, or on structural fill. The subgrade soil must be in a firm, non-yielding condition at the time of slab construction or underslab fill placement. Any soft areas encountered should be excavated and replaced with select, imported structural fill.

Even where the exposed soils appear dry, water vapor will tend to naturally migrate upward through the soil to the new constructed space above it. This can affect moisture-sensitive flooring, cause imperfections or damage to the slab, or simply allow excessive water vapor into the space above the slab. All interior slabs-on-grade should be underlain by a capillary break drainage layer consisting of a minimum 4-inch thickness of clean gravel or crushed rock that has a fines content (percent passing the No. 200 sieve) of less than 3 percent and a sand content (percent passing the No. 4 sieve) of no more than 10 percent. Pea gravel or crushed rock are typically used for this layer.

As noted by the American Concrete Institute (ACI) in the *Guides for Concrete Floor and Slab Structures*, proper moisture protection is desirable immediately below any on-grade slab that will be covered by tile, wood, carpet, impermeable floor coverings, or any moisture-sensitive equipment or products. ACI also notes that vapor *retarders* such as 6-mil plastic sheeting have been used in the past, but are now recommending a minimum 10-mil thickness for better durability and long term performance. A vapor retarder is defined as a material with a permeance of less than 0.3 perms, as determined by ASTM E 96. It is possible that concrete admixtures may meet this specification, although the manufacturers of the admixtures should be consulted. Where vapor retarders are used under slabs, their edges should overlap by at least 6 inches and be sealed with adhesive tape. The sheeting should extend to the foundation walls for maximum vapor protection. If no

potential for vapor passage through the slab is desired, a vapor *barrier* should be used. A vapor barrier, as defined by ACI, is a product with a water transmission rate of 0.01 perms when tested in accordance with ASTM E 96. Reinforced membranes having sealed overlaps can meet this requirement.

EXCAVATIONS AND SLOPES

Excavation slopes should not exceed the limits specified in local, state, and national government safety regulations. Temporary cuts to a depth of about 4 feet may be attempted vertically in unsaturated soil, if there are no indications of slope instability. However, vertical cuts should not be made near property boundaries, or existing utilities and structures. Based upon Washington Administrative Code (WAC) 296, Part N, the soil at the subject site would generally be classified as Type B. Therefore, temporary cut slopes greater than 4 feet in height should not be excavated at an inclination steeper than 1:1 (Horizontal:Vertical), extending continuously between the top and the bottom of a cut. Other considerations for temporary cuts are presented in the **General Section**.

The above-recommended temporary slope inclination is based on the conditions exposed in our explorations, and on what has been successful at other sites with similar soil conditions. It is possible that variations in soil and groundwater conditions will require modifications to the inclination at which temporary slopes can stand. Temporary cuts are those that will remain unsupported for a relatively short duration to allow for the construction of foundations, retaining walls, or utilities. Temporary cut slopes should be protected with plastic sheeting during wet weather. It is also important that surface runoff be directed away from the top of temporary slope cuts. Cut slopes should also be backfilled or retained as soon as possible to reduce the potential for instability. Please note that sand or loose soil can cave suddenly and without warning. Excavation, foundation, and utility contractors should be made especially aware of this potential danger. These recommendations may need to be modified if the area near the potential cuts has been disturbed in the past by utility installation, or if settlement-sensitive utilities are located nearby.

All permanent cuts into native soil should be inclined no steeper than 2:1 (H:V). Compacted fill slopes should not be constructed with an inclination greater than 2:1 (H:V). To reduce the potential for shallow sloughing, fill must be compacted to the face of these slopes. This can be accomplished by overbuilding the compacted fill and then trimming it back to its final inclination. Adequate compaction of the slope face is important for long-term stability and is necessary to prevent excessive settlement of patios, slabs, foundations, or other improvements that may be placed near the edge of the slope.

Water should not be allowed to flow uncontrolled over the top of any temporary or permanent slope. All permanently exposed slopes should be seeded with an appropriate species of vegetation to reduce erosion and improve the stability of the surficial layer of soil.

DRAINAGE CONSIDERATIONS

Footing drains should be used where (1) crawl spaces or basements will be below a structure, (2) a slab is below the outside grade, or (3) the outside grade does not slope downward from a building. Drains should also be placed at the base of all earth-retaining walls. These drains should be surrounded by at least 6 inches of 1-inch-minus, washed rock that is encircled with non-woven, geotextile filter fabric (Mirafi 140N, Supac 4NP, or similar material). At its highest point, a

perforated pipe invert should be at least 6 inches below the bottom of a slab floor or the level of a crawl space. The discharge pipe for subsurface drains should be sloped for flow to the outlet point. Roof and surface water drains must not discharge into the foundation drain system. A typical drain detail is attached to this report as Plate 6. For the best long-term performance, perforated PVC pipe is recommended for all subsurface drains.

Underslab drainage or drainage inside the building's footprint should also be provided where (1) a crawl space or slab will slope or be lower than the surrounding ground surface, (2) an excavation encounters significant seepage, or (3) an excavation for a building will be close to the expected high groundwater elevations. We can provide recommendations for interior drains, should they become necessary, during excavation and foundation construction.

As a minimum, a vapor retarder, as defined in the ***Slabs-On-Grade*** section, should be provided in any crawl space area to limit the transmission of water vapor from the underlying soils. Crawl space grades are sometimes left near the elevation of the bottom of the footings. As a result, an outlet drain is recommended for all crawl spaces to prevent an accumulation of any water that may bypass the footing drains. Providing even a few inches of free draining gravel underneath the vapor retarder limits the potential for seepage to build up on top of the vapor retarder.

Groundwater was observed during our field work. If seepage is encountered in an excavation, it should be drained from the site by directing it through drainage ditches, perforated pipe, or French drains, or by pumping it from sumps interconnected by shallow connector trenches at the bottom of the excavation.

The excavation and site should be graded so that surface water is directed off the site and away from the tops of slopes. Water should not be allowed to stand in any area where foundations, slabs, or pavements are to be constructed. Final site grading in areas adjacent to buildings should slope away at least 2 percent, except where the area is paved. Surface drains should be provided where necessary to prevent ponding of water behind foundation or retaining walls. A discussion of grading and drainage related to pervious surfaces near walls and structures is contained in the ***Foundation and Retaining Walls*** section.

GENERAL EARTHWORK AND STRUCTURAL FILL

All building and pavement areas should be stripped of surface vegetation, topsoil, organic soil, and other deleterious material. It is important that existing foundation(s) be removed before site development. The stripped or removed materials should not be mixed with any materials to be used as structural fill, but they could be used in non-structural areas, such as landscape beds.

Structural fill is defined as any fill, including utility backfill, placed under, or close to, a building, behind permanent retaining or foundation walls, or in other areas where the underlying soil needs to support loads. All structural fill should be placed in horizontal lifts with a moisture content at, or near, the optimum moisture content. The optimum moisture content is that moisture content that results in the greatest compacted dry density. The moisture content of fill is very important and must be closely controlled during the filling and compaction process.

The allowable thickness of the fill lift will depend on the material type selected, the compaction equipment used, and the number of passes made to compact the lift. The loose lift thickness should not exceed 12 inches. We recommend testing the fill as it is placed. If the fill is not sufficiently compacted, it can be recompacted before another lift is placed. This eliminates the

need to remove the fill to achieve the required compaction. The following table presents recommended relative compactions for structural fill:

LOCATION OF FILL PLACEMENT	MINIMUM RELATIVE COMPACTION
Beneath footings, slabs or walkways	95%
Filled slopes and behind retaining walls	90%
Beneath pavements	95% for upper 12 inches of subgrade; 90% below that level

Where: Minimum Relative Compaction is the ratio, expressed in percentages, of the compacted dry density to the maximum dry density, as determined in accordance with ASTM Test Designation D 1557-91 (Modified Proctor).

Use of On-Site Soil

The sand soils that underlie the site have low moisture sensitivity, so it should be feasible to use these materials as structural fill. It would be difficult to compact them sufficiently for use under footings.

Structural fill that will be placed in wet weather should consist of a coarse, granular soil with a silt or clay content of no more than 5 percent. The percentage of particles passing the No. 200 sieve should be measured from that portion of soil passing the three-quarter-inch sieve.

LIMITATIONS

The conclusions and recommendations contained in this report are based on site conditions as they existed at the time of our exploration and assume that the soil and groundwater conditions encountered in the test pits are representative of subsurface conditions on the site. If the subsurface conditions encountered during construction are significantly different from those observed in our explorations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. Unanticipated conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking samples in test pits. Subsurface conditions can also vary between exploration locations. Such unexpected conditions frequently require making additional expenditures to attain a properly constructed project. It is recommended that the owner consider providing a contingency fund to accommodate such potential extra costs and risks. This is a standard recommendation for all projects.

This report has been prepared for the exclusive use of Michael Chan and his representatives for specific application to this project and site. Our conclusions and recommendations are professional opinions derived in accordance with our understanding of current local standards of

practice, and within the scope of our services. No warranty is expressed or implied. The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design. Our services also do not include assessing or minimizing the potential for biological hazards, such as mold, bacteria, mildew and fungi in either the existing or proposed site development.

ADDITIONAL SERVICES

In addition to reviewing the final plans, Geotech Consultants, Inc. should be retained to provide geotechnical consultation, testing, and observation services during construction. This is to confirm that subsurface conditions are consistent with those indicated by our exploration, to evaluate whether earthwork and foundation construction activities comply with the general intent of the recommendations presented in this report, and to provide suggestions for design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. However, our work would not include the supervision or direction of the actual work of the contractor and its employees or agents. Also, job and site safety, and dimensional measurements, will be the responsibility of the contractor.

During the construction phase, we will provide geotechnical observation and testing services when requested by you or your representatives. Please be aware that we can only document site work we actually observe. It is still the responsibility of your contractor or on-site construction team to verify that our recommendations are being followed, whether we are present at the site or not.

The following plates are attached to complete this report:

Plate 1	Vicinity Map
Plate 2	Site Exploration Plan
Plates 3 - 5	Test Pit Logs
Plate 6	Typical Footing Drain Detail

We appreciate the opportunity to be of service on this project. Please contact us if you have any questions, or if we can be of further assistance.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

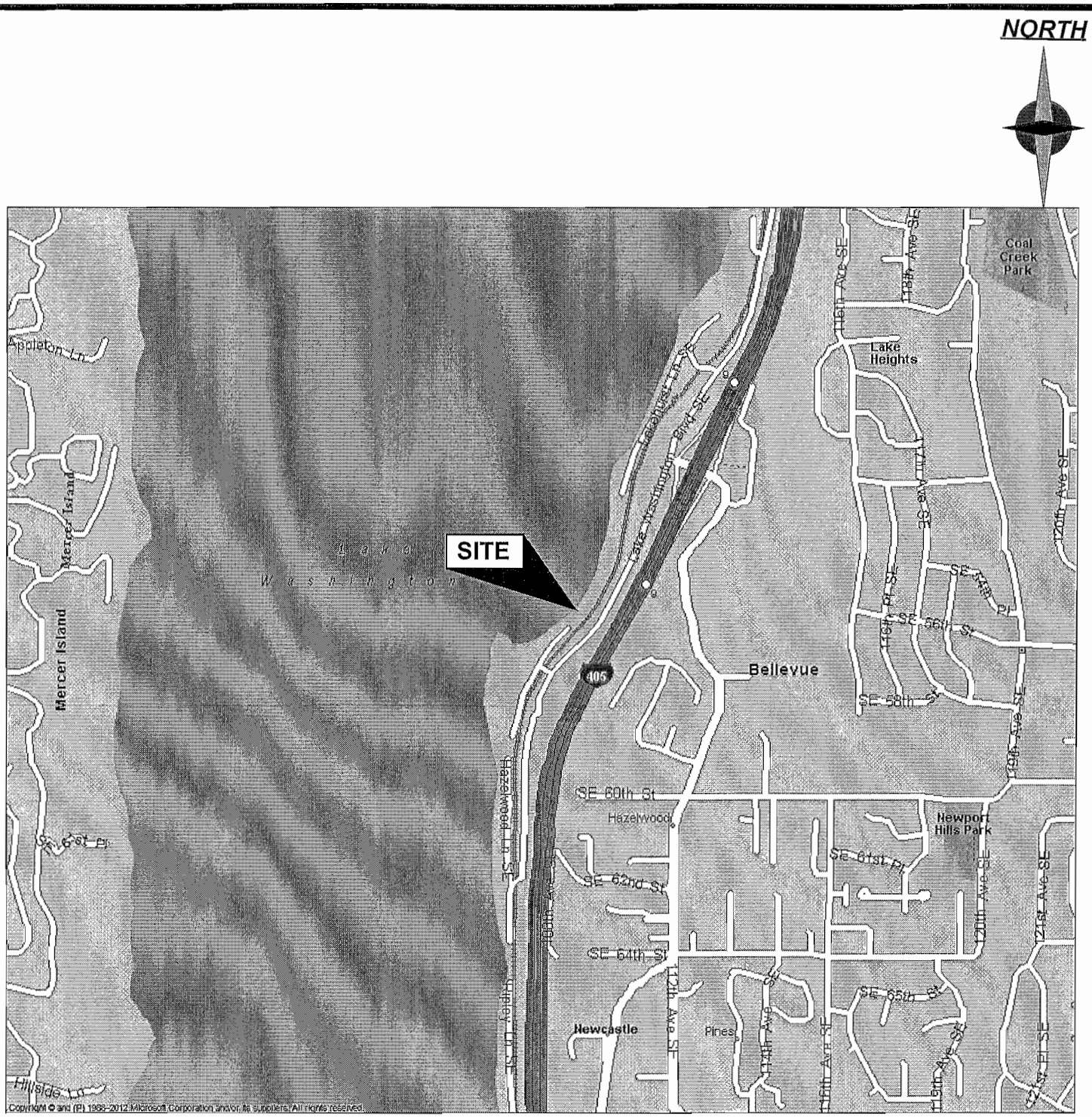
Thor Christensen, P.E.
Senior Engineer

MARC R. McGINNIS
STATE OF WASHINGTON
27845
REGISTERED
PROFESSIONAL ENGINEER

7/3/14

Marc R. McGinnis, P.E.
Principal

TRC/MRM: at



(Source: Microsoft Streets and Trips, 2013)

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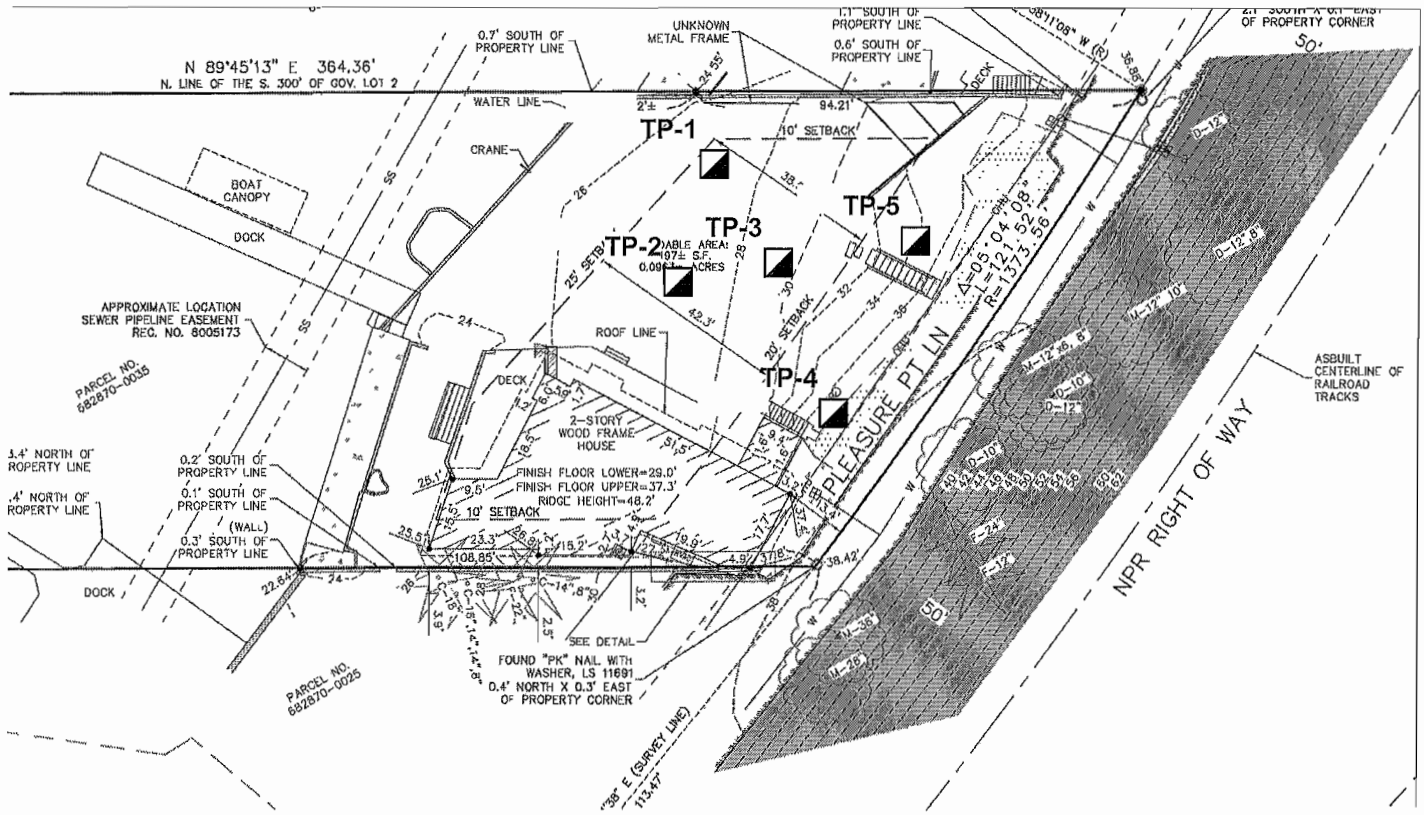
VICINITY MAP

5455 Pleasure Point Lane
Bellevue, Washington

Job No:	Date:		Plate:
14231	July 2014		1

NORTH



Legend:

- Test boring location

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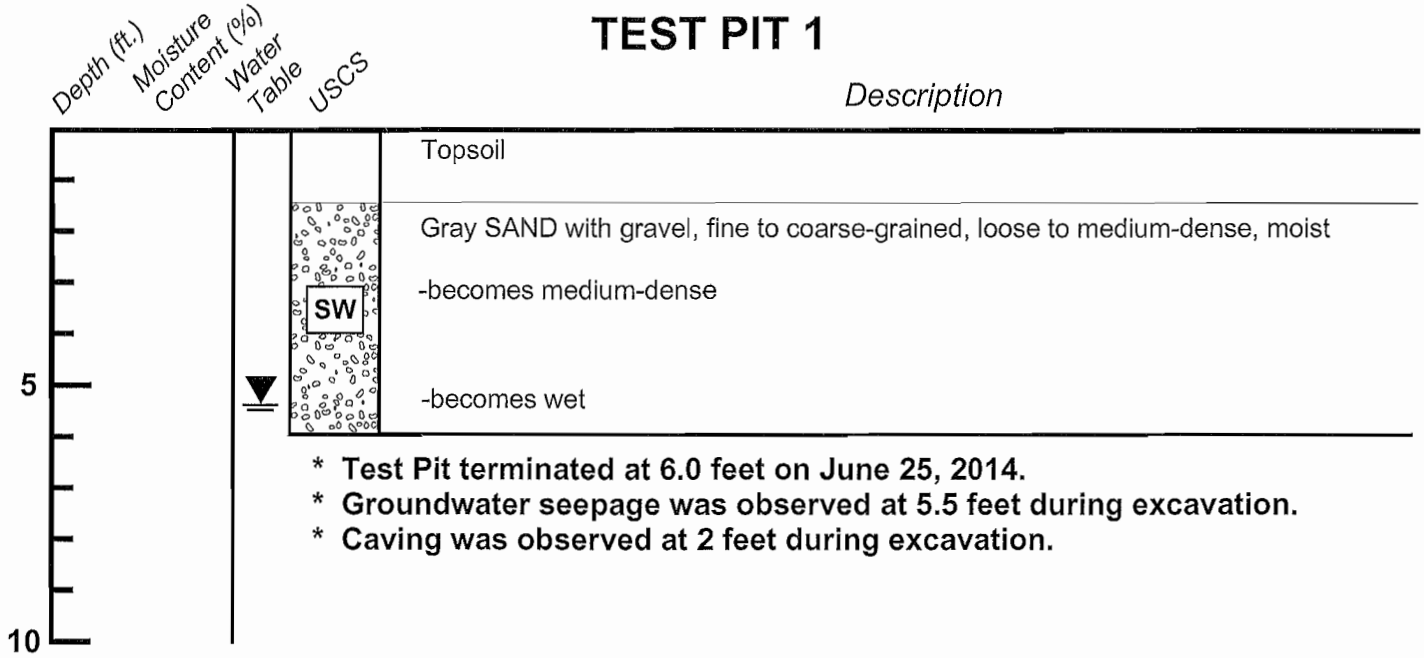
SITE EXPLORATION PLAN

5455 Pleasure Point Lane Southeast
Bellevue, Washington

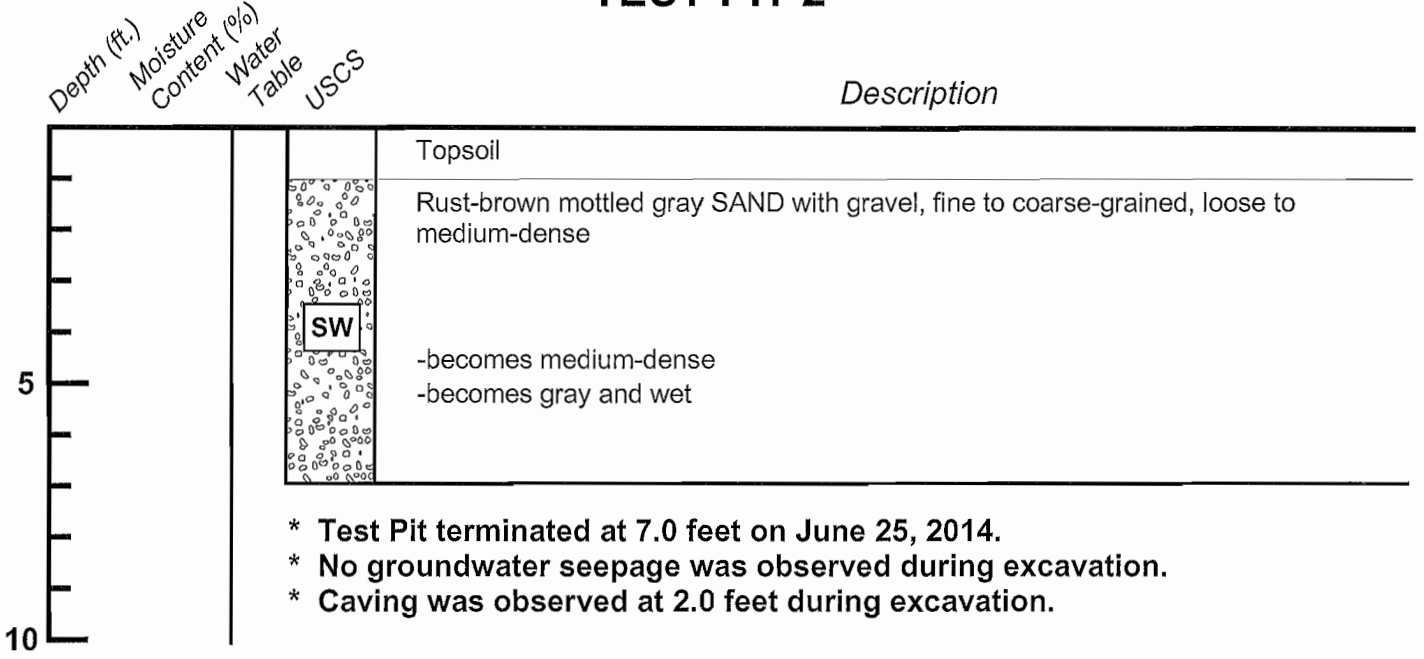
Job No:	Date:		Plate:
14231	July 2014	No Scale	2

TEST PIT 1



* **Test Pit terminated at 6.0 feet on June 25, 2014.**
* **Groundwater seepage was observed at 5.5 feet during excavation.**
* **Caving was observed at 2 feet during excavation.**

TEST PIT 2



* **Test Pit terminated at 7.0 feet on June 25, 2014.**
* **No groundwater seepage was observed during excavation.**
* **Caving was observed at 2.0 feet during excavation.**

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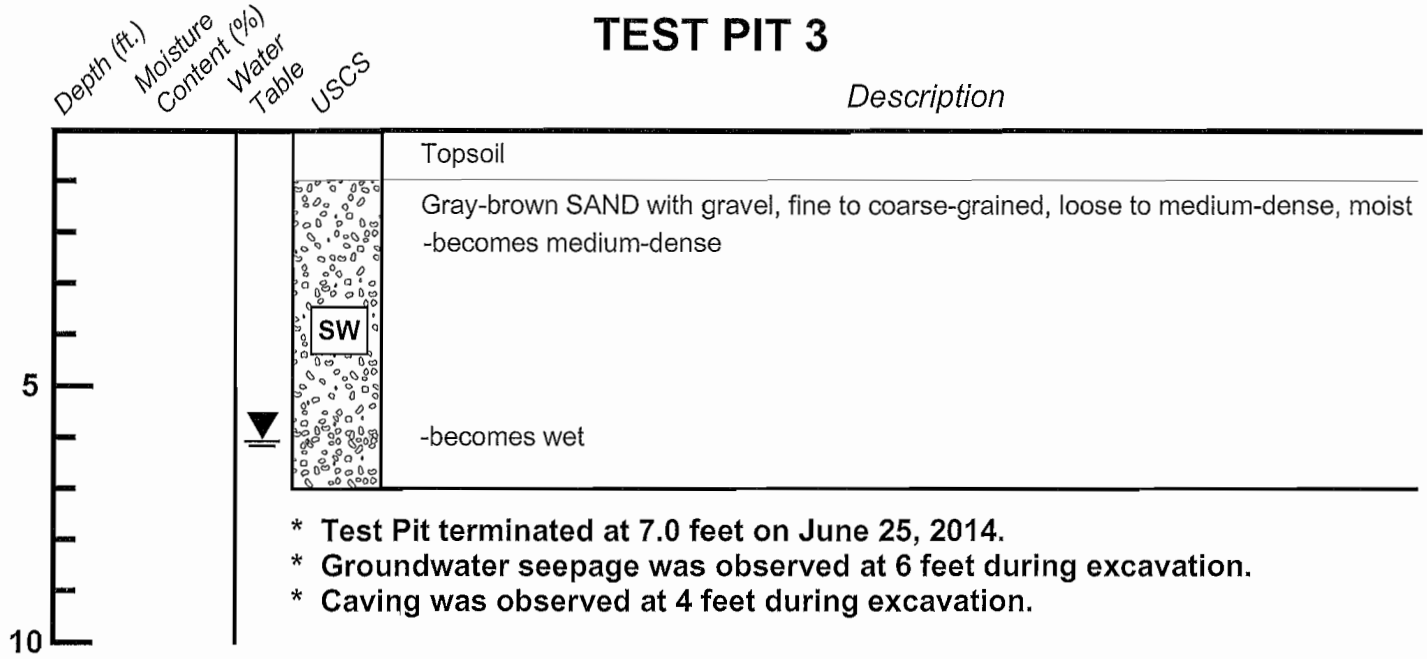
TEST PIT LOG

5455 Pleasure Point Lane Southeast
Bellevue, Washington

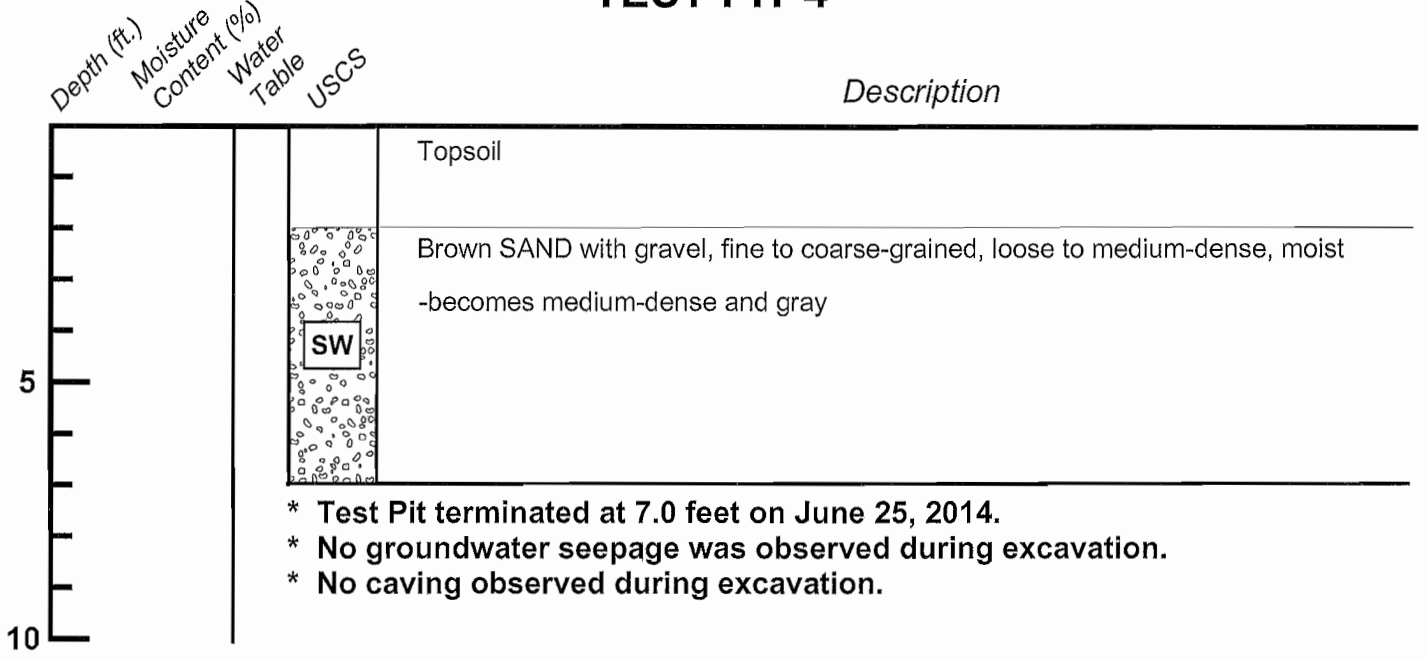
Job	Date:	Logged by:	Plate:
14231	July 2014	TRC	3

TEST PIT 3



* **Test Pit terminated at 7.0 feet on June 25, 2014.**
* **Groundwater seepage was observed at 6 feet during excavation.**
* **Caving was observed at 4 feet during excavation.**

TEST PIT 4



* **Test Pit terminated at 7.0 feet on June 25, 2014.**
* **No groundwater seepage was observed during excavation.**
* **No caving observed during excavation.**

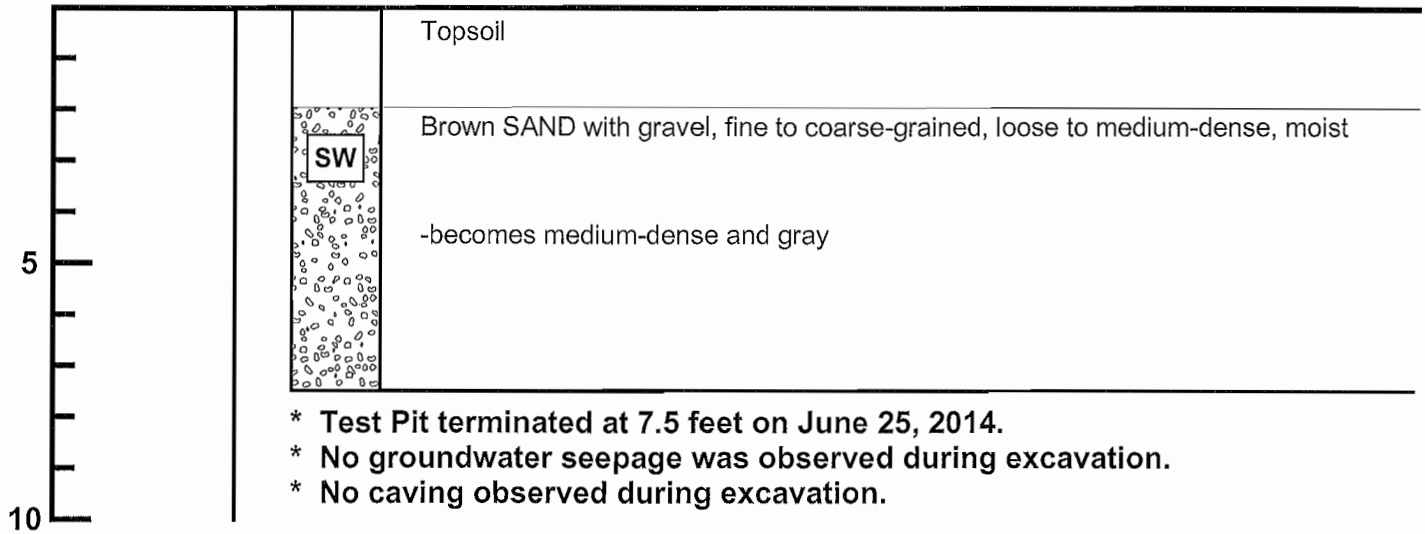
GEOTECH CONSULTANTS, INC.

TEST PIT LOG

5455 Pleasure Point Lane Southeast
Bellevue, Washington

Job	Date:	Logged by:	Plate:
14231	July 2014	TRC	4

TEST PIT 5



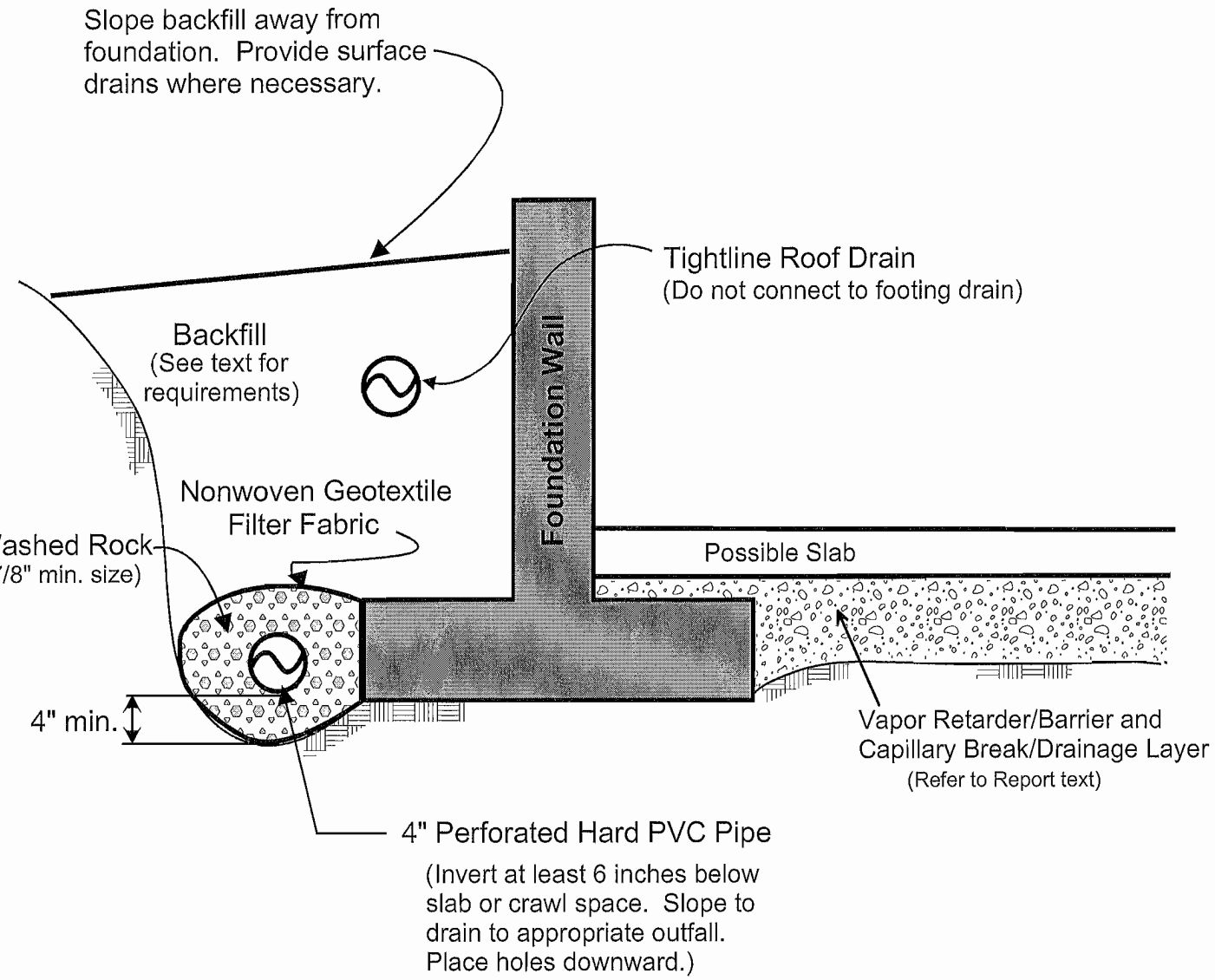
* **Test Pit terminated at 7.5 feet on June 25, 2014.**
* **No groundwater seepage was observed during excavation.**
* **No caving observed during excavation.**

GEOTECH CONSULTANTS, INC.

TEST PIT LOG

5455 Pleasure Point Lane Southeast
Bellevue, Washington

Job	Date:	Logged by:	Plate:
14231	July 2014	TRC	5



NOTES:

(1) In crawl spaces, provide an outlet drain to prevent buildup of water that bypasses the perimeter footing drains.

(2) Refer to report text for additional drainage, waterproofing, and slab considerations.

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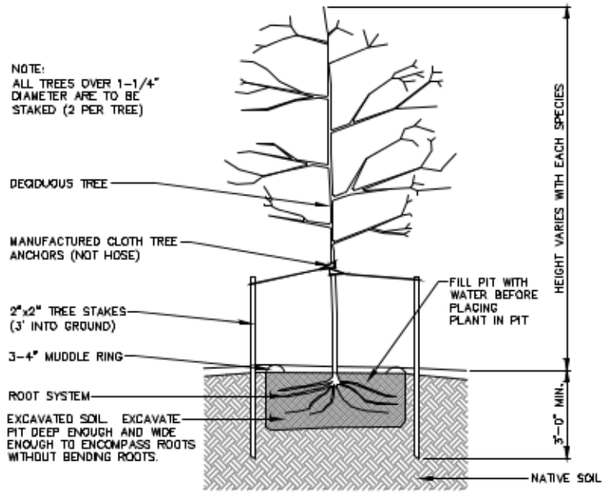
FOOTING DRAIN DETAIL

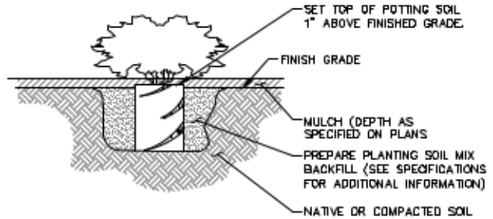
5455 Pleasure Point Lane Southeast
Bellevue, Washington

Job No:	Date:		Plate:
14231	July 2014		6



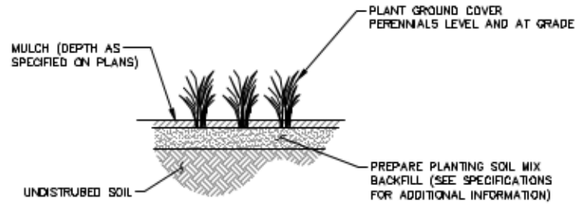
DECIDUOUS TREE PLANTING DETAIL

N.T.S.



SHRUB CONTAINER PLANTING DETAIL

N.T.S.

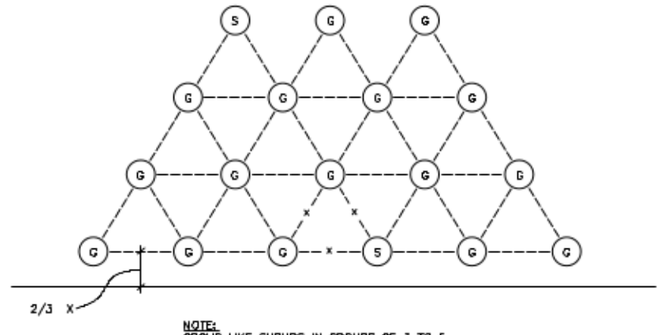


PERENNIAL AND GROUND COVER DETAIL

N.T.S.

PLANTING MATERIAL LIST

COMMON NAME	SCIENTIFIC NAME	SIZE	LIGHT NEEDS	SPACING	ZONE 1 QTY	ZONE 2 QTY	ZONE 3 QTY
TREES							
QUACKING ASPEN	*POPULUS TREMULOIDES*	CONTAINER	SUN	10 FT MIN		2	
SHORE PINE	*PINUS CONTORTA*	CONTAINER	SUN	10 FT MIN			1
SHRUBS							
RED FLOWERING CURRANT	*RIBES SANGUINEUM*	CONTAINER	SUN	6 FT		6	5
OCEAN SPRAY	*HOLODISCUS DISCOLOR*	CONTAINER	SUN-PART SUN	6 FT		6	4
SNOWBERRY	*SYMPHORICARPOS ALBUS*	CONTAINER	SUN-PART SUN	6 FT		6	4
INDIAN PLUM	*OEMLERIA CERASIFORMIS*	CONTAINER	SHADE	6 FT	5		
THIMBLEBERRY	*RUBUS PARVIFLORUS*	CONTAINER	SUN	6 FT		6	5
SHORT OREGON GRAPE	*BERBERIS NERVOSA*	CONTAINER	PART SHADE	6 FT	5		
GROUNDCOVER							
KINNIKINNICK	*ARCTOSTAPHYLOS UVA-URSI*	CONTAINER	SUN	2 FT		30	22
BLEEDING HEART	*DICENTRA FORMOSA*	CONTAINER	PART SHADE	2 FT	35		
WILD LILY OF THE VALLEY	*MAIANTHEMUM DILATATUM*	CONTAINER	PART SHADE	2 FT		30	22
WOOD-SORREL	*OXALIS OREGANA*	CONTAINER	PART SHADE	2 FT		30	22
WILD GINGER	*ASARUM CAUDATUM*	CONTAINER	SHADE	2 FT	35		
SWORD FERN	*POLYSTICHUM MUNITUM*	CONTAINER	PART SHADE	2 FT	10		
WILD STRAWBERRY	*FRAGARIA CHILOENSIS*	CONTAINER	SUN	2 FT		30	22
WESTERN IRIS	*IRIS TENAX*	CONTAINER	SUN	2 FT		30	22
WESTERN COLUMBINE	*AQUILEGIA FORMOSA*	CONTAINER	SUN	2 FT		30	22
SALAL	*GAULTHERIA SHALLON*	CONTAINER	SHADE	2 FT	10		
BIG-LEAF LUPINE	*LUPINUS POLYPHYLLUS*	CONTAINER	SUN			30	22
			TOTALS	TREES	0	2	1
				SHRUBS	10	24	18
				GROUNDCOVER	90	210	154



NOTE:
GROUP LIKE SHRUBS IN GROUPS OF 3 TO 5.
TREES SHOULD NOT BE PLACED NEXT TO EACH OTHER.

TYPICAL PLANT SPACING

X = PLANT SPACING (SEE PLANTING PLAN)

(S) - SHRUB

(G) - GROUNDCOVER

PRELIMINARY

Know what's below. Call before you dig.

FILE NAME: P:\10-140049 CHAN PLANTING PLAN\3 CADD\SHEETS\P_10-140049_PLANT.DWG
PLOT TIME: 11/4/2014 10:53 AM
USER NAME:RICHARD

DESIGNED BY BT
DRAWN BY RDH
CHECKED BY BT

OSBORN CONSULTING INCORPORATED

OSBORN CONSULTING, INC.
1800 112th Ave. NE, Suite 220E Ph (425) 451-4009
Bellevue, WA. 98004 Fax (425) 451-4901

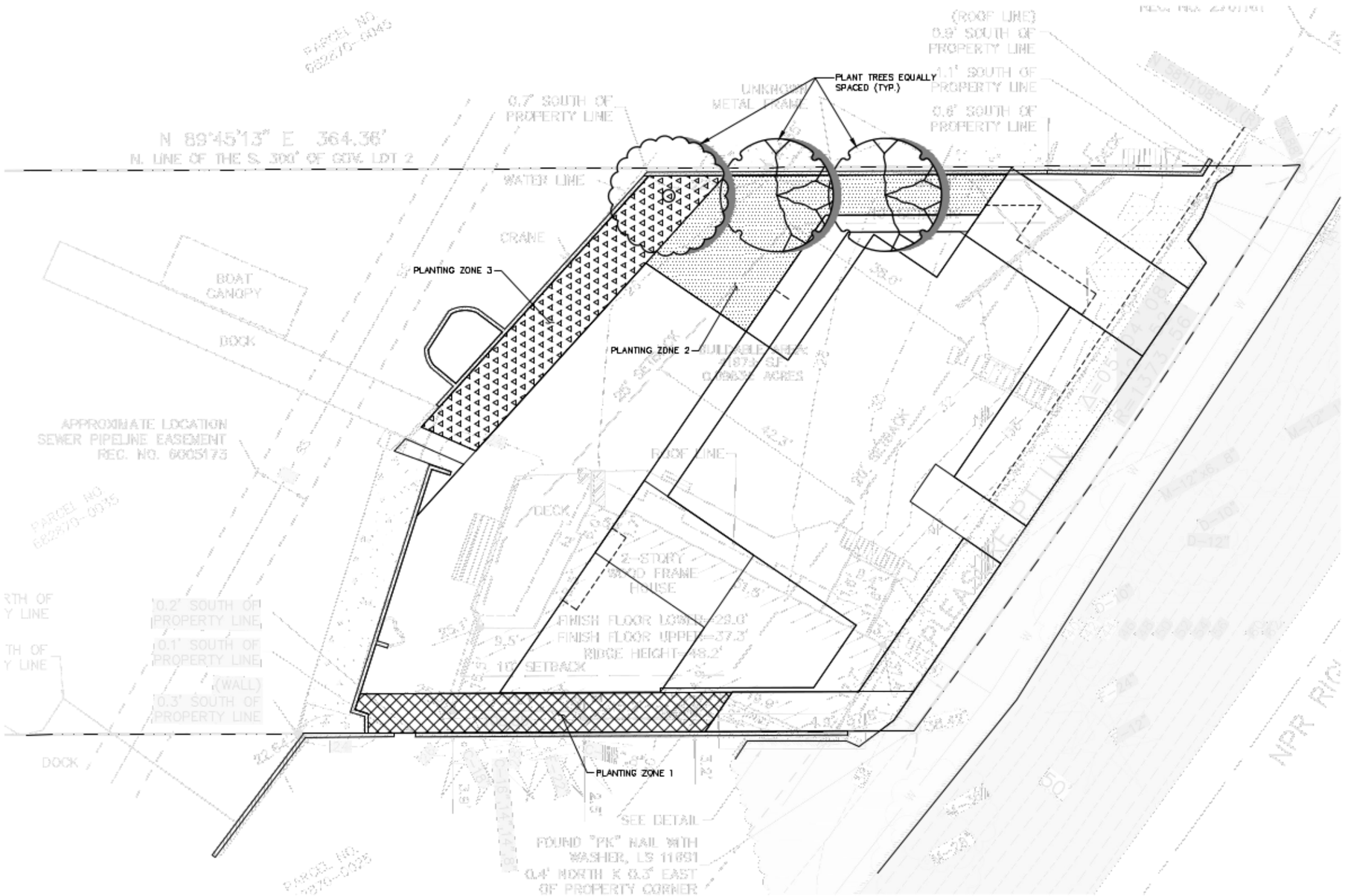
NO.	DATE	REVISION	BY

Northwest Environmental Consulting, LLC

CHAN PLANTING PLAN
5455 PLEASURE PT LN BELLEVUE, WA 98006
PLANT LIST AND DETAILS

JOB# / DWG: 10-140049
DATE: OCT. 2014
SCALE: H: N/A V: N/A
SHEET: 2 of 2

SEC. 20 , T. 24 N., R. 5 E., W.M.



N

SCALE: 1" = 10'
0 10 20 30

GENERAL NOTES:

1. FOR PLANTING LIST AND DETAILS SEE SHEET 2.
2. PLANTING GUIDE NOTES SHOULD BE FOLLOWED FOR EACH PLANTING ZONE.

LEGEND:

QUACKING ASPEN

SHORE PINE

PLANT NOTES:

ZONE 1 = 441 SQ FT
FOLLOW PLANTING GUIDE IN PLANTING MATERIAL LIST AND GENERAL NOTES FOR PLANT LAYOUTS.

ZONE 2 = 732 SQ FT
FOLLOW PLANTING GUIDE IN PLANTING MATERIAL LIST AND GENERAL NOTES FOR PLANT LAYOUTS.

ZONE 3 = 630 SQ FT
FOLLOW PLANTING GUIDE IN PLANTING MATERIAL LIST AND GENERAL NOTES FOR PLANT LAYOUTS.

811 Know what's below. Call before you dig.

PRELIMINARY

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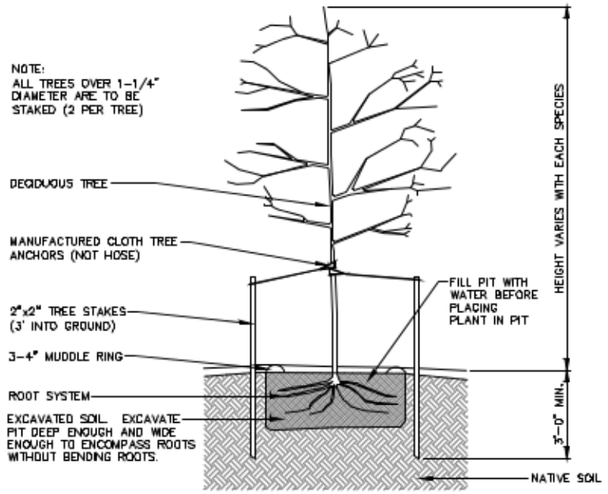
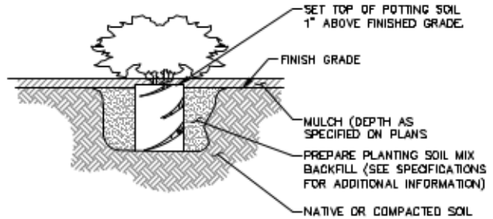
CHAN PLANTING PLAN
5455 PLEASURE PT LN BELLEVUE, WA 98006
PLANTING PLAN

JOB# / DWG	DATE
10-140049	OCT. 2014
SCALE: H: 1"=10' V: N/A	SHEET: 1 of 2



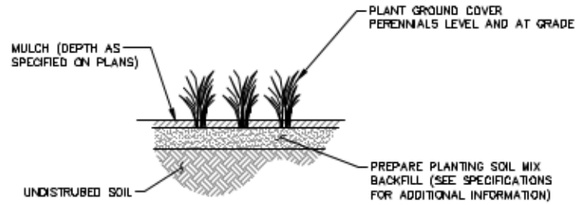
DECIDUOUS TREE PLANTING DETAIL

N.T.S.



SHRUB CONTAINER PLANTING DETAIL

N.T.S.



PERENNIAL AND GROUND COVER DETAIL

N.T.S.

PLANTING MATERIAL LIST

COMMON NAME	SCIENTIFIC NAME	SIZE	LIGHT NEEDS	SPACING	ZONE 1 QTY	ZONE 2 QTY	ZONE 3 QTY
TREES							
QUACKING ASPEN	*POPULUS TREMULOIDES*	CONTAINER	SUN	10 FT MIN		2	
SHORE PINE	*PINUS CONTORTA*	CONTAINER	SUN	10 FT MIN			1
SHRUBS							
RED FLOWERING CURRANT	*RIBES SANGUINEUM*	CONTAINER	SUN	6 FT		6	5
OCEAN SPRAY	*HOLODISCUS DISCOLOR*	CONTAINER	SUN-PART SUN	6 FT		6	4
SNOWBERRY	*SYMPHORICARPOS ALBUS*	CONTAINER	SUN-PART SUN	6 FT		6	4
INDIAN PLUM	*OEMLERIA CERASIFORMIS*	CONTAINER	SHADE	6 FT	5		
THIMBLEBERRY	*RUBUS PARVIFLORUS*	CONTAINER	SUN	6 FT		6	5
SHORT OREGON GRAPE	*BERBERIS NERVOSA*	CONTAINER	PART SHADE	6 FT	5		
GROUNDCOVER							
KINNIKINNICK	*ARCTOSTAPHYLOS UVA-URSI*	CONTAINER	SUN	2 FT		30	22
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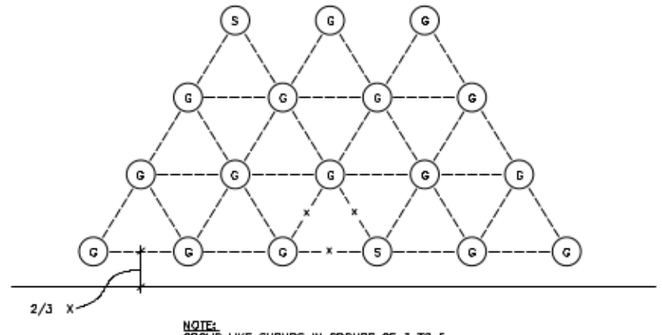

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