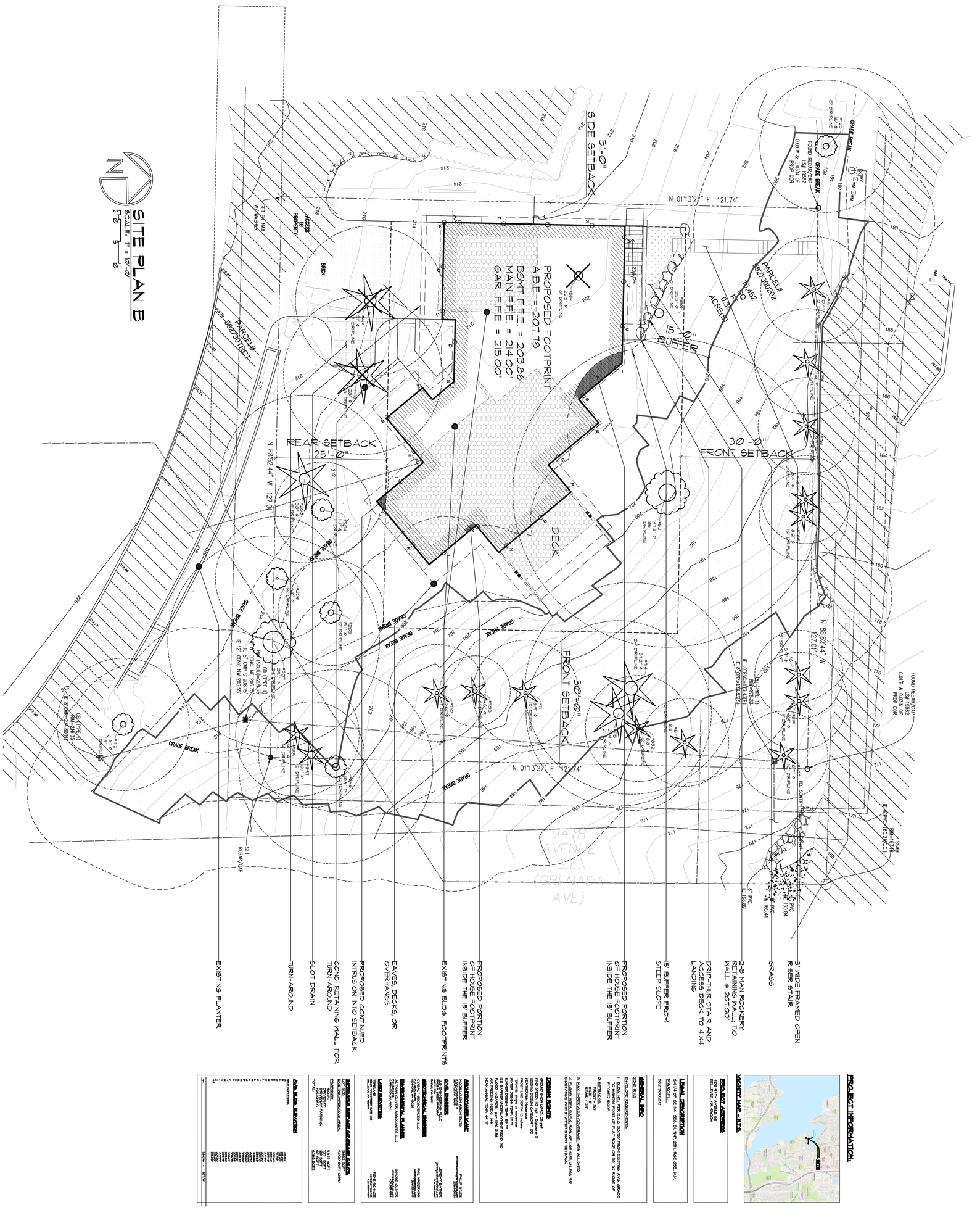


CALUP PROPOSAL

A1 SITE PLAN B

Zheng-Zemel Residence

403 94th Ave. SE
Bellevue, WA 98004

7806 REGISTERED ARCHITECT PHILIP McCULLOUGH STATE OF WASHINGTON

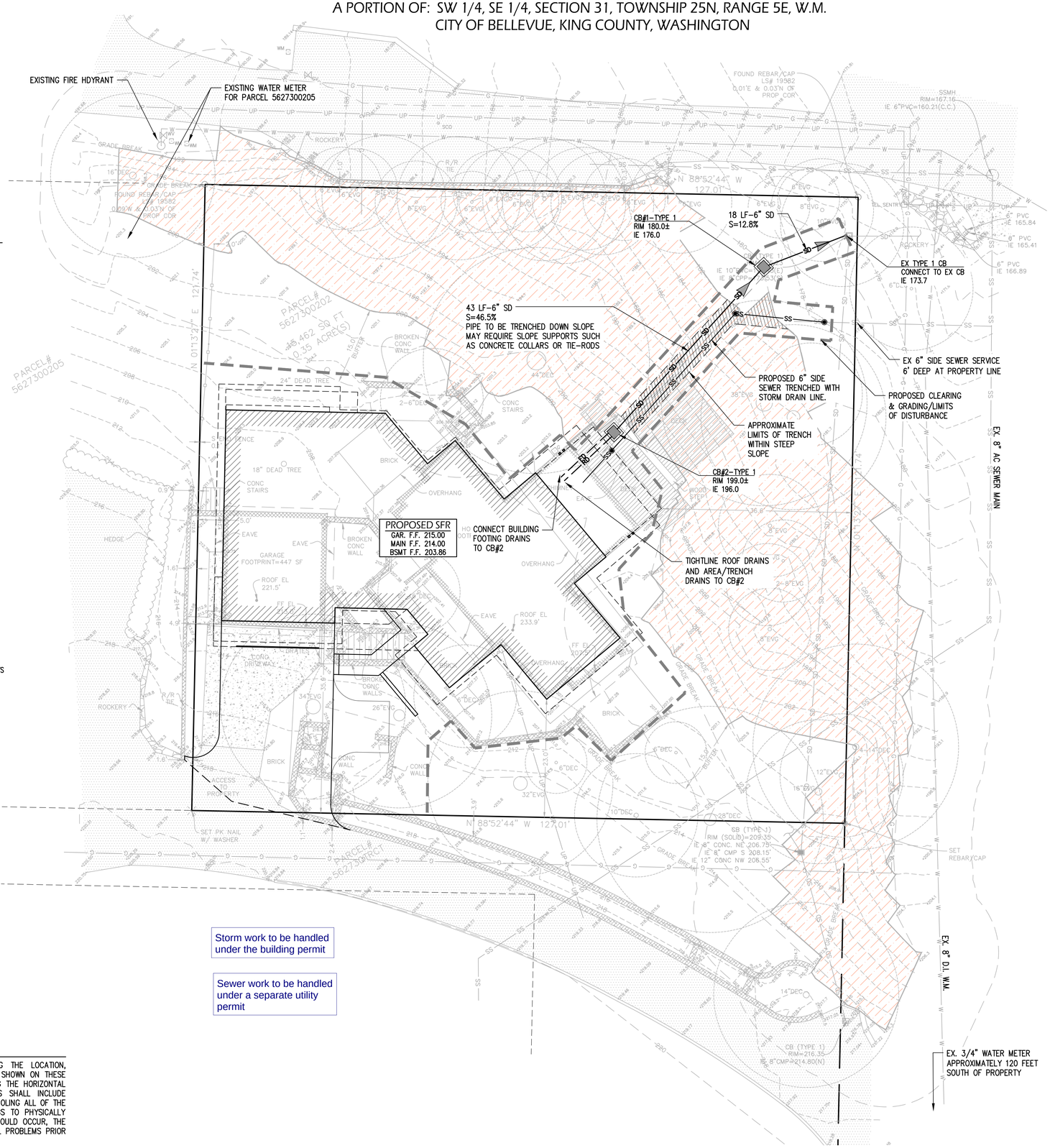
Date: 2019.08.15
Job No: 19-006
Project No: 00000
Drawn: PCS
Approved: APM

Owner
Zheng-Zemel

Revisions Comment
2019.MM.DD

MCCULLOUGH ARCHITECTS
5700 Corson Ave South
Seattle, WA. 98108
206.443.1181
mccullougharchitects.com

A PORTION OF: SW 1/4, SE 1/4, SECTION 31, TOWNSHIP 25N, RANGE 5E, W.M.
CITY OF BELLEVUE, KING COUNTY, WASHINGTON



Storm work to be handled under the building permit

Sewer work to be handled under a separate utility permit

LEGEND

EXISTING

- ASPHALT SURFACE
- BRICK SURFACE
- BUILDING
- CENTERLINE ROW
- CLEANOUT
- CULVERT PIPE
- CONCRETE SURFACE
- RETAINING WALL
- DECK
- FENCE LINE (WOOD)
- FIRE HYDRANT
- GAS LINE
- GAS METER
- GAS VALVE
- GUARDRAIL
- HEDGE FOLIAGE LINE
- INLET (TYPE 1)
- INLET (TYPE 1, SOLID LID)
- INLET (TYPE 1, CURB INLET)
- NAIL AS NOTED
- MONUMENT IN CASE (FOUND)
- POWER METER
- POWER (UNDERGROUND)
- REBAR AS NOTED (FOUND)
- REBAR & CAP (SET)
- ROCKERY
- SEWER LINE
- SEWER MANHOLE
- STEEP SLOPE AREA
- STORM DRAIN LINE
- TELEPHONE SENTRY
- TREE (AS NOTED)
- WATER LINE
- WATER METER
- WATER VALVE
- CENTER CHANNEL
- CONCRETE
- CORNER
- DECIDUOUS
- ELEVATION
- EVERGREEN
- FINISH FLOOR
- MEASURED
- MONUMENT
- PROPERTY
- RECORD DATA

PROPOSED

- PROPERTY LINE
- CLEARING AND GRADING LIMITS
- CONTOUR – MAJOR
- CONTOUR – MINOR
- SLOPE/GRADE
- FLOWPATH ARROW
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- STORM DRAIN LINE
- ROOF DRAIN LINE
- FOOTING DRAIN LINE
- STORM CLEAN OUT
- YARD/AREA DRAIN
- STORM DRAIN CATCH BASIN
- SIDE SEWER SERVICE
- SEWER CLEAN OUT
- WATER SERVICE LINE
- WATER METER

N

0 10 20 40
1 inch = 20 feet

SITE INFORMATION

ADDRESS: 403 94TH AVENUE SE
BELLEVUE, WA 98004

KING CO PARCEL# 562730-0202

PARCEL AREA 15,462 SF (0.35 ACRES)

SURVEY NOTES

SURVEY PREPARED BY TERRANE DATED DECEMBER 14, 2017

BASIS OF BEARING: A BEARING OF N 88°52'14" W ON THE CENTERLINE OF SE 7TH STREET, PER CITY OF BELLEVUE.

VERTICAL DATUM: NAVD88 PER CITY OF BELLEVUE VERTICAL STA. NO. 264

3"x3" CONCRETE MON W/ LEAD & TACK IN CASE; TOP MON TO TOP RIM CASE 0.73 FEET IN SOUTHEAST QUADRANT OF INTERSECTION 98TH AVE SE/99TH AVE SE & SE 7TH ST.

ELEV. 169.61'

LEGAL DESCRIPTION: PER STATUTORY WARRANTY DEED UNDER RECORDING NUMBER 20060929003502. SEE SURVEY FOR DETAILED LEGAL DESCRIPTION.

AREA SUMMARY

TOTAL SITE AREA	15,462 SF
EX. IMPERVIOUS AREA	4,020 SF (26% COVERAGE)
NEW + REPLACED HARD SURFACE AREAS	
ROOF	3,873 SF
DRIVEWAY	727 SF
DRIVEWAY-PARKING	120 SF
WALKWAY	48 SF
TOTAL HARD SURFACES	4,768 SF

DRAINAGE DESCRIPTION

THE PROPOSED PROJECT WILL COMPLY WITH MINIMUM REQUIREMENTS #1 – 5 PER CITY OF BELLEVUE SURFACE WATER ENGINEERING STANDARDS, FIGURE 1.4.

PER GEOTECHNICAL RECOMMENDATIONS INFILTRATION AND DISPERSION BEST MANAGEMENT PRACTICES (BMP'S) ARE INFEASIBLE DUE TO ONSITE STEEP SLOPES.

STORMWATER RUNOFF FROM NEW AND REPLACED IMPERVIOUS SURFACES WILL BE CONVEYED VIA TIGHTLINE AND CONNECTED TO EXISTING DRAINAGE INFRASTRUCTURE NEAR THE BOTTOM OF THE SLOPE.

UTILITY CONFLICT NOTE - CAUTION:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION, AND DEPTH OF ALL EXISTING UTILITIES WHETHER SHOWN ON THESE PLANS OR NOT BY POTHOLING THE UTILITIES AND SURVEYING THE HORIZONTAL AND VERTICAL LOCATION PRIOR TO CONSTRUCTION. THIS SHALL INCLUDE CALLING UTILITY LOCATE @ 1-800-424-5555 AND THEN POTHOLING ALL OF THE EXISTING UTILITIES AT LOCATIONS OF NEW UTILITY CROSSINGS TO PHYSICALLY VERIFY WHETHER OR NOT CONFLICTS EXIST. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT THE ENGINEER TO RESOLVE ALL PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.

Call before you Dig
1-800-424-5555
UNDERGROUND SERVICE (USA)

CRITICAL AREA LAND USE PERMIT (CALUP)

#	REVISION/MILESTONE	DATE	BY
1	CALUP PERMIT SUBMITTAL	8/13/19	SYM

JEREMY L. SANDIN — STATE OF WASHINGTON — 25888 — REGISTERED PROFESSIONAL ENGINEER — PRELIMINARY

JLS Site Civil Engineering PLLC
19125 North Creek Parkway
Suite 123
Bothell, WA 98011
(206)849-5469

CLIENT NAME: Zheng-Zemel

PROJECT LOCATION: 403 94TH AVENUE SE
BELLEVUE, WA 98004
KC PARCEL# 562730-0202

PROJECT NAME: Zheng-Zemel Residence

SHEET NAME: **PRELIMINARY CIVIL IMPROVEMENT PLAN**

PERMIT# 19-_____-__

SCALE	DATE
AS SHOWN	8/13/2019
DESIGNED BY	CHECKED BY
JLS	JLS

JLS JOB# 19-133

SHEET# **C1**

SHEET 1 OF 1

FILE PATH: C:_PROJECTS\2019\19-133 ZHENG-ZEMEL PROJECT - BELLEVUE SFR\CAD\Z-Z_DV.DWG

Altmann Oliver Associates, LLC

PO Box 578 Carnation, WA 98014 Office (425) 333-4535 Fax (425) 333-4509

AOA
Environmental
Planning &
Landscape
Architecture

August 26, 2019

AOA-6000

Philip Stuen
McCullough Architects
5700 Corson Ave.
Seattle, WA 98108

SUBJECT: **Zheng-Zemel Residence - Critical Areas Report - Habitat Assessment**
406 – 94th Ave. SE, Bellevue, WA (Parcel 562730-0202)
Steep Slope Buffer Modification and Enhancement
Vegetation Management Plan

Dear Philip:

We have prepared this habitat assessment and vegetation management plan associated with a proposed steep slope buffer modification on the subject property. The site is currently developed with an existing single-family residence and associated yard. A northeast facing steep slope occupies much of the northeast portion of the site. The required buffers from this slope encumber nearly all of the site.

1.0 WILDLIFE HABITAT ASSESSMENT

A habitat assessment was conducted on the property on August 22, 2019. Prior to conducting the field investigations, the Washington State Department of Fish and Wildlife's Priority Habitats and Species (PHS) database was reviewed. No priority habitats or species were identified on or adjacent to the site as part of this mapping.

1.1 Description of Vegetation on and Adjacent to the Site

Vegetation on the site includes scattered trees and shrubs including Douglas fir (*Pseudotsuga menziesii*), big-leaf maple (*Acer macrophyllum*), hazelnut (*Corylus cornuta*), snowberry (*Symphoricarpos albus*), and a variety of ornamental plantings. Much of the unmaintained portions of the site have become dominated by herbaceous weedy vegetation. Vegetation on adjacent properties consisted primarily of scattered trees with maintained yards.

Habitat features on the property consisted of two Douglas fir snags (18" dbh and 24" dbh) in the western portion of the site. No raptors or raptor nests were identified during the field investigation.

1.2 Wildlife Species of Local Importance
Twenty-three (23) species have been designated by the City of Bellevue as species of local importance (LUC 20.25H.150). The potential of site utilization by each species is briefly described below:

- Bald eagle (*Haliaeetus leucocephalus*): site not located within Bald Eagle Buffer Management Zone per PHS data. Some potential occasional perching opportunity within larger on-site trees possible but does not have a primary association with habitat on or immediately adjacent site. Primary Association: no.

- Peregrine falcon (*Falco peregrinus*): generally associated with coastal cliffs and shorelines, but also use large buildings in city center. Use of project site unlikely. Primary Association: no.

- Common Loon (*Gavia immer*): no presence - highly aquatic species associated with large water bodies. Primary Association: no.

- Pileated woodpecker (*Dryocopus pileatus*): Pileated woodpeckers generally inhabit mature and old-growth forests, and second-growth forests with large snags and fallen trees. The range of the species encompasses all of the forested areas of the state. Although typically found in larger forested tracts, they are known to occur in suburban habitats as well. Their key breeding habitat need is the presence of large snags or decaying live trees for nesting, as this species generally excavates a new nest cavity each year. The breeding and nesting periods of the pileated woodpecker extends from late March to early July. Although presence of snags indicates potential use, highly developed condition of site and adjacent properties makes nesting highly unlikely. Primary Association: no.

- Vaux's swift (*Chaetura vauxi*): Vaux's swifts are strongly associated with old growth and mature forests throughout the state and are highly dependent on large hollow trees and snags for breeding and roosting. Unlikely nesting or primary association on the site due to lack of intact forest. Primary Association: no.

- Merlin (*Falco columbarius*): unlikely presence – generally require coastal or high elevation forests. Primary Association: no.

- Purple martin (*Progne subis*): unlikely presence – generally require cavities near or over water for nesting. Primary Association: no.

- Western grebe (*Aechmophorus occidentalis*): no presence – highly aquatic species associated with large water bodies. Primary Association: no.

- Great blue heron (*Ardea herodias*): unlikely presence – typically forage in larger wetlands or pasture which do not occur on-site. No roosts observed on or adjacent site. Primary Association: no.

- Osprey (*Pandion haliaetus*): unlikely presence - perch availability not near large water body. Primary Association: no.

- Green heron (*Butorides striatus*): unlikely presence – not near large wetland or waterbody. Primary Association: no.

- Red-tailed hawk (*Buteo jamaicensis*): potential utilization of site for occasional perching, although no nests observed and not near significant open expanse. Primary Association: no.

- Western big-eared bat (*Plecotus townsendii*): potential presence, but no known nearby hibernacula or caves so not considered a habitat of primary association. Primary Association: no.

- Keen's myotis (*Myotis keenii*): potential presence, but generally associated with larger coniferous forests so not considered a habitat of primary association. Primary Association: no.

- Long-legged myotis (*Myotis volans*): potential presence, but generally associated with larger coniferous forests so not considered a habitat of primary association. Primary Association: no.

- Long-eared myotis (*Myotis evotis*): potential presence, but generally associated with larger coniferous forests so not considered a habitat of primary association. Primary Association: no.

- Oregon spotted frog (*Rana pretiosa*): no presence - believed to be extirpated from nearly all of western Washington and no ponding on the site. Primary Association: no.

- Western toad (*Bufo boreas*): presence possible but no breeding potential and not considered habitat of primary association. Primary Association: no.

- Western pond turtle (*Clemmys marmorata*): no presence - no ponding on site and no known nearby populations. Primary Association: no.

- Chinook (*Oncorhynchus tshawytscha*): no presence – no streams on the site. Primary Association: no.

- Bull trout (*Salvelinus confluentus*): no presence – no streams on the site. Primary Association: no.

- Coho salmon (*Oncorhynchus kisutch*): no presence – no streams on the site. Primary Association: no.

- River lamprey (*Lampetra ayresi*): no presence – no streams on the site. Primary Association: no.

None of the 23 species of local importance appear to have a primary association with habitat on or immediately adjacent the project site.

1.3 Draft Functional Assessment Tool for Upland Habitat

The project site was evaluated using the City of Bellevue's *Draft Functional Assessment Tool for Upland Habitat* (**Attachment A**). Based on this assessment the project site received a score of 32. In general, sites with scores of 26 to 40 "provide both actual habitat and likely the opportunity for wildlife to use the habitat on the site".

The property received lower scores for the isolation from other habitat areas, presence of invasive species, and distance to water bodies. The project site is effectively isolated from large habitat patches by the surrounding development and roadways. The property received higher scores primarily due to the presence of large trees, including conifers. The wildlife habitat on the site does not appear to be habitat of primary association for any of the 23 species of local importance and the site's value is primarily as a component of the overall open space of the area and not as specific habitat for an individual species.

2.0 STEEP SLOPE BUFFER IMPACTS

The proposed project consists of the re-development of the existing residence with a new residence constructed in the same general location as the existing residence. Since the standard steep slope buffer encompasses nearly all of the property including the existing residence, re-development of the residence is not possible without working within the steep slope buffer.

The stability of the slope buffer was evaluated by Cobalt Geosciences, a geotechnical consultant. The buffer area that would be impacted consists nearly entirely of yard area that currently provides little significant habitat or slope protection functions. However, the project does require the removal of a Douglas fir snag within the buffer. Two live Douglas fir trees located just outside the buffer would also be removed (see arborist report).

2.1 Steep Slope Buffer Reduction
Any proposals to reduce a standard steep slope buffer must meet the decision criteria of **LUC 20.25H.255.B**

B. Decision Criteria – Proposals to Reduce Regulated Critical Area Buffer.

The Director may approve, or approve with modifications, a proposal to reduce the regulated critical area buffer on a site where the applicant demonstrates:

1. *The proposal includes plans for restoration of degraded critical area or critical area buffer functions which demonstrate a net gain in overall critical area or critical area buffer functions;*

   A habitat enhancement plan for the degraded habitats on the site has been prepared. Enhancement will occur through the removal of invasive plant species and re-planting degraded or sparsely vegetated areas with a variety of native plant species to the extent feasible on the site.

2. *The proposal includes plans for restoration of degraded critical area or critical area buffer functions which demonstrate a net gain in the most important critical area or critical area buffer functions to the ecosystem in which they exist;*

   Since the primary function of the steep slope buffers on the site is as a component of the overall open space on and adjacent the property, an enhancement plan has been prepared to increase the plant species and structural diversity of the degraded habitats on the site to the extent feasible.

3. *The proposal includes a net gain in stormwater quality function by the critical area buffer or by elements of the development proposal outside of the reduced regulated critical area buffer;*

   The proposed project will be constructed outside of any geotechnical consultant recommended steep slope buffers and it is my understanding that the project will be designed to incorporate all required City of Bellevue stormwater management measures.

4. *Adequate resources to ensure completion of any required restoration, mitigation and monitoring efforts;*

   To ensure success of the enhancement, a performance bond for the enhancement area will be posted for the 5-year monitoring period. This bond will not be released until all of the performance standards have been met.

5. *The modifications and performance standards included in the proposal are not detrimental to the functions and values of critical area and critical area buffers off-site; and*

   The performance standards for the project have been developed to increase the structural and plant species diversity of the enhancement areas and per the Geotechnical consultant will not be detrimental to the steep slope functions.

6. *The resulting development is compatible with other uses and development in the same land use district. (Ord. 5680, 6-26-06)*

   The residential project is compatible with adjacent land uses and meets the zoning requirements for the land use district.

2.2 Decision Criteria per LUC 20.30P.140

The Director may approve or approve with modifications an application for a Critical Areas Land Use Permit if:

A. *The proposal obtains all other permits required by the Land Use Code; and*

It is our understanding that all other permits required by the Land Use Code will be obtained.

B. *The proposal utilizes to the maximum extent possible the best available construction, design and development techniques which result in the least impact on the critical area and critical area buffer; and*

The project will need to utilize all of the best available construction, design, and development techniques to ensure the least possible impact on the critical area and its buffer. A final erosion control plan should be prepared, and silt-fencing and tree protection fencing will also be required.

All plantings within the buffer will consist of native species and will be installed and maintained only by a qualified landscape contractor familiar with work in sensitive environments.

C. *The proposal incorporates the performance standards of Part 20.25H LUC to the maximum extent applicable; and*

All of the applicable performance standards in LUC 20.25H would be implemented to the maximum extent possible.

D. The proposal will be served by adequate public facilities including streets, fire protection, and utilities; and

It is our understanding that the proposal will be served by adequate public facilities including streets, fire protection, and utilities.

E. The proposal includes a mitigation or restoration plan consistent with the requirements of LUC 20.25H.210; except that a proposal to modify or remove vegetation pursuant to an approved Vegetation Management Plan under LUC 20.25H.055.C.3.i shall not require a mitigation or restoration plan; and

A critical area enhancement plan has been prepared that is consistent with the requirements of LUC 20.25H.

F. The proposal complies with other applicable requirements of this code.

It is our understanding that all other applicable requirements of the Land Use Code will be met.

3.0 SLOPE BUFFER MITIGATION

A habitat enhancement plan has been prepared by AOA. As part of the enhancement plan, invasive species throughout the site would be removed and the area planted with a variety of native species to the extent feasible. The native plantings would increase the plant species and structural diversity of the site while providing increased visual and physical screening to the preserved habitat from the residence.

3.1 Goal, Objectives, and Performance Standards for Enhancement Areas

The primary goal of the mitigation plan is to increase the habitat functions of the enhanced portions of the site over current conditions. To meet this goal, the following objectives and performance standards have been incorporated into the design of the plan:

Objective A: Increase the structural and plant species diversity within the enhancement areas.
Performance Standard: There will be 100% survival of all woody planted species throughout the enhancement areas at the end of the first year of planting. Following Year 1, success will be based on an 85% survival rate. Areal coverage of plantings or native re-colonized species will be at least 10% at Year 1, 20% at year 2, 30% at year 3, and 50% at year 5.

Objective B: Limit the amount of invasive and exotic species within the enhancement areas.
Performance Standard: After construction and following every monitoring event for a period of at least five years, exotic and invasive plant species will be maintained at levels below 10% total cover in all planted areas.

3.2 Construction Management

Prior to commencement of any work in the enhancement areas, the clearing limits will be staked and all existing vegetation to be saved will be clearly marked. A pre-construction meeting will be held at the site to review and discuss all aspects of the project with the landscape contractor and the owner.

A consultant will supervise plan implementation during construction to ensure that objectives and specifications of the enhancement plan are met. Any necessary significant modifications to the design that occur as a result of unforeseen site conditions will be jointly approved by the City of Bellevue and the consultant prior to their implementation.

3.3 Monitoring Methodology

The monitoring program will be conducted for a period of five years, with annual reports submitted to the City of Bellevue. Permanent vegetation sampling plots may be established to monitor the general appearance, health, mortality, colonization rates, percent cover, percent survival, volunteer plant species, and invasive weeds.

Photo-points will be established from which photographs will be taken throughout the monitoring period. These photographs will document general appearance and progress in plant community establishment in the enhancement areas. Review of the photos over time will provide a visual representation of success of the plan.

3.4 Maintenance Plan

Maintenance will be conducted on a routine, year-round basis. Additional maintenance needs will be identified and addressed following a twice-yearly maintenance review. Contingency measures and remedial action on the site shall be implemented on an as-needed basis at the direction of the consultant or the owner.

Routine removal and control of non-native and other invasive plants should be performed by manual means whenever possible. Undesirable and weedy exotic plant species shall be maintained at levels below 10% total cover within any given stratum at any time during the five-year monitoring period.

3.5 Contingency Plan
All dead plants will be replaced with the same species or an approved substitute species that meets the goal of the enhancement plan. Plant material shall meet the same specifications as originally installed material. Replanting will not occur until after reason for failure has been identified (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.). Replanting shall be completed under the direction of the consultant, City of Bellevue, or the owner.

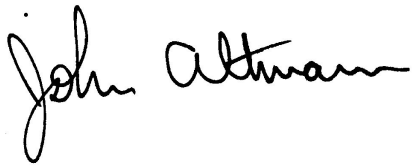
3.6 As-Built Plan
Following completion of construction activities, an as-built plan for the restoration area will be provided to the City of Bellevue. The plan will identify and describe any changes in relation to the original approved plan.

3.7 Financial Guarantee
A financial guarantee will be posted to ensure that the mitigation and monitoring program is fully implemented.

If you have any questions, please give me a call.

Sincerely,

ALTMANN OLIVER ASSOCIATES, LLC



John Altmann
Ecologist

Attachments

ATTACHMENT A

City of Bellevue

DRAFT FUNCTIONAL ASSESSMENT TOOL

for Upland Habitat

Property address 403 - 94th AVE SE

Location Range 5E Township 25N Section 31

Parcel number 562730-0202

Property owner

Telephone number ( ) -

Project name Zheng-Zemel Residence

Project contact John Altmann

Telephone number (425) -333-4535

Address PO Box 578, Carnation, WA 98014

Staff John Altmann

Date(s) of site visit(s) 08/22/19

Washington Department of Fish and Wildlife Priority Habitat and Species (PHS) data obtained? Y/N Y

1.0	PROPERTY DESIGNATION	Zone A	Zone B	Zone C	Zone D		Zone
1.1	Existing impervious surface	>90%	50-90%	20-50%	0-20%		C
2.0	**LANDSCAPE PARAMETERS**	**No points**	**1 point**	**2 points**	**3 points**	**Additional points**	**Total**
2.1	**Land use/development density**	Zone A	Zone B	Zone C	Zone D		2
2.2	***Occurrence (number) of habitat types**	0	1	2	3+		2
2.3	****Proximity of known critical areas (distance to edge)**	>2,500 ft	<2,500 ft	<1,200 ft	<100 ft	+1 point if contiguous with critical area	2
2.4	**Habitat connectivity and corridors**	No connection to other habitat areas	≥50-foot-wide connection to vegetated areas of at least 1 acre	≥50-foot-wide connection to vegetated areas of at least 50 acres but not listed parks***	≥50-foot-wide connection King County wildlife network or listed parks***	+1 point for ≥150-foot-wide connection King County wildlife network or listed parks***	0
2.5	**Patch size**	<0.-1.0 ac	1.0-5.0 ac	>5-10 ac	10-42 acres	>42 acres = 4 points	3

City of Bellevue

DRAFT FUNCTIONAL ASSESSMENT TOOL

for upland habitat

2.0	LANDSCAPE PARAMETERS	No points	1 point	2 points	3 points	Additional points	Total
2.6	***Interspersion of habitat patches (excluding patches <1 ac in area)**	No or isolated patch (no others within 0.5-ac circle)	Low	Moderate	High	+1 point if wildlife network or listed park is included	2
3.0	**LOCAL PARAMETERS**	**No points**	**1 point**	**2 points**	**3 points**	**Additional points**	**Total**
3.1	**Size of native trees on site**	No significant trees on site	6-12" dbh tree(s) present	12-20" dbh tree(s) present	>20" dbh tree(s) present	+1 point if tree(s) >30" dbh are present	4
3.2	**Coniferous component**	No conifers on site	Conifers very sparse or present in understory only	Conifers co- or sub-dominant in overstory	Conifers dominant	+1 point if conifers >30" dbh are present	3
3.3	**Percent cover (sample vegetated areas only)**						
	Ground layer (0-2.3 ft) (5-ft radius)	0%	0-25%	25-50%	50%+	+1 point for cover >75%; -1 point if mowed grass is >50%	2
	Shrub layer (2.3-25 ft) (10-ft radius)	0%	0-25%	25-50%	50%+	+1 point for cover >75%	1
	Canopy (>25 ft) (30-ft radius)	0%	0-25%	25-50%	50%+	+1 point for cover >75%	2
3.4	**Vegetative vertical structural diversity (foliage height diversity)**	FHD = 0	FHD < 0.70	FHD = 0.70-0.90	FHD > 0.90		2
3.5	**Vegetative species richness**	0-1 species	2-5 species	6-19 species	20+ species		2
3.6	**Invasive species component**	>75% cover	25-75% cover	10-25%cover	<10% cover		1

City of Bellevue

DRAFT FUNCTIONAL ASSESSMENT TOOL

for Upland Habitat

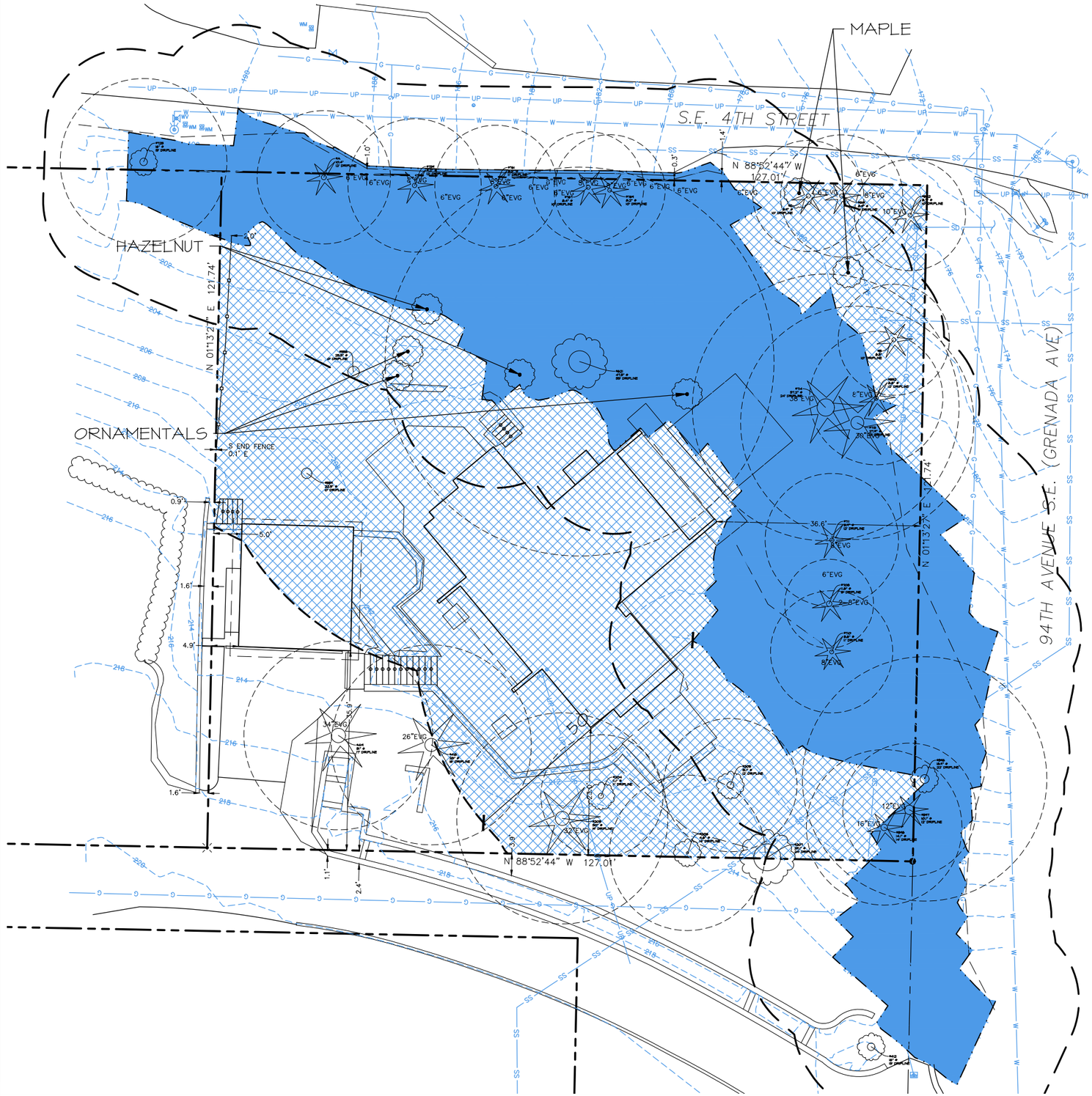
3.0	LOCAL PARAMETERS	No points	1 point	2 points	3 points	Additional points	Total
3.7	**Proximity to year-round water**	>1.0 mi or artificial feature with maintained /invasive buffer present within 0.3-1 mi	0.3-1.0 mi or artificial feature with maintained/ invasive buffer present within <0.3 mi	<0.3 mi or artificial feature with maintained/ invasive buffer present within patch	Natural water feature present within patch with native buffer		2
3.8	**Snags (≥4 in dbh)**	No snags on site	1/ac or fewer	2-6/ac	>7/ac	Add 0.5 point for each >20 in dbh and 1 point for each >30 in dbh	2
3.9	**Other habitat features**	None	1	2-4	5 or more		0
Landscape parameters points							11
Local parameters points							21
TOTAL POINTS							32

* Use circle of the appropriate size for the property's zone:

Zone A – 0.5 ac
Zone B – 5.0 ac
Zone C – 100 ac
Zone D – 250 ac

** PHS data required for sites in Zone D

***Parks: Mercer Slough, Phantom Lake wetland complex, Larson Lake wetland complex, Cougar Mountain Regional Wildland Park, Weowna Park; King County wildlife network



CRITICAL AREAS LEGEND

- PROPERTY LINE
- TOP/TOE OF SLOPE
- STEEP SLOPE BUFFER (50' FROM TOP OF SLOPE AND 75' FROM BASE OF SLOPE
- REDUCED STEEP SLOPE BUFFER (15' PER GEOTECH
- 40%+ STEEP SLOPE
- STEEP SLOPE BUFFER

GRAPHIC SCALE (IN FEET)

0 10 20 30 40 60

SCALE: 1:20

N

NOTES

1. BASE INFORMATION PROVIDED BY MCCULLOUGH ARCHITECTS, (206) 443-1181.

PROJECT 6000
DRAWN SO
SCALE AS NOTED
DATE 09-04-19
REVISED
1/9

FIGURE 1: EXISTING CONDITIONS
BUFFER MITIGATION PLAN
ZHENG-ZEMEL PROPERTY
403 94TH AVE S.E.
BELLEVUE, WA 98004

Altmann Oliver Associates, LLC
AOA
Environmental Planning & Landscape Architecture
PO Box 578 Carnation, WA 98014 Office (425) 333-4535Fax (425) 333-4599

6000-MIT-09-04-19.dwg

EXISTING VEGETATION LEGEND

- PROPERTY LINE
- TOP/TOE OF SLOPE
- STEEP SLOPE BUFFER (50' FROM TOP OF SLOPE AND 75' FROM BASE OF SLOPE
- REDUCED STEEP SLOPE BUFFER (15' PER GEOTECH)
- HERB ROBERT 75% COVER - 550 SF
- SNOWBERRY, SWORD FERN ~40% COVER, HIMALAYAN BLACKBERRY ~20% COVER - 1,429 SF
- DENSE HEDGE - 3,003 SF
- WATSON'S WILLOWHERB - 282 SF
- HIMALAYAN BLACKBERRY 15% COVER - 672 SF
- SWORD FERN 100% COVER - 184 SF
- HIMALAYAN BLACKBERRY 15% COVER - 494 SF
- HYPERICUM - 139 SF
- HIMALAYAN BLACKBERRY, PERIWINKLE, ENGLISH IVY 80% COVER - 1,283 SF
- HERB ROBERT 50% COVER - 1,922 SF

GRAPHIC SCALE
(IN FEET)

0 10 20 30 40 60

SCALE: 1:20

N

NOTES

1. BASE INFORMATION PROVIDED BY MCCULLOUGH ARCHITECTS, (206) 443-1181.

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FIGURE 2: EXISTING VEGETATION
BUFFER MITIGATION PLAN
ZHENG-ZEMEL PROPERTY
403 94TH AVE S.E.
BELLEVUE, WA 98004

Altmann Oliver Associates, LLC
AOA
Environmental Planning & Landscape Architecture
PO Box 578 Carnation, WA 98014 Office (425) 333-4535 Fax (425) 333-4569

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PLAN LEGEND

- PROPERTY LINE
- TOP/TOE OF SLOPE
- STEEP SLOPE BUFFER (50' FROM TOP OF SLOPE AND 75' FROM BASE OF SLOPE
- REDUCED STEEP SLOPE BUFFER (15' PER GEOTECH
- CLEARING LIMITS

EXISTING IMPERVIOUS LEGEND

	IMPERVIOUS FOR HOUSE	1,797 SF
	OTHER IMPERVIOUS SURFACE (GROUTED BRICK PATIOS, DRIVEWAY, WALLS)	2,179 SF
	EXISTING PERVIOUS DECK	494 SF
	TOTAL EXISTING IMPERVIOUS	3,976 SF

GRAPHIC SCALE
(IN FEET)

0 10 20 30 40 60

SCALE: 1:20

N

NOTES

1. BASE INFORMATION PROVIDED BY MCCULLOUGH ARCHITECTS, (206) 443-1181.

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FIGURE 3: EXISTING IMPERVIOUS PLAN
BUFFER MITIGATION PLAN
ZHENG-ZEMEL PROPERTY
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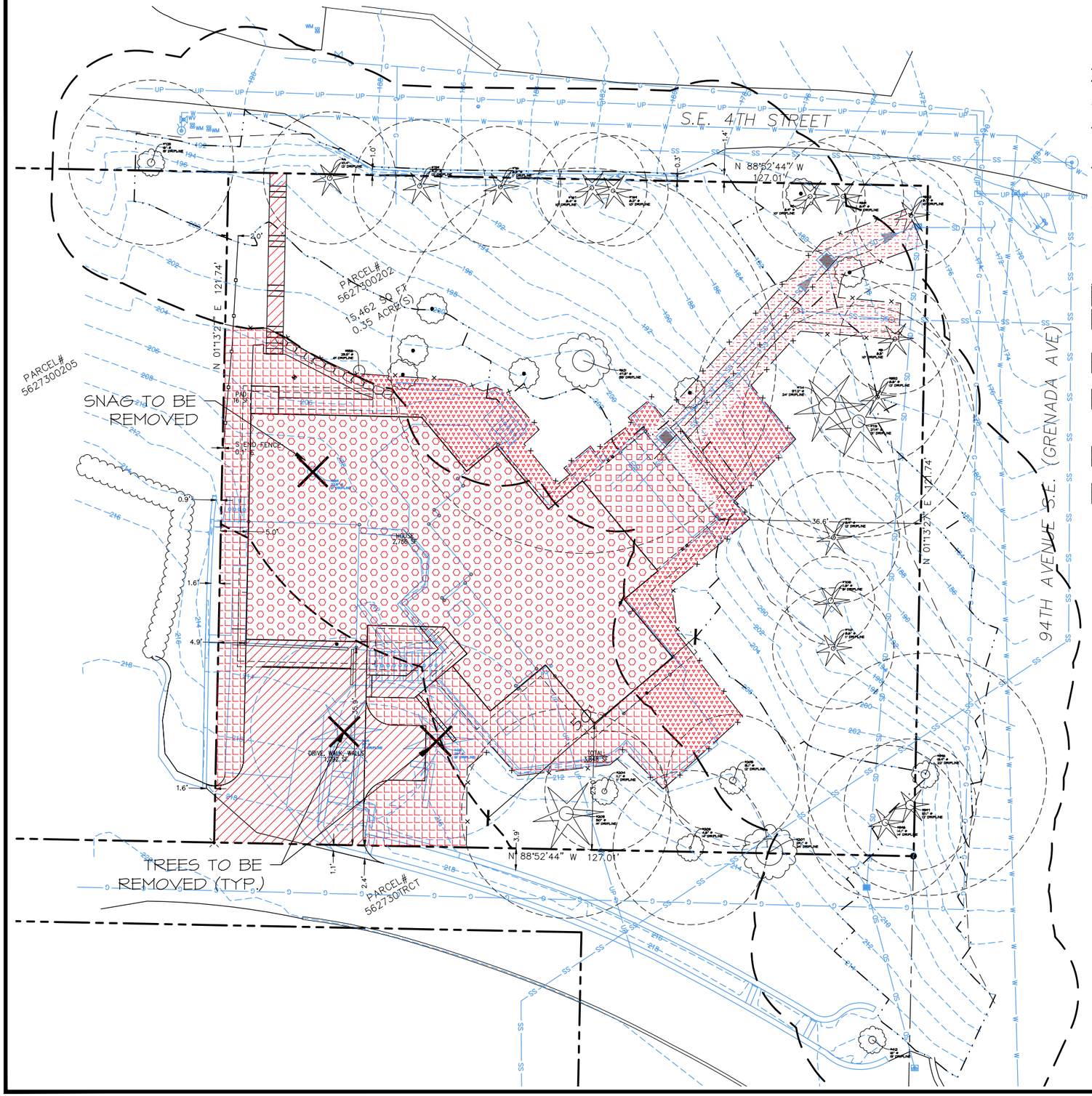

PLAN LEGEND

- PROPERTY LINE
- TOP/TOE OF SLOPE
- STEEP SLOPE BUFFER (50' FROM TOP OF SLOPE AND 75' FROM BASE OF SLOPE
- REDUCED STEEP SLOPE BUFFER (15' PER GEOTECH
- CLEARING LIMITS

PROPOSED IMPERVIOUS LEGEND

NEW IMPERVIOUS FOR HOUSE	2,756 SF
NEW OTHER IMPERVIOUS (DRIVE, WALK, WALLS)	1,091 SF
NEW PROPOSED PERVIOUS DECK	312 SF
TEMPORARY IMPACT FOR UTILITY INSTALLATION TO BE RESTORED	616 SF
TEMPORARY IMPACT TO BE RESTORED	945 SF
TEMPORARY IMPACT TO BE RE-LANDSCAPED	1,676 SF
NET NEW IMPERVIOUS	183 SF

GRAPHIC SCALE
(IN FEET)

0 10 20 30 40 60

SCALE: 1:20

N

NOTES

1. BASE INFORMATION PROVIDED BY MCCULLOUGH ARCHITECTS, (206) 443-1181.

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FIGURE 4: PROPOSED IMPERVIOUS PLAN
BUFFER MITIGATION PLAN
ZHENG-ZEMEL PROPERTY
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PLAN LEGEND

- PROPERTY LINE
- TOP/TOE OF SLOPE
- STEEP SLOPE BUFFER (50' FROM TOP OF SLOPE AND 75' FROM BASE OF SLOPE
- REDUCED STEEP SLOPE BUFFER (15' PER GEOTECH
- CLEARING LIMITS

MITIGATION LEGEND

STEEP SLOPE RESTORATION	3,848 SF
STEEP SLOPE BUFFER RESTORATION	2,495 SF

GRAPHIC SCALE
(IN FEET)

0 10 20 30 40 60

SCALE:1:20

N

NOTES

1. BASE INFORMATION PROVIDED BY MCCULLOUGH ARCHITECTS, (206) 443-1181.

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FIGURE 5: MITIGATION PLAN
BUFFER MITIGATION PLAN
ZHENG-ZEMEL PROPERTY
403 94TH AVE S.E.
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PLANT LIST (SEE FIGURE 6 FOR SCHEDULE)

LARGE TREES

KEY	SCIENTIFIC NAME	COMMON NAME
CN	CORNUS NUTTALII	PACIFIC DOGWOOD
PC	PINUS CONTORTA	SHORE PINE
TP	THUJA PLICATA	WESTERN RED CEDAR

SMALL TREES

KEY	SCIENTIFIC NAME	COMMON NAME
AC	ACER CIRCINATUM	VINE MAPLE

SHRUBS

KEY	SCIENTIFIC NAME	COMMON NAME
M	MAHONIA AQUIFOLIUM	TALL OREGON GRAPE
OC	OEMLERIA CERASIFORMIS	INDIAN PLUM
RS	RIBES SANGUINEUM	RED CURRANT
S	SYMPHORICARPOS ALBUS	SNOWBERRY
V	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY

GROUNDCOVER

KEY	SCIENTIFIC NAME	COMMON NAME
	ARCTOSTAPHYLOS UVA-URSI	KINNIKINNICK
	GAULTHERIA SHALLON	SALAL
	POLYSTICHUM MUNITUM	SWORD FERN

GRAPHIC SCALE (IN FEET)

0 10 20 30 40 60

SCALE: 1:20

N

NOTES

1. BASE INFORMATION PROVIDED BY MCCULLOUGH ARCHITECTS, (206) 443-1181.

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FIGURE 6: PLANTING PLAN
BUFFER MITIGATION PLAN
ZHENG-ZEMEL PROPERTY
403 94TH AVE S.E.
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PLANT SCHEDULE

LARGE TREES

KEY	SCIENTIFIC NAME	COMMON NAME	SPACING	QTY.	SIZE (MIN.)	NOTES
CN	CORNUS NUTTALII	PACIFIC DOGWOOD	10' O.C.	2	5 GAL.	SINGLE TRUNK, WELL BRANCHED
PC	PINUS CONTORTA	SHORE PINE	8' O.C.	1	5 GAL.	FULL & BUSHY
TP	THUJA PLICATA	WESTERN RED CEDAR	10' O.C.	1	5 GAL.	FULL & BUSHY

SMALL TREES

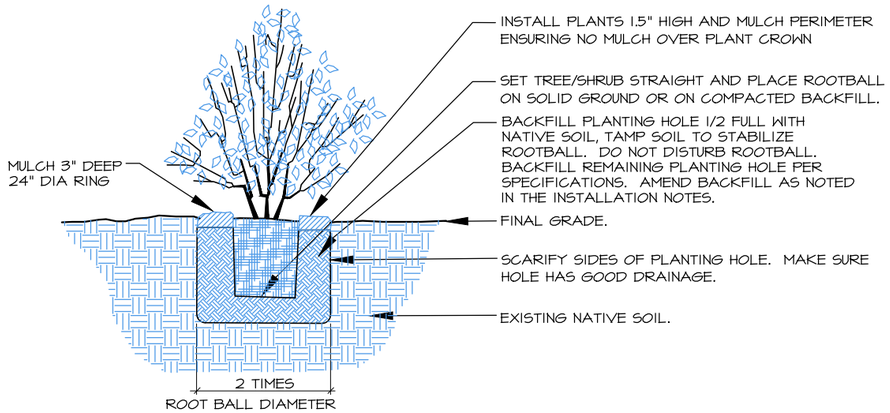
KEY	SCIENTIFIC NAME	COMMON NAME	SPACING	QTY.	SIZE (MIN.)	NOTES
AC	ACER CIRCINATUM	VINE MAPLE	6' O.C.	8	5 GAL.	MULTI-STEM (3 MIN.)

SHRUBS

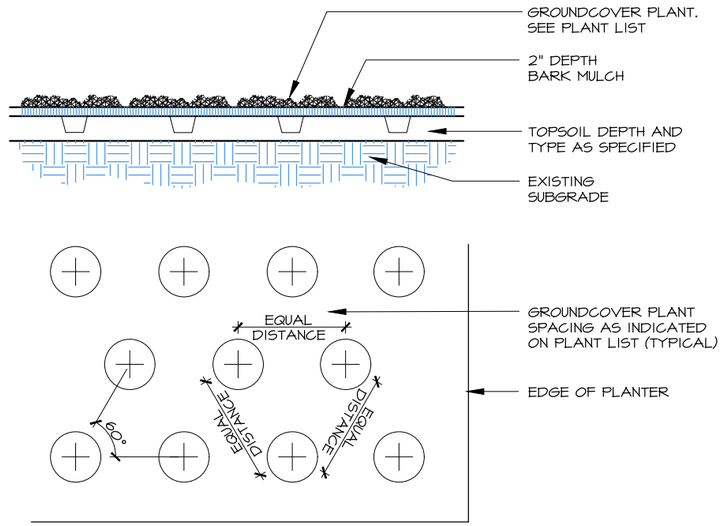
KEY	SCIENTIFIC NAME	COMMON NAME	SPACING	QTY.	SIZE (MIN.)	NOTES
M	MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	3' O.C.	121	2 GAL.	FULL & BUSHY
OC	OEMLERIA CERASIFORMIS	INDIAN PLUM	5' O.C.	5	1 GAL.	MULTI-STEM (3 MIN.)
RS	RIBES SANGUINEUM	RED CURRANT	5' O.C.	5	2-5 GAL.	MULTI-STEM (3 MIN.)
S	SYMPHORICARPOS ALBUS	SNOWBERRY	3' O.C.	103	2 GAL.	MULTI-STEM (3 MIN.)
V	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	2' O.C.	109	2 GAL.	FULL & BUSHY

GROUNDCOVER

KEY	SCIENTIFIC NAME	COMMON NAME	SPACING	QTY.	SIZE (MIN.)	NOTES
	ARCTOSTAPHYLOS UVA-URSI	KINNIKINNICK	2' O.C.	TBD	1 GAL.	FULL & BUSHY
	GAULTHERIA SHALLON	SALAL	2' O.C.	TBD	1 GAL.	FULL & BUSHY
	POLYSTICHUM MUNITUM	SWORD FERN	3' O.C.	75	1 GAL.	FULL & BUSHY



1 CONTAINER TREE/SHRUB PLANTING (TYP.)
SCALE: NTS



3 GROUNDCOVER PLANTING (TYP.)
SCALE: NTS

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FIGURE 7: PLANT SCHEDULE
BUFFER MITIGATION PLAN
ZHENG-ZEMEL PROPERTY
403 94TH AVE S.E.
BELLEVUE, WA 98004

Altmann Oliver Associates, LLC
PO Box 578 Carnation, WA 98014 Office (425) 333-4535 Fax (425) 333-4509
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SPECIFICATIONS

1. THIS PLAN PERTAINS TO PLANTING PORTION OF THE SITE WORK ONLY.
2. CONTRACTOR INFORMATION. WHEN IT IS AVAILABLE, CONTACT INFORMATION SHALL BE PROVIDED TO THE CITY OF BELLEVUE THAT INCLUDES NAMES, ADDRESSES AND PHONE NUMBERS OF PERSONS/FIRMS THAT WILL BE RESPONSIBLE FOR INSTALLING REQUIRED PLANTS AND PERFORMING REQUIRED MAINTENANCE.
3. CONTRACTOR'S QUALIFICATIONS. ALL WORK SHALL BE PERFORMED BY A LICENSED LANDSCAPE CONTRACTOR REGISTERED IN THE STATE OF WASHINGTON. CONTRACTOR MUST BE EXPERIENCED IN MITIGATION AND RESTORATION WORK. THE CONTRACTOR SHALL PROVIDE THAT THERE IS ONE PERSON ON THE SITE AT ALL TIMES DURING WORK AND INSTALLATION WHO IS THOROUGHLY FAMILIAR WITH THE TYPE OF MATERIALS BEING INSTALLED AND THE BEST METHODS FOR THEIR INSTALLATION, AND WHO SHALL DIRECT ALL WORK BEING PERFORMED UNDER THESE SPECIFICATIONS. THIS PERSON SHALL HAVE A MINIMUM OF FIVE (5) YEARS EXPERIENCE INSTALLING NATIVE PLANT MATERIALS FOR WETLAND MITIGATION OR RESTORATION PROJECTS, UNLESS OTHERWISE ALLOWED BY THE LANDSCAPE DESIGNER, WETLAND BIOLOGIST AND/OR THE CITY OF BELLEVUE.
4. EXISTING STRUCTURES AND NON-NATURAL MATERIALS SHALL BE REMOVED FROM ALL MITIGATION AND LANDSCAPED AREAS PRIOR TO PLANTING.
5. ALL PLANTING AREAS OF PREVIOUS IMPERVIOUS OR TEMPORARILY-IMPACTED AREAS OUTSIDE THE DRIPLINE OF THE EXISTING TREES TO BE SAVED SHALL BE OVER-EXCAVATED 12" FOR PLACEMENT OF 12" OF IMPORTED 3-WAY TOPSOIL (DEJONG'S) OR STOCKPILED NATIVE TOPSOIL. AOA TO APPROVE TOPSOIL PRIOR TO PLACEMENT.
6. ALL PLANTS SHOULD BE INSTALLED BETWEEN DECEMBER 1ST AND MARCH 15TH.
7. INTERMEDIATE INSPECTIONS. ALL PLANTS SHALL BE INSPECTED AND APPROVED BY THE LANDSCAPE DESIGNER AND/OR WETLAND BIOLOGIST PRIOR TO INSTALLATION. CONDITION OF ROOTS OF A RANDOM SAMPLE OF PLANTS WILL BE INSPECTED, AS WELL AS ALL ABOVEGROUND GROWTH ON ALL PLANTS. ROOTS OF ANY BARE ROOT PLANTS, IF PERMITTED FOR USE, WILL BE INSPECTED. PLANT MATERIAL MAY BE APPROVED AT THE SOURCE, AT THE DISCRETION OF THE LANDSCAPE DESIGNER AND THE WETLAND BIOLOGIST, BUT ALL MATERIAL MUST BE RE-INSPECTED AND APPROVED ON THE SITE PRIOR TO INSTALLATION. PLANT LOCATIONS SHALL ALSO BE INSPECTED AND APPROVED PRIOR TO PLANTING.
8. PRIOR TO INSTALLATION OF PLANT MATERIAL, THE PLANTING AREAS WILL BE LAID OUT BASED ON THE PLANTING PLAN, AND ALL HIMALAYAN BLACKBERRY, ENGLISH IVY OR OTHER INVASIVE PLANT SPECIES LOCATED IN THE PLANTING AREAS WILL BE REMOVED BY HAND.
9. ALL PLANTS SHALL BE PIT-PLANTED IN PLANTING PITS EXCAVATED 2X THE DIAMETER OF THE PLANT. PLANTS SHALL BE INSTALLED 3" HIGH AND SURFACED MULCHED TO A DEPTH OF 3" WITH MEDIUM-COURSE BARK MULCH PLACED CONTINUOUSLY THROUGHOUT THE PLANTING BED.
10. ALL PLANTS SHALL BE NURSERY GROWN (IN WESTERN WA OR OR) FOR AT LEAST 1 YEAR FROM PURCHASE DATE, FREE FROM DISEASE OR PESTS, WELL-ROOTED, BUT NOT ROOT-BOUND AND TRUE TO SPECIES.
11. PLANT LAYOUT SHALL BE APPROVED BY AOA PRIOR TO INSTALLATION AND APPROVED UPON COMPLETION OF PLANTING.
12. UPON COMPLETION OF PLANTING, ALL PLANTS SHALL BE THOROUGHLY WATERED.
13. UPON APPROVAL OF PLANTING INSTALLATION BY AOA, THE CITY OF BELLEVUE WILL BE NOTIFIED TO CONDUCT A SITE REVIEW FOR FINAL APPROVAL OF CONSTRUCTION.
14. MAINTENANCE SHALL BE REQUIRED IN ACCORDANCE WITH THE CITY OF BELLEVUE SENSITIVE AREAS MITIGATION GUIDELINES AND APPROVED PLANS.
20. AN IRRIGATION SHALL BE DESIGN/BUILT BY LANDSCAPE CONTRACTOR TO PROVIDE SEPARATE ZONE COVERAGE TO THE LAWN AREAS VERSUS THE PLANTING BEDS.
21. THE ZONE TO THE PLANTING BEDS SHALL BE SET TO PROVIDE 1/2" OF FLOW 2-3 TIMES WEEKLY FROM JULY 1 – OCTOBER 31 THE FIRST YEAR AFTER PLANTING. FLOW SHALL REDUCE TO 1-2 TIMES WEEKLY THE SECOND YEAR AFTER PLANTING AND ONCE WEEKLY THE YEARS 3-5. NO FURTHER IRRIGATION IS NECESSARY AFTER THE THIRD YEAR FOR THE NATIVE PLANTING BEDS.
22. THE IRRIGATION SYSTEM SHALL UTILIZE MP-3 ROTARY HEADS AND WILL HAVE A RAIN SENSOR ATTACHED.
23. MAINTENANCE SHALL BE IMPLEMENTED ON A REGULAR BASIS ACCORDING TO THE SCHEDULE BELOW.

ANNUAL MAINTENANCE SCHEDULE

MAINTENANCE ITEM	J	F	M	A	M	J	J	A	S	O	N	D
WEED CONTROL			1		1	1	1	1	1	1		
GENERAL MAINT.			1		1	1	1	1	1	1		
WATERING - YEAR 1						4	8	8	8			
WATERING - YEAR 2						4	8	8	8			
WATERING - YEARS 3-5						4	4	4	4			

1-8 = NUMBER OF TIMES TASK SHALL BE PERFORMED PER MONTH.

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FIGURE 8: SPECIFICATIONS
BUFFER MITIGATION PLAN
ZHENG-ZEMEL PROPERTY
403 94TH AVE S.E.
BELLEVUE, WA 98004

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MAINTENANCE & MONITORING PLAN

CONSTRUCTION MANAGEMENT

1. Prior to commencement of any work in the steep slope and shoreline setback enhancement areas, the clearing limits will be staked and all existing vegetation to be saved will be clearly marked. A pre-installation meeting will be held at the site to review and discuss all aspects of the project with the owner.
2. A biologist will supervise plan implementation during construction to ensure that objectives and specifications of the steep slope and shoreline setback enhancement plan are met.
3. Any necessary significant modifications to the design that occur as a result of unforeseen site conditions will be jointly approved by the City of Bellevue and the biologist prior to their implementation.

MONITORING METHODOLOGY

1. The monitoring program will be conducted twice yearly (in the beginning and end of the growing season) for a period of five years, with reports submitted annually (at the end of the growing season) to the City of Bellevue.
2. Vegetation establishment within the steep slope and shoreline setback enhancement areas will be monitored during each field visit with a record kept of all plant species found.
3. Photo-points will be established from which photographs will be taken throughout the monitoring period. These photographs will document general appearance and progress in plant community establishment in the enhancement areas. Review of the photos over time will provide a semi-quantitative representation of success of the enhancement plan.

PERFORMANCE STANDARDS

Success of plant establishment within the steep slope and shoreline setback enhancement areas will be evaluated on the basis of percent survival of planted species.

1. Native woody cover will be a minimum of; 10% at construction completion, 15% at year 1, 20% at year 2, 25% at year 3 and 40% at year 5.
2. There will be 100% survival of all woody planted species throughout the mitigation planted area at the end of the first year of planting. For years 2-5, success will be based on an 85% survival rate or similar number of recolonized native woody plants.
3. Exotic and invasive plant species will be maintained at levels below 10% total cover. Removal of these species will occur immediately following the monitoring event in which they surpass the above maximum coverage. Removal will occur by hand whenever possible.

MAINTENANCE (M) & CONTINGENCY (C)

1. Established performance standards for the project will be compared to the monitoring results in order to judge the success of the enhancement project.
2. Contingency will include many of the items listed below and would be implemented if these performance standards are not met.
3. Maintenance and remedial action on the site will be implemented immediately upon completion of the monitoring event, (unless otherwise specifically indicated below).

- replace dead plants with the same species or a substitute species that meet the goal of the enhancement plan (C)
- re-plant areas after reason for failure has been identified (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.) (C)
- irrigate following plant installation for five years (M)

PERFORMANCE BOND

1. A performance bond or other surety device will be posted with the City of Bellevue by the applicant to cover the costs of steep slope and shoreline setback enhancement plan implementation (including labor, materials, maintenance, and monitoring).
2. The bond or assignment may be released in partial amounts in proportion to work successfully completed over the five year monitoring period, as the applicant demonstrates performance and corrective measures.

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FIGURE 9: MAINTENANCE & MONITORING PLAN
BUFFER MITIGATION PLAN
ZHENG-ZEMEL PROPERTY
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TOPOGRAPHIC & BOUNDARY SURVEY

LEGAL DESCRIPTION

(PER STATUTORY WARRANTY DEED UNDER RECORDING NUMBER 20060929003502)

THE EASTERLY 127 FEET OF THE FOLLOWING DESCRIBED PROPERTY:

THAT PORTION OF THE PLAT OF MOORLAND, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 4 OF PLATS, PAGE 103, IN KING COUNTY, WASHINGTON, AND VACATED STREETS AND ALLEYS WITHIN SAID PLAT DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION POINT OF THE CENTERLINE OF 94TH AVENUE S.E., SAID CENTERLINE NOW BEING THE WEST MARGIN OF SAID 94TH AVENUE S.E., WITH THE NORTH BOUNDARY OF SAID PLAT OF MOORLAND;
THENCE DUE SOUTH ALONG SAID CENTERLINE AND WEST MARGIN A DISTANCE OF 121.74 FEET;
THENCE SOUTH 89°53'49" WEST A DISTANCE OF 170.00 FEET;
THENCE DUE SOUTH A DISTANCE OF 7.50 FEET;
THENCE SOUTH 89°53'49" WEST A DISTANCE OF 274.67 FEET TO A LINE WHICH IS 8.69 FEET WEST OF AND PARALLEL TO WHEN MEASURED AT RIGHT ANGLES FROM THE WESTERLY MARGIN OF BLOCK 8 OF SIAD PLAT OF MOORLAND;
THENCE DUE NORTH ALONG SAID PARALLEL LINE A DISTANCE OF 129.24 FEET TO THE NORTH BOUNDARY OF SAID PLAT OF MOORLAND;
THENCE NORTH 89°53'49" EAST ALONG SAID NORTH BOUNDARY A DISTANCE OF 444.69 FEET TO THE POINT OF BEGINNING;

TOGETHER WITH AN UNDIVIDED QUARTER INTEREST IN THAT PORTION OF THE PLAT OF MOORLAND DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECTION POINT OF THE CENTERLINE OF 94TH AVENUE S.E., SAID CENTERLINE NOW BEING THE WEST MARGIN OF SAID 94TH AVENUE S.E., WITH THE NORTH BOUNDARY OF SAID PLAT OF MOORLAND;
THENCE DUE SOUTH ALONG SAID CENTERLINE AND WEST MARGIN A DISTANCE OF 121.74 FEET TO THE TRUE POINT OF BEGINNING;
THENCE CONTINUING DUE SOUTH ALONG SAID CENTERLINE AND WESTERLY MARGIN A DISTANCE OF 227.50 FEET TO THE EASTERLY EXTENSION ON THE SOUTH LINE OF LOT 28, BLOCK 9 OF SAID PLAY OF MOORLAND;
THENCE SOUTH 89°53'49" WEST 60 FEET;
THENCE DUE NORTH FOR A DISTANCE OF 212.50 FEET;
THENCE SOUTH 89°53'49" WEST A DISTANCE OF 110.00 FEET;
THENCE DUE NORTH A DISTANCE OF 15.00 FEET;
THENCE NORTH 89°53'49" EAST A DISTANCE OF 170.00 FEET TO THE TRUE POINT OF BEGINNING.

VERTICAL DATUM

NAVD88 PER CITY OF BELLEVUE VERTICAL STA. NO. 264

3"x3" CONCRETE MON W/ LEAD & TACK IN CASE; TOP MON TO TOP RIM CASE 0.73 FEET IN SOUTHEAST QUADRANT OF INTERSECTION 98TH AVE SE/99TH AVE SE & SE 7TH ST.

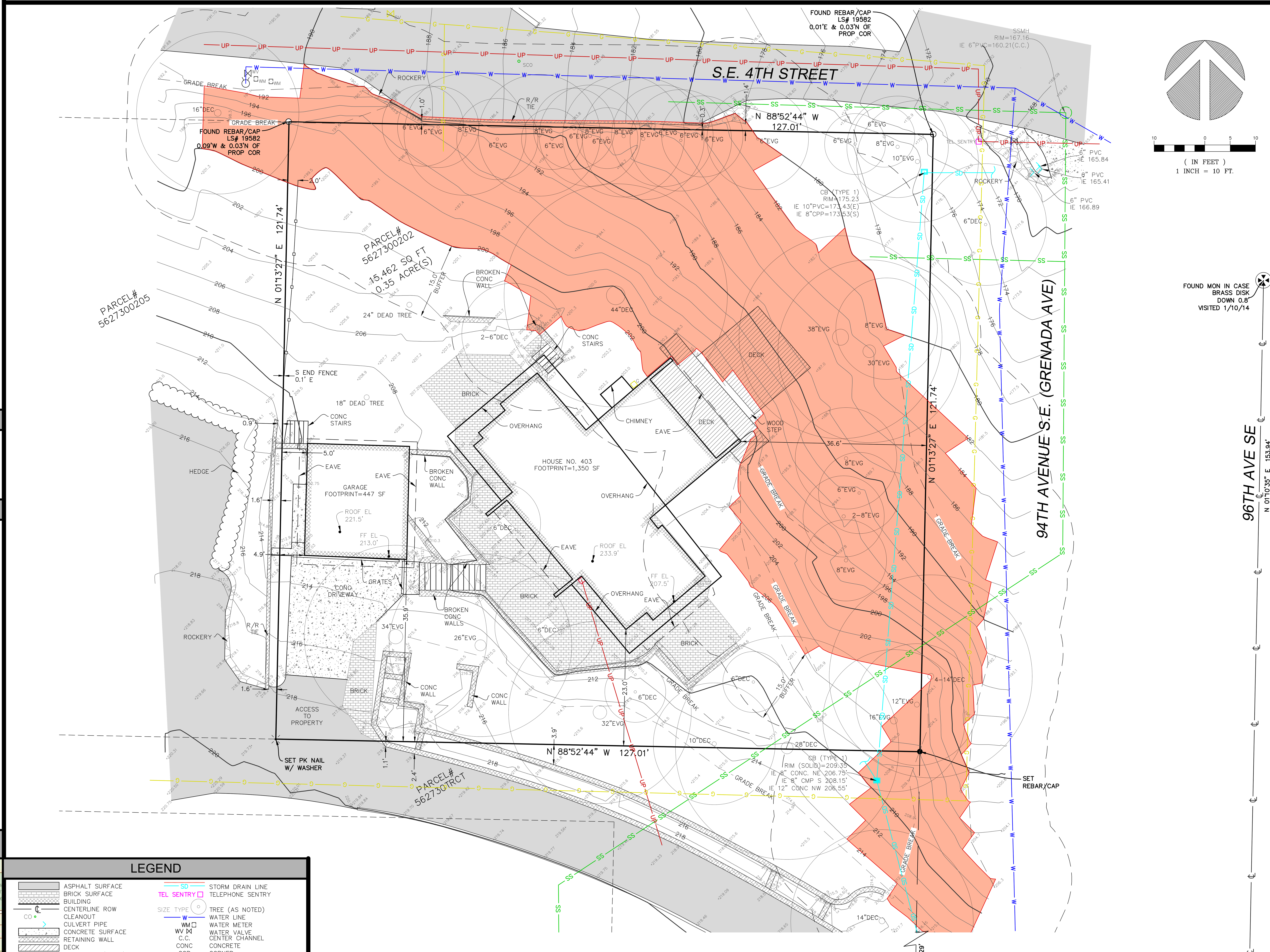
ELEV: 169.61'

SURVEYOR'S NOTES

1. THE TOPOGRAPHIC SURVEY SHOWN HEREON WAS PERFORMED IN DECEMBER OF 2017. THE FIELD DATA WAS COLLECTED AND RECORDED ON MAGNETIC MEDIA THROUGH AN ELECTRONIC THEODOLITE. THE DATA FILE IS ARCHIVED ON DISC OR CD. WRITTEN FIELD NOTES MAY NOT EXIST. CONTOURS ARE SHOWN FOR CONVENIENCE ONLY. DESIGN SHOULD RELY ON SPOT ELEVATIONS.
2. ALL MONUMENTS SHOWN HEREON WERE LOCATED DURING THE COURSE OF THIS SURVEY UNLESS OTHERWISE NOTED.
3. BURIED UTILITIES SHOWN BASED ON RECORDS FURNISHED BY OTHERS AND VERIFIED WHERE POSSIBLE IN THE FIELD. TERRANE ASSUMES NO LIABILITY FOR THE ACCURACY OF THOSE RECORDS OR ACCEPT RESPONSIBILITY FOR UNDERGROUND LINES WHICH ARE NOT MADE PUBLIC RECORD. FOR THE FINAL LOCATION OF EXISTING UTILITIES IN AREAS CRITICAL TO DESIGN CONTACT THE UTILITY OWNER/AGENCY. AS ALWAYS, CALL 1-800-424-5555 BEFORE CONSTRUCTION.
4. SUBJECT PROPERTY TAX PARCEL NO. 5627300202.
5. SUBJECT PROPERTY AREA PER THIS SURVEY IS 15,462 S.F. (0.35 ACRES)
6. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT. EASEMENTS AND OTHER ENCUMBRANCES MAY EXIST THAT ARE NOT SHOWN HEREON.
7. FIELD DATA FOR THIS SURVEY WAS OBTAINED BY DIRECT FIELD MEASUREMENTS WITH A CALIBRATED ELECTRONIC 5-SECOND TOTAL STATION AND/OR SURVEY GRADE GPS OBSERVATIONS. ALL ANGULAR AND LINEAR RELATIONSHIPS ARE ACCURATE AND MEET THE STANDARDS SET BY WAC 332-130-090.

VICINITY MAP

N.T.S.



LEGEND

	ASPHALT SURFACE	SD	STORM DRAIN LINE
	BRICK SURFACE	TEL SENTRY	TELEPHONE SENTRY
	BUILDING	SIZE TYPE	TREE (AS NOTED)
℄	CENTERLINE ROW	W	WATER LINE
CO	CLEANOUT	WM	WATER METER
	CULVERT PIPE	WV	WATER VALVE
	CONCRETE SURFACE	C.C.	CENTER CHANNEL
	RETAINING WALL	CONC	CONCRETE
	DECK	COR	CORNER
	FENCE LINE (WOOD)	DEC	DECIDUOUS
	FIRE HYDRANT	EL	ELEVATION
G	GAS LINE	EVG	EVERGREEN
G	GAS METER	FF	FINISH FLOOR
GV	GAS VALVE	MEAS	MEASURED
	GUARDRAIL	MON	MONUMENT
	HEDGE FOLIAGE LINE	PROP	PROPERTY
	INLET (TYPE 1)	(R)	RECORD DATA
	INLET (TYPE 1, SOLID LID)		
	INLET (TYPE 1, CURB INLET)		
	NAIL AS NOTED		
	MONUMENT IN CASE (FOUND)		
P	POWER METER		
UP	POWER (UNDERGROUND)		
	REBAR AS NOTED (FOUND)		
	REBAR & CAP (SET)		
	ROCKERY		
SS	SEWER LINE		
	SEWER MANHOLE		
	STEEP SLOPE AREA		

BASIS OF BEARINGS

A BEARING OF N 88°52'14" W ON THE CENTERLINE OF SE 7TH STREET, PER CITY OF BELLEVUE.

REFERENCES

1. CITY OF BELLEVUE SHORT PLAT NUMBER 79-29, RECORDED UNDER RECORDING NUMBER 7905290618, KING COUNTY RECORDS.

STEEP SLOPE/BUFFER DISCLAIMER

THE LIMITS OF THE 40% AS SHOWN ON THIS DRAWING IS OUR INTERPRETATION WHICH MAY DIFFER FROM THAT OF THE REVIEWING AGENCY. THE LIMITS OF THE 40% SLOPES AND ASSOCIATED SETBACKS NEEDS TO BE DETERMINED BY THE RESPECTIVE REVIEWING AGENCY, PRIOR TO ANY DESIGN AND OR CONSTRUCTION TAKING PLACE.

measure success

TOPOGRAPHIC & BOUNDARY SURVEY
SW 1/4 OF SE 1/4 SEC 31, TWP. 25N., RGE 05E., W.M.
PARCEL NO. 5627300202

ZEMEL RESIDENCE
403 94TH AVENUE S.E.
BELLEVUE, WA. 98004

EDWIN J. GREEN JR. — STATE OF WASHINGTON — REGISTERED PROFESSIONAL LAND SURVEYOR — 15025
06/20/19

Terrane
10801 Main Street, Suite 102, Bellevue, WA 98004
phone 425.458.4488 support@terrane.net
www.terrane.net

JOB NUMBER:	171077
DATE:	12/06/17
DRAFTED BY:	VLJ
CHECKED BY:	MAB
SCALE:	1"= 10'

REVISION HISTORY	
12/14/18	SLOPE BUFFER
5/17/19	UPDATE BUFFER
6/20/19	UPDATE BUFFER

SHEET NUMBER
1 OF 1

COBALT
GEOSCIENCES

Geotechnical Investigation
Proposed Residence

403 – 94th Avenue SE
Bellevue, Washington

August 14, 2019

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GEOTECHNICAL INVESTIGATION
BELLEVUE, WASHINGTON

August 14, 2019

1.0 Introduction

In accordance with your authorization, Cobalt Geosciences, LLC (Cobalt) has completed a geotechnical investigation for the proposed single-family residence located at 403 – 94th Avenue SE in Bellevue, Washington (Figure 1).

The purpose of the geotechnical investigation was to identify subsurface conditions and to provide geotechnical recommendations for foundation design, stormwater management, earthwork, soil compaction, and suitability of the on-site soils for use as fill.

The scope of work for the geotechnical evaluation consisted of a site investigation followed by engineering analyses to prepare this report. Recommendations presented herein pertain to various geotechnical aspects of the proposed development, including foundation support of the new building, general slope stability, and stormwater management.

2.0 Project Description

The project includes construction of a new multi-story residence with attached garage located in the vicinity of an existing residence and garage. The provided site plan dated August 5, 2019 shows the location of the proposed residence, mapped steep slope areas, and finish floor elevations. Based on our discussions with the architect, the building will be generally located to fit the existing topography. Foundation systems will likely incorporate multiple steps over the existing slope systems in addition to local taller concrete basement walls.

Anticipated building loads are expected to be light and site grading will include cuts and fills on the order of 10 feet or less for basement construction. Stormwater management will include infiltration devices, if they are determined to be feasible.

3.0 Site Description

The site is located along at 403 – 94th Avenue SE in Bellevue, Washington (Figure 1). The property consists of one irregularly shaped parcel (No. 562730-0202) with a total area of 15,464 square feet.

The property is developed with a multi-story residence, detached garage, and numerous block, timber, stacked concrete, and rockery walls. These walls are mostly located in the south half of the property and are generally less than 4 feet in height. Associated with the walls are patio areas, steps, and landscaped areas.

In general, the site slopes downward from southwest to northeast at variable magnitudes ranging from about 10 to 60 percent and total topographic relief of about 45 feet. Most slope areas within the property are 10 to 30 percent in magnitude. The steepest slope areas are located north, east, and south of the existing residence. These slopes are 30 to 60 percent in magnitude with local relief of 10 to 30 feet.

There is a cantilever soldier pile wall along a portion of the north property line. This wall is about 8 feet in height and borders SE 5th Street.

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Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

The site is vegetated with grasses, blackberry vines, ivy, ferns, bushes/shrubs, along with variable diameter evergreen and deciduous trees.

The site is bordered to the north by SE 5th Street, to the east and west by single-family residences, and to the south by an asphalt paved access roadway.

4.0 Field Investigation

4.1.1 Site Investigation Program

The geotechnical field investigation program was completed on May 13, 2019 and included excavating and sampling five hand auger borings within the property for subsurface analysis. A dynamic cone penetrometer (DCP) was used to evaluate the relative density of the subsurface soils.

The soils encountered were logged in the field and are described in accordance with the Unified Soil Classification System (USCS).

A Cobalt Geosciences field representative conducted the explorations, collected disturbed soil samples, classified the encountered soils, kept a detailed log of the explorations, and observed and recorded pertinent site features.

The results of the auger boring sampling are presented in Appendix C.

5.0 Soil and Groundwater Conditions

5.1.1 Area Geology

The site lies within the Puget Lowland. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved, with a depositional and erosional history including at least four separate glacial advances/retreats. The Puget Lowland is bounded to the west by the Olympic Mountains and to the east by the Cascade Range. The lowland is filled with glacial and non-glacial sediments consisting of interbedded gravel, sand, silt, till, and peat lenses.

The Geologic Map of King County, indicates that the site is near the contacts between Vashon Glacial Till and Vashon Advance Outwash.

Vashon Glacial Till is typically characterized by an unsorted, non-stratified mixture of clay, silt, sand, gravel, cobbles and boulders in variable quantities. These materials are typically dense and relatively impermeable. The poor sorting reflects the mixing of the materials as these sediments were overridden and incorporated by the glacial ice.

Vashon Advance Outwash consists of fine to medium grained sand with minor gravel and local interbeds of silt and clay. These materials are usually permeable and are typically dense to very dense. Vashon Advance Outwash typically underlies Vashon Glacial Till.

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Auger Boring Explorations

All of our hand auger borings encountered 6 to 18 inches of topsoil and vegetation underlain by approximately 2 to 4.5 feet of loose/medium stiff to medium dense/stiff silty-sand and silt with sand trace to some gravel (Weathered Glacial Till?). These deposits were underlain by dense to very dense, silty-fine to medium grained sand with gravel (Glacial Till), which continued to the termination depths of the auger borings.

5.1.2 Groundwater

Groundwater was not observed during our investigation. There is a chance that light amounts of perched groundwater may develop between weathered and unweathered glacial till at depth during the late winter and early spring months.

Water table elevations often fluctuate over time. The groundwater level will depend on a variety of factors that may include seasonal precipitation, irrigation, land use, climatic conditions and soil permeability. Water levels at the time of the field investigation may be different from those encountered during the construction phase of the project.

6.0 Geologic Hazards

6.1 Steep Slope Hazard

Critical area ordinances designate slopes with magnitudes greater than about 40 percent and vertical relief of at least 10 feet as potentially geologically hazardous (steep slope/landslide hazards). Additional criteria include areas where landslide activity has taken place historically or where there is evidence of slope movements. Slope areas underlain by permeable soils overlying impermeable soils often exhibit landslide activity.

In general, the site slopes downward from southwest to northeast at variable magnitudes ranging from about 10 to 60 percent and total topographic relief of about 45 feet. Most slope areas within the property are 10 to 30 percent in magnitude. The steepest slope areas, and areas that qualify as steep slope hazard areas, are located north, east, and south of the existing residence. These slopes are 30 to 60 percent in magnitude with local relief of 10 to 30 feet.

The LUC defines steep slope hazard areas as having any of the following characteristics:

A. Designation of Critical Areas.

The following geologic hazard areas are hereby designated critical areas subject to the regulations of this part.

1. Landslide Hazards. Areas of slopes of 15 percent or more with more than 10 feet of rise, which also display any of the following characteristics:

a. Areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides.

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cobaltgeo@gmail.com
206-331-1097

b. Areas that have shown movement during the Holocene Epoch (past 13,500 years) or that are underlain by landslide deposits.

c. Slopes that are parallel or subparallel to planes of weakness in subsurface materials.

d. Slopes exhibiting geomorphological features indicative of past failures, such as hummocky ground and back-rotated benches on slopes.

e. Areas with seeps indicating a shallow ground water table on or adjacent to the slope face.

f. Areas of potential instability because of rapid stream incision, stream bank erosion, and undercutting by wave action.

2. Steep Slopes. Slopes of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.

The site contains steep slope areas as defined above. The site does not contain features or aspects consistent with landslide hazard areas.

During our field assessment, we traversed slope areas at all of the site locations, where accessible. As we conducted the traverses, we looked for any signs that would indicate past slope failures or features indicating possible future instability.

Overall, the steep slope areas and adjacent areas within 200 feet of the slopes appear stable at this time with no evidence of severe erosion, exposed soils, hummocky terrain, or other signs of landslide activity. The geologic units that underlie the slope system are generally dense and resistant to deep seated slide activity.

6.2 Erosion Hazard

The Natural Resources Conservation Services (NRCS) maps for King County indicate that the site is underlain by Kitsap silt loam (15 to 30 percent slopes). These soils would have a moderate to severe potential in a disturbed state depending on the slope magnitude.

It is our opinion that soil erosion potential at this project site can be reduced through landscaping and surface water runoff control. Typically erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, such as silt fences, hay bales, mulching, control ditches and diversion trenches. The typical wet weather season, with regard to site grading, is from October 31st to April 1st. Erosion control measures should be in place before the onset of wet weather.

6.3 Seismic Hazard

The overall subsurface profile corresponds to a Site Class *D* as defined by Table 1613.5.2 of the 2015 International Building Code (2015 IBC). A Site Class *D* applies to an overall profile consisting of dense to very dense soils within the upper 100 feet.

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Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

We referenced the U.S. Geological Survey (USGS) Earthquake Hazards Program Website to obtain values for S_S, S_1, F_a, and F_v. The USGS website includes the most updated published data on seismic conditions. The site specific seismic design parameters and adjusted maximum spectral response acceleration parameters are as follows:

PGA	(Peak Ground Acceleration, in percent of g)
S_S	133.00% of g
S_1	51.20% of g
F_A	1.00
F_V	1.50

Additional seismic considerations include liquefaction potential and amplification of ground motions by soft/loose soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. The relatively dense soil deposits that underlie the site have a low liquefaction potential.

6.4 Slope Stability Analyses

We performed slope stability analyses through a representational cross section through a mapped steep slope and proposed/existing residence.

The commercially available slope stability computer program Geostase 4 was used to evaluate the global stability of the slope within the property. The slope stability was analyzed under static and seismic (pseudo-static method) conditions for the existing/proposed topography and building loads. Since the proposed development is very similar in location and elevation to the existing development, we conducted a single set of analyses based on the current conditions.

The computer program calculates factors of safety for potential slope failures and generates the potential failure planes. This software calculates the slope stability under seismic conditions using pseudo-static methods. The stability of the described configuration was analyzed by comparing observed factors of safety to minimum values as set by standard geotechnical practice.

A factor of safety of 1.0 is considered equilibrium and less than 1.0 is considered failure. The required factor of safety for global stability is 1.5 for static conditions and 1.1 for seismic conditions. In accordance with typical engineering standards, we used a seismic acceleration equal to one half of the horizontal peak ground acceleration. At this location, the site modified PGA is 0.553 with one half equal to 0.27. A line load of 2,500 psf was used to simulate the building foundation system.

We utilized DCP data along with field Torvayne shear testing to determine suitable soil parameters of the glacial soils that underlie the site at shallow depths. The following estimated soil parameters were used in our analyses:

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Soil Description	Unit Weight (pcf)	Cohesion (psf)	Friction (degrees)
Weathered Glacial Till	115-125	100	32
Glacial Till	120-130	200	36

Slope Stability Results

Cross Section A to A'	Static Factor of Safety	0.27g Seismic Factor of Safety
Existing/Proposed Conditions	1.846	1.250

The analyses indicate suitable factors of safety for global stability at the location of the proposed residence. The site slopes are mostly natural and underlain by dense glacially consolidated materials. There is minimal risk to slope stability from the proposed grading and construction.

These analyses do not determine safety during construction. Typically, construction activities are temporary and provided excavation recommendations from the geotechnical engineer are followed, the risk of failure can be managed through daily observation of stability. Please see temporary excavation section of this report for more information.

6.1.5 Critical Area Report Summary

In this section, we present a generalized discussion of the relevant sections of the City of Bellevue Land Use Code pertaining to geologically hazardous areas and critical area reports. Comments follow each section where applicable.

VII. GEOLOGIC HAZARD AREAS

20.25H.120 Designation of critical area and buffers.

A. Designation of Critical Areas.

The following geologic hazard areas are hereby designated critical areas subject to the regulations of this part.

1. Landslide Hazards. Areas of slopes of 15 percent or more with more than 10 feet of rise, which also display any of the following characteristics:

a. Areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides.

b. Areas that have shown movement during the Holocene Epoch (past 13,500 years) or that are underlain by landslide deposits.

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Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

c. Slopes that are parallel or subparallel to planes of weakness in subsurface materials.

d. Slopes exhibiting geomorphological features indicative of past failures, such as hummocky ground and back-rotated benches on slopes.

e. Areas with seeps indicating a shallow ground water table on or adjacent to the slope face.

f. Areas of potential instability because of rapid stream incision, stream bank erosion, and undercutting by wave action.

2. Steep Slopes. Slopes of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.

- The highlighted criteria are present at the site. See Section 6.1.1 for a discussion of steep slope hazards. Based on our explorations, hazards associated with steep slopes at the site are low, provided stormwater runoff is fully controlled and excavation work, fill placement, and drainage system installation is monitored by the geotechnical engineer. The steep slope areas south and east of the residence were likely created through grading during original site development.

20.25H.125 Performance standards – Landslide hazards and steep slopes.

In addition to generally applicable performance standards set forth in LUC 20.25H.055 and 20.25H.065, development within a landslide hazard or steep slope critical area or the critical area buffers of such hazards shall incorporate the following additional performance standards in design of the development, as applicable. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function.

A. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;

- In general, the proposed building will be constructed to fit the topography of the moderately steep slope areas. Cuts are necessary for the proposed project but will be limited to about 10 feet deep for basement wall construction. The foundation walls proposed to support these cuts will be engineered for the appropriate lateral earth pressures.

B. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;

- Disturbance to vegetation will be minimized during construction and any areas temporarily disturbed beyond the footprint of the proposed structure will be revegetated. The proposed building is in the general area of the existing structure.

C. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;

- The site slopes are stable in their current configurations. There will be no net increase in risk to critical areas or adjacent properties. Increased buffers are not warranted at this time.

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Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

D. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall;

- Provided within the proposal. We agree that retaining walls generally require less land disturbance and fill slopes are typically not more stable than a wall system with natural slope conditions. Typically landscaping walls less than 4 feet in height are suitable, if proposed.

E. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer;

- Proposed impervious surfaces are generally located within hazard buffers only, and not within most of the critical areas since the proposed building is in the same area as the existing development. Additional impervious surfaces will be limited to those necessary for development. Stormwater collected from existing and future impervious surfaces will be collected and discharged downslope of the steep slope area, reducing potential surficial erosion and instability.

F. Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with this criteria;

- Proposed buildings will be supported on native soils only, and will be constructed to fit the topography. Significant fills are not proposed at the site and we recommend against significant fill placement at the site.

G. Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation;

- Provided in the current conceptual plans. The building foundation walls may be used as retaining walls depending on the foundation layout and building elevations.

H. On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification;

- Foundation will be tiered. Pole foundations not warranted at this time.

I. On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types; and

- Not proposed at this time.

J. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210. (Ord. 5680, 6-26-06, § 3)

- Applicable to civil engineer and landscape architect.

PO Box 82243
Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

20.25H.140 Critical areas report – Additional provisions for landslide hazards and steep slopes.

In addition to the provisions of LUC 20.25H.230, any proposal to modify a landslide hazard or steep slope or associated critical area buffer through a critical areas report shall comply with the requirements of this section.

A. Limitation on Modification.

The provisions for coal mine hazard areas in LUC 20.25H.130 may not be modified through a critical areas report.

B. Area Addressed in Critical Area Report.

In addition to the general requirements of LUC 20.25H.230, the following areas shall be addressed in a critical areas report for geologically hazardous areas:

1. Site and Construction Plans. The report shall include a copy of the site plans for the proposal and a topographic survey;

Provided site plan showing topography and construction is provided in Figure 2. Applicant should supply additional plan sheets as needed.

2. Assessment of Geological Characteristics. The report shall include an assessment of the geologic characteristics of the soils, sediments, and/or rock of the project area and potentially affected adjacent properties, and a review of the site history regarding landslides, erosion, and prior grading. Soils analysis shall be accomplished in accordance with accepted classification systems in use in the region;

Provided in this report. Underlying geologic units include generally dense/stiff glacially consolidated materials consistent with glacial till.

3. Analysis of Proposal. The report shall contain a hazards analysis including a detailed description of the project, its relationship to the geologic hazard(s), and its potential impact upon the hazard area, the subject property, and affected adjacent properties; and

Included in this report. New construction will be located in the area of the existing buildings. There is no evidence of soil erosion or slope movements within the property. The proposed residence will be situated just above mapped steep slope areas. Upon completion of grading and construction, there should be no adverse effects to existing hazards on the subject or adjacent properties. It is critical that the geotechnical engineer observe all aspects of grading, drainage installation, foundation placement, and final surfacing to verify that the construction efforts meet project specifications.

4. Minimum Critical Area Buffer and Building Setback. The report shall make a recommendation for a minimum geologic hazard critical area buffer, if any, and minimum building setback, if any, from any geologic hazard based upon the geotechnical analysis. (Ord. 5717, 2-20-07, § 10; Ord. 5680, 6-26-06, § 3)

A majority of the proposed structure will be constructed within moderately steep to steep slope areas and/or the buffer zone. In general, no specific buffer is necessary for the proposed development. A minimum 10 feet effective setback for all foundation elements from the face of the adjacent slope area is recommended. This may require additional footing embedment for foundation areas above sloped areas.

PO Box 82243
Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

20.25H.145 Critical areas report – Approval of modification.

Modifications to geologic hazard critical areas and critical area buffers shall only be approved if the Director determines that the modification:

A. Will not increase the threat of the geological hazard to adjacent properties over conditions that would exist if the provisions of this part were not modified;

The site is underlain by dense/stiff to very dense/hard, glacially consolidated soils. There are slopes with magnitudes that meet the definition of steep slope hazards, and surface soils can be susceptible to erosion when cleared of vegetation. However, the proposed development will not increase the threat of geologic hazards (erosion and steep slopes) on the property or adjacent properties provided the work is performed during the dry grading season, TESC plans are implemented, and geotechnical oversight is performed during construction.

B. Will not adversely impact other critical areas;

As noted above, modifications to current critical areas will not adversely affect other critical areas within the site and adjacent areas provided proper TESC and oversight are implemented and performed.

C. Is designed so that the hazard to the project is eliminated or mitigated to a level equal to or less than would exist if the provisions of this part were not modified;

Since the proposed development is located in the area of an existing development and the entire site is stable against slope movements, the hazard level will be maintained at a very low level. This level will be the same or lower than what is currently present.

D. Is certified as safe as designed and under anticipated conditions by a qualified engineer or geologist, licensed in the state of Washington;

Provided the site development occurs during the dry grading season, all TESC is implemented, the geotechnical engineer reviews all finalized plans, and the geotechnical engineer observed the construction/grading activities, the proposal as designed is safe.

E. The applicant provides a geotechnical report prepared by a qualified professional demonstrating that modification of the critical area or critical area buffer will have no adverse impacts on stability of any adjacent slopes, and will not impact stability of any existing structures. Geotechnical reporting standards shall comply with requirements developed by the Director in City of Bellevue Submittal Requirements Sheet 25, Geotechnical Report and Stability Analysis Requirements, now or as hereafter amended;

Provided herein.

F. Any modification complies with recommendations of the geotechnical support with respect to best management practices, construction techniques or other recommendations; and

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Kenmore, WA 98028
cobaltgeo@gmail.com
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G. The proposed modification to the critical area or critical area buffer with any associated mitigation does not significantly impact habitat associated with species of local importance, or such habitat that could reasonably be expected to exist during the anticipated life of the development proposal if the area were regulated under this part.

Habitat analyses are not within our scope of work.

7.0 DISCUSSION

7.1.1 General

The site is underlain by variable thicknesses of weathered glacial till overlying dense glacial till. The proposed residential structure may be supported on a shallow foundation system bearing on medium dense or firmer native soils and structural fill placed on suitable native soils.

While there are relatively steep slopes within the eastern/northeastern portion of the property, the slope areas are stable and will not be adversely affected by the proposed development. Site runoff, both temporary and permanent, must be fully controlled in order to maintain surface stability and limit soil erosion on slope areas.

The architectural layout does not provide the location or grading information. We should be provided with the grading and site plans when they become available so that we may update our recommendations. Local retaining walls, such as rockeries or gravity structures, may be necessary as part of driveway construction.

Infiltration of runoff from new impervious surfaces is not feasible. We recommend direct connection of runoff collection devices to City infrastructure in SE 5th Street. Tightlined utilities may extend downward through steep slope areas provided they are backfilled with structural fill up to finish grade and all areas are re-vegetated following construction. Utilities should be backfilled with 5/8 inch minus crushed rock for bedding and native silty-sands up to finish grade. Overland utilities with hill holders are not warranted.

8.0 Recommendations

8.1.1 Site Preparation

Trees, shrubs and other vegetation should be removed prior to stripping of surficial organic-rich soil and fill. Based on observations from the site investigation program, it is anticipated that the stripping depth will be 6 to 18 inches. Deeper excavations will be necessary below large trees where root systems can extend to greater depths, in areas of existing foundation systems, and in any areas underlain by undocumented fill.

The native soils consist of silty-sand with gravel. The native soils may be used as structural fill provided they achieve compaction requirements and are within 3 percent of the optimum moisture. Some of these soils may only be suitable for use as fill during the summer months, as they will be above the optimum

PO Box 82243
Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

moisture levels in their current state. These soils are variably moisture sensitive and may degrade during periods of wet weather and under equipment traffic.

Imported structural fill should consist of a sand and gravel mixture with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). Structural fill should be placed in maximum lift thicknesses of 12 inches and should be compacted to a minimum of 95 percent of the modified proctor maximum dry density, as determined by the ASTM D 1557 test method.

8.1.2 Temporary Excavations

Based on our understanding of the project, we anticipate that the grading could include local cuts on the order of approximately 10 feet or less for foundation and utility placement. Temporary excavations should be sloped no steeper than 1.5H:1V (Horizontal:Vertical) in loose native soils and fill, 1H:1V in medium dense native soils, and 3/4H:1V in dense to very dense native soils. If an excavation is subject to heavy vibration or surcharge loads, we recommend that the excavations be sloped no steeper than 2H:1V, where room permits.

Temporary cuts should be in accordance with the Washington Administrative Code (WAC) Part N, Excavation, Trenching, and Shoring. Temporary slopes should be visually inspected daily by a qualified person during construction activities and the inspections should be documented in daily reports. The contractor is responsible for maintaining the stability of the temporary cut slopes and reducing slope erosion during construction.

Temporary cut slopes should be covered with visqueen to help reduce erosion during wet weather, and the slopes should be closely monitored until the permanent retaining systems or slope configurations are complete. Materials should not be stored or equipment operated within 10 feet of the top of any temporary cut slope.

Soil conditions may not be completely known from the geotechnical investigation. In the case of temporary cuts, the existing soil conditions may not be completely revealed until the excavation work exposes the soil. Typically, as excavation work progresses the maximum inclination of temporary slopes will need to be re-evaluated by the geotechnical engineer so that supplemental recommendations can be made. Soil and groundwater conditions can be highly variable. Scheduling for soil work will need to be adjustable, to deal with unanticipated conditions, so that the project can proceed and required deadlines can be met.

If any variations or undesirable conditions are encountered during construction, we should be notified so that supplemental recommendations can be made. If room constraints or groundwater conditions do not permit temporary slopes to be cut to the maximum angles allowed by the WAC, temporary shoring systems may be required. The contractor should be responsible for developing temporary shoring systems, if needed. We recommend that Cobalt Geosciences and the project structural engineer review temporary shoring designs prior to installation, to verify the suitability of the proposed systems.

8.1.3 Erosion and Sediment Control

Erosion and sediment control (ESC) is used to reduce the transportation of eroded sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be implemented and these measures should be in general accordance with local regulations. At a

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Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features for the site:

- Schedule the soil, foundation, utility, and other work requiring excavation or the disturbance of the site soils, to take place during the dry season (generally May through September). However, provided precautions are taken using Best Management Practices (BMP's), grading activities can be completed during the wet season (generally October through April).
- All site work should be completed and stabilized as quickly as possible.
- Additional perimeter erosion and sediment control features may be required to reduce the possibility of sediment entering the surface water. This may include additional silt fences, silt fences with a higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.
- Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.

8.1.4 Foundation Design

The proposed single-family residence may be supported on a shallow spread footing foundation system bearing on undisturbed medium dense or firmer native soils or on properly compacted structural fill placed on the suitable native soils. If structural fill is used to support foundations, then the zone of structural fill should extend beyond the faces of the footing a lateral distance at least equal to the thickness of the structural fill.

For shallow foundation support, we recommend widths of at least 16 and 24 inches, respectively, for continuous wall and isolated column footings supporting the proposed structure. Provided that the footings are supported as recommended above, a net allowable bearing pressure of 2,500 pounds per square foot (psf) may be used for design.

A 1/3 increase in the above value may be used for short duration loads, such as those imposed by wind and seismic events. Structural fill placed on bearing, native subgrade should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Footing excavations should be inspected to verify that the foundations will bear on suitable material.

Exterior footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Interior footings should have a minimum depth of 12 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower.

If constructed as recommended, the total foundation settlement is not expected to exceed 1 inch. Differential settlement, along a 25-foot exterior wall footing, or between adjoining column footings, should be less than ½ inch. This translates to an angular distortion of 0.002. Most settlement is expected to occur during construction, as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. All footing excavations should be observed by a qualified geotechnical consultant.

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Resistance to lateral footing displacement can be determined using an allowable friction factor of 0.40 acting between the base of foundations and the supporting subgrades. Lateral resistance for footings can also be developed using an allowable equivalent fluid passive pressure of 225 pounds per cubic foot (pcf) acting against the appropriate vertical footing faces (neglect the upper 12 inches below grade in exterior areas).

The allowable friction factor and allowable equivalent fluid passive pressure values include a factor of safety of 1.5. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance.

Care should be taken to prevent wetting or drying of the bearing materials during construction. Any extremely wet or dry materials, or any loose or disturbed materials at the bottom of the footing excavations, should be removed prior to placing concrete. The potential for wetting or drying of the bearing materials can be reduced by pouring concrete as soon as possible after completing the footing excavation and evaluating the bearing surface by the geotechnical engineer or his representative.

8.1.5 Reinforced Concrete Retaining Walls

The following table, titled **Wall Design Criteria**, presents the recommended soil related design parameters for retaining walls with a level backslope. Contact Cobalt if an alternate retaining wall system is used.

Wall Design Criteria	
"At-rest" Conditions (Lateral Earth Pressure – EFD+)	55 pcf (Equivalent Fluid Density)
"Active" Conditions (Lateral Earth Pressure – EFD+)	35 pcf (Equivalent Fluid Density)
Seismic Increase for "At-rest" Conditions (Lateral Earth Pressure)	11H* (Uniform Distribution)
Seismic Increase for "Active" Conditions (Lateral Earth Pressure)	6H* (Uniform Distribution)
Passive Earth Pressure on Low Side of Wall (Allowable, includes F.S. = 1.5)	Neglect upper 2 feet, then 250 pcf EFD+
Soil-Footing Coefficient of Sliding Friction (Allowable; includes F.S. = 1.5)	0.40

*H is the height of the wall; Increase based on one in 500 year seismic event (10 percent probability of being exceeded in 50 years),
+ EFD – Equivalent Fluid Density

The stated lateral earth pressures do not include the effects of hydrostatic pressure generated by water accumulation behind the retaining walls. Uniform horizontal lateral active and at-rest pressures on the retaining walls from vertical surcharges behind the wall may be calculated using active and at-rest lateral

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earth pressure coefficients of 0.3 and 0.5, respectively. The soil unit weight of 125 pcf may be used to calculate vertical earth surcharges.

To reduce the potential for the buildup of water pressure against the walls, continuous footing drains (with cleanouts) should be provided at the bases of the walls. The footing drains should consist of a minimum 4-inch diameter perforated pipe, sloped to drain, with perforations placed down and enveloped by a minimum 6 inches of pea gravel in all directions.

The backfill adjacent to and extending a lateral distance behind the walls at least 2 feet should consist of free-draining granular material. All free draining backfill should contain less than 3 percent fines (passing the U.S. Standard No. 200 Sieve) based upon the fraction passing the U.S. Standard No. 4 Sieve with at least 30 percent of the material being retained on the U.S. Standard No. 4 Sieve. The primary purpose of the free-draining material is the reduction of hydrostatic pressure. Some potential for the moisture to contact the back face of the wall may exist, even with treatment, which may require that more extensive waterproofing be specified for walls, which require interior moisture sensitive finishes.

We recommend that the backfill be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. In place density tests should be performed to verify adequate compaction. Soil compactors place transient surcharges on the backfill. Consequently, only light hand operated equipment is recommended within 3 feet of walls so that excessive stress is not imposed on the walls.

8.1.6 Stormwater Management

We conducted a small-scale Pilot Infiltration Test (PIT) in an excavation adjacent to AB-5 at a depth of 3 feet below grade. Following saturation, falling head testing, and application of correction factors for site variability (0.33), testing (0.5), and influent control (0.9), the measured/design infiltration rate was 0.15 inches/hour. This is lower than what the Department of Ecology considers to be feasible. Furthermore, the site contains slopes in excess of 15 percent. Dispersion and infiltration in areas with slopes greater than 15 percent is not recommended/feasible.

We recommend direct connection of stormwater devices to City infrastructure. Based on our discussions with the civil engineer, a tightline will extend downslope to City infrastructure northeast of the site.

8.1.7 Slab-on-Grade

We recommend that the upper 12 inches of the existing native soils within slab areas be re-compacted to at least 95 percent of the modified proctor (ASTM D1557 Test Method).

Often, a vapor barrier is considered below concrete slab areas. However, the usage of a vapor barrier could result in curling of the concrete slab at joints. Floor covers sensitive to moisture typically requires the usage of a vapor barrier. A materials or structural engineer should be consulted regarding the detailing of the vapor barrier below concrete slabs. Exterior slabs typically do not utilize vapor barriers.

The American Concrete Institutes ACI 360R-06 Design of Slabs on Grade and ACI 302.1R-04 Guide for Concrete Floor and Slab Construction are recommended references for vapor barrier selection and floor slab detailing.

Slabs on grade may be designed using a coefficient of subgrade reaction of 180 pounds per cubic inch (pci) assuming the slab-on-grade base course is underlain by structural fill placed and compacted as outlined in

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cobaltgeo@gmail.com
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Section 8.1. A minimum 4-inch thick layer of clean angular rock (5/8 inch) or pea gravel should be placed over the subgrade as a capillary break material.

A perimeter drainage system is recommended unless interior slab areas are elevated a minimum of 12 inches above adjacent exterior grades. If installed, a perimeter drainage system should consist of a 4 inch diameter perforated drain pipe surrounded by a minimum 6 inches of drain rock wrapped in a non-woven geosynthetic filter fabric to reduce migration of soil particles into the drainage system. The perimeter drainage system should discharge by gravity flow to a suitable stormwater system.

Exterior grades surrounding buildings should be sloped at a minimum of one percent to facilitate surface water flow away from the building and preferably with a relatively impermeable surface cover immediately adjacent to the building.

8.1.8 Groundwater Influence on Construction

Groundwater was not encountered during our investigation. There is a chance that light volumes of perched groundwater may be encountered during late winter and early spring. The depth to perched groundwater would likely vary between 5 and 15 feet below grade.

If groundwater is encountered, we anticipate that sump excavations and small diameter pumps systems will adequately de-water short-term excavations, if required. Any system should be designed by the contractor. We can provide additional recommendations upon request.

8.1.9 Utilities

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards, by a contractor experienced in such work. The contractor is responsible for the safety of open trenches. Traffic and vibration adjacent to trench walls should be reduced; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

In general, sandy and silty soils were encountered at shallow depths in the explorations at this site. These soils have low cohesion and density and will have a tendency to cave or slough in excavations. Shoring or sloping back trench sidewalls is required within these soils in excavations greater than 4 feet deep.

All utility trench backfill should consist of imported structural fill or suitable on site soils. Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. The upper 5 feet of utility trench backfill placed in pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Below 5 feet, utility trench backfill in pavement areas should be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. Pipe bedding should be in accordance with the pipe manufacturer's recommendations.

The contractor is responsible for removing all water-sensitive soils from the trenches regardless of the backfill location and compaction requirements. Depending on the depth and location of the proposed utilities, we anticipate the need to re-compact existing fill soils below the utility structures and pipes. The

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Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction procedures.

9.0 Construction Field Reviews

Cobalt Geosciences should be retained to provide part time field review during construction in order to verify that the soil conditions encountered are consistent with our design assumptions and that the intent of our recommendations is being met. This will require field and engineering review to:

- Monitor and test structural fill placement and soil compaction
- Observe bearing capacity at foundation locations
- Observe slab-on-grade preparation
- Observe excavation stability

Geotechnical design services should also be anticipated during the subsequent final design phase to support the structural design and address specific issues arising during this phase. Field and engineering review services will also be required during the construction phase in order to provide a Final Letter for the project.

10.0 Closure

This report was prepared for the exclusive use of Zinnia Zemel and their appointed consultants. Any use of this report or the material contained herein by third parties, or for other than the intended purpose, should first be approved in writing by Cobalt Geosciences, LLC.

The recommendations contained in this report are based on assumed continuity of soils with those of our test holes, and assumed structural loads. Cobalt Geosciences should be provided with final architectural and civil drawings when they become available in order that we may review our design recommendations and advise of any revisions, if necessary.

Use of this report is subject to the Statement of General Conditions provided in Appendix A. It is the responsibility of Zinnia Zemel who are identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Cobalt Geosciences should any of these not be satisfied.

PO Box 82243
Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

August 14, 2019

Respectfully submitted,

Cobalt Geosciences, LLC
Original signed by:

Exp 6/26/2020

Phil Haberman, PE, LG, LEG
Principal

PH/sc

PO Box 82243
Kenmore, WA 98028
cobaltgeo@gmail.com
206-331-1097

APPENDIX A
Statement of General Conditions

Statement of General Conditions

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Cobalt Geosciences and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Cobalt Geosciences present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Cobalt Geosciences is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Cobalt Geosciences at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Cobalt Geosciences must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Cobalt Geosciences will not be responsible to any party for damages incurred as a result of failing to notify Cobalt Geosciences that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Cobalt Geosciences, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Cobalt Geosciences cannot be responsible for site work carried out without being present.

APPENDIX B
Figures: Vicinity Map, Site Plan

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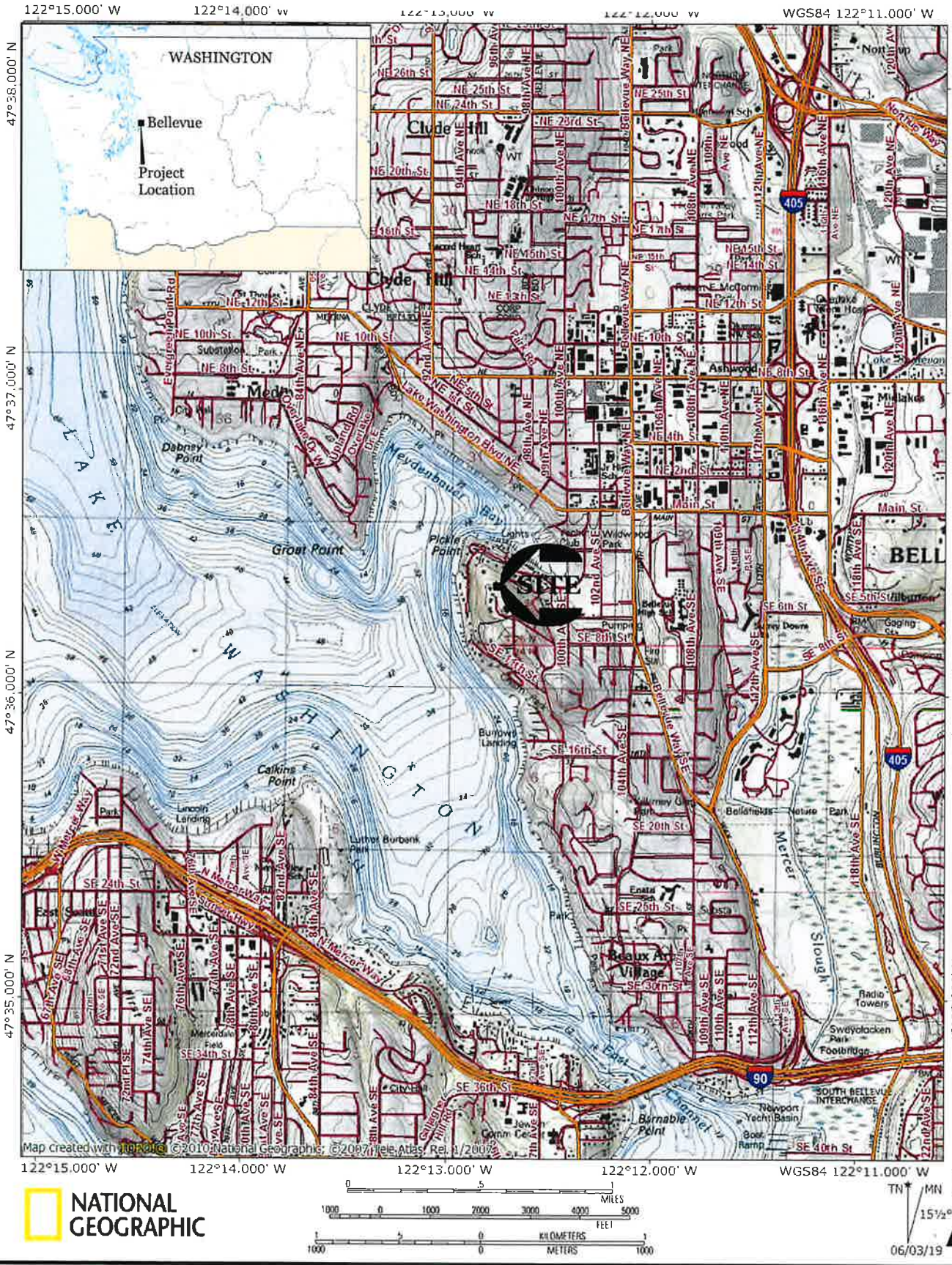

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VICINITY MAP
FIGURE 1

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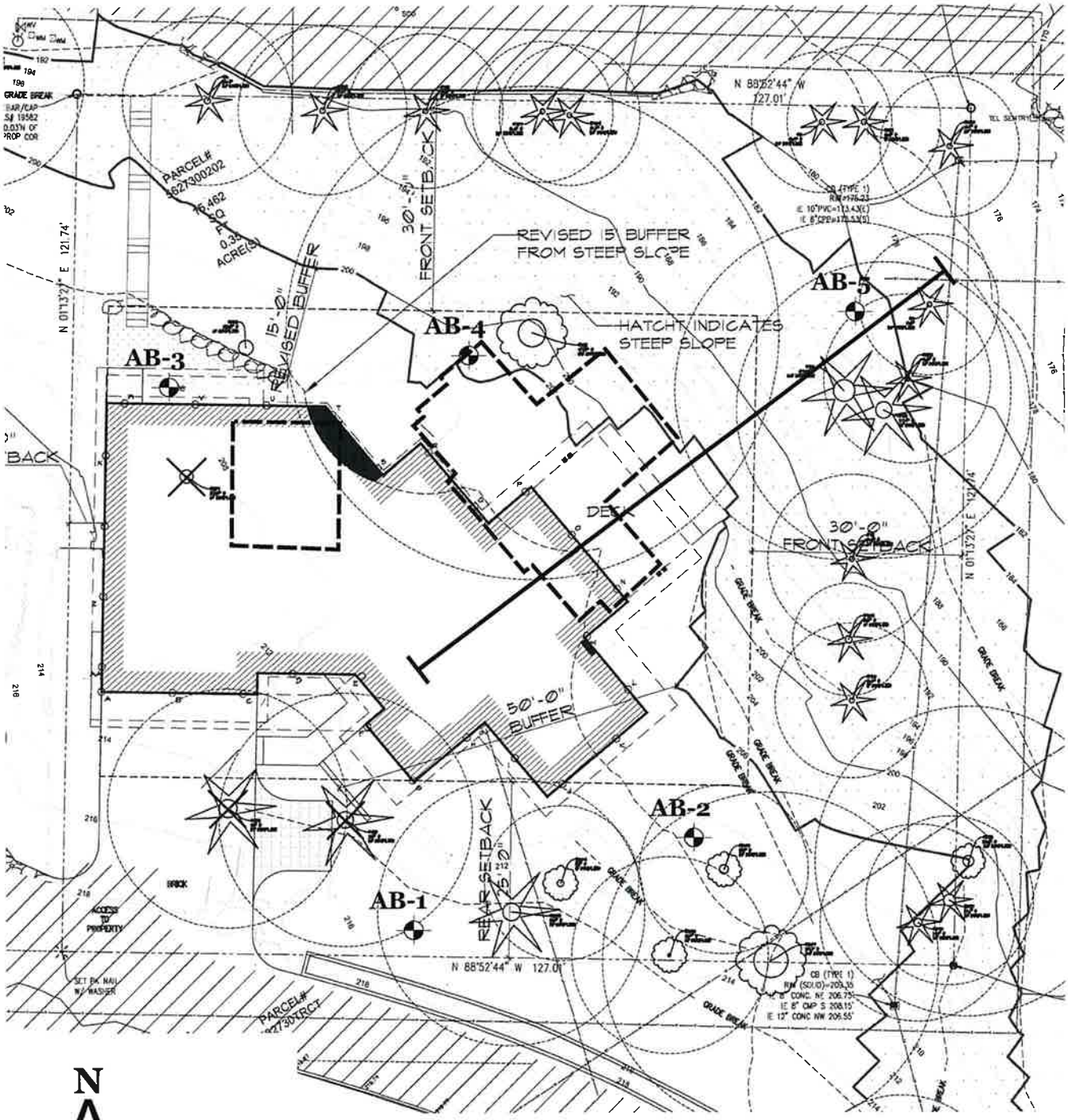

Section for Slope Stability Analyses

AB-1 **Approximate Auger Boring Location**

Approximate Scale 1"=30'

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APPENDIX C
Auger Boring Logs

Unified Soil Classification System (USCS)

MAJOR DIVISIONS			SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS (more than 50% retained on No. 200 sieve)	Gravels (more than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with Fines (more than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	Clean Sands (less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly graded sand, gravelly sands, little or no fines
		Sands with Fines (more than 12% fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (50% or more passes the No. 200 sieve)	Silts and Clays (liquid limit less than 50)	Inorganic	ML	Inorganic silts of low to medium plasticity, sandy silts, gravelly silts, or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays silty clays, lean clays
		Organic	OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays (liquid limit 50 or more)	Inorganic	MH	Inorganic silts, micaceous or diatomaceous fine sands or silty soils, elastic silt
			CH	Inorganic clays of medium to high plasticity, sandy fat clay, or gravelly fat clay
		Organic	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT	Peat, humus, swamp soils with high organic content (ASTM D4427)

Classification of Soil Constituents

MAJOR constituents compose more than 50 percent, by weight, of the soil. Major constituents are capitalized (i.e., SAND).

Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (i.e., silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (i.e., slightly silty SAND).

Trace constituents compose 0 to 5 percent of the soil (i.e., slightly silty SAND, trace gravel).

Grain Size Definitions

Description	Sieve Number and/or Size
Fines	<#200 (0.08 mm)
Sand	
-Fine	#200 to #40 (0.08 to 0.4 mm)
-Medium	#40 to #10 (0.4 to 2 mm)
-Coarse	#10 to #4 (2 to 5 mm)
Gravel	
-Fine	#4 to 3/4 inch (5 to 19 mm)
-Coarse	3/4 to 3 inches (19 to 76 mm)
Cobbles	3 to 12 inches (75 to 305 mm)
Boulders	>12 inches (305 mm)

Relative Density (Coarse Grained Soils)

N, SPT, Blows/FT	Relative Density
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
Over 50	Very dense

Consistency (Fine Grained Soils)

N, SPT, Blows/FT	Relative Consistency
Under 2	Very soft
2 - 4	Soft
4 - 8	Medium stiff
8 - 15	Stiff
15 - 30	Very stiff
Over 30	Hard

Moisture Content Definitions

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

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Kenmore, WA 98028
(206) 331-1097
www.cobaltgeo.com
cobaltgeo@gmail.com

Soil Classification Chart

Figure C1

Log of Hand Auger Boring AB-1

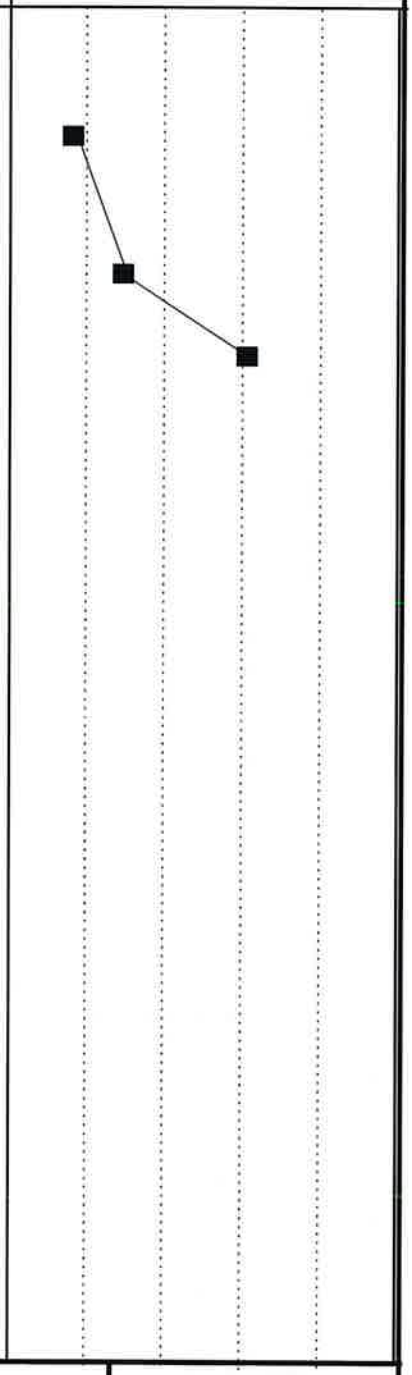
Date: May 13, 2019	Depth: 9'	Initial Groundwater: None
Contractor:	Elevation: N/A	Sample Type: Grab
Method: Hand Auger	Logged By: PH Checked By: SC	Final Groundwater: N/A

Depth (Feet)	Interval	% Recovery	Blows/6"	Graphic Log	USCS Symbol	Material Description
						Vegetation/Topsoil
1					SM/ ML	Loose/medium stiff to medium dense/stiff, silty-fine to medium grained sand trace gravel, dark yellowish brown to yellowish brown, moist. (Weathered Glacial Till?)
2						
3						
4					SM	Dense, silty-fine to medium grained sand with gravel, yellowish brown to grayish brown, moist. (Glacial Till)
5						
6						
7						
8						
9						End of Hand Boring 9'
10						

Groundwater

Moisture Content (%)
Plastic Limit — Liquid Limit

DCP Equivalent N-Value
0 10 20 30 40 50



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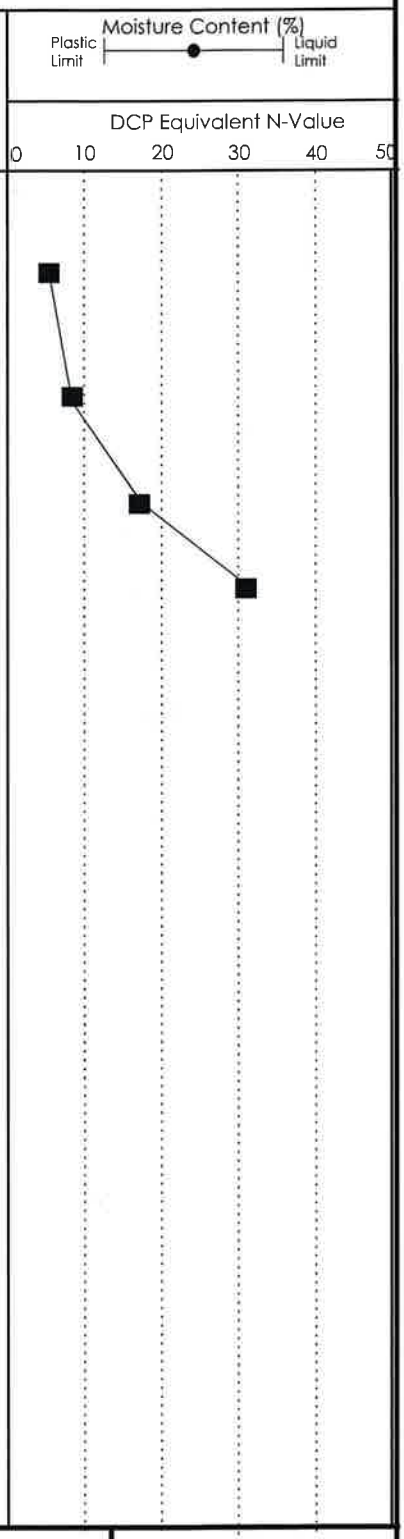
Hand Boring Log

Log of Hand Auger Boring AB-2

Date: May 13, 2019	Depth: 9'	Initial Groundwater: None
Contractor:	Elevation: N/A	Sample Type: Grab
Method: Hand Auger	Logged By: PH Checked By: SC	Final Groundwater: N/A

Depth (Feet)	Interval	% Recovery	Blows/6"	Graphic Log	USCS Symbol	Material Description
						Vegetation/Topsoil
1 – 2					SM/ML	Loose/medium stiff, silty-fine to medium grained sand trace gravel, dark yellowish brown to yellowish brown, moist. (Fill)
3 – 4					SM/ML	Loose/medium stiff to medium dense/stiff, silty-fine to medium grained sand trace gravel, dark yellowish brown to yellowish brown, moist. (Weathered Glacial Till?)
5 – 8					SM	Dense, silty-fine to medium grained sand with gravel, yellowish brown to grayish brown, moist. (Glacial Till)
9 – 10						End of Hand Boring 9'

Groundwater



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www.cobaltgeo.com
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Hand Boring Log

Log of Hand Auger Boring AB-3

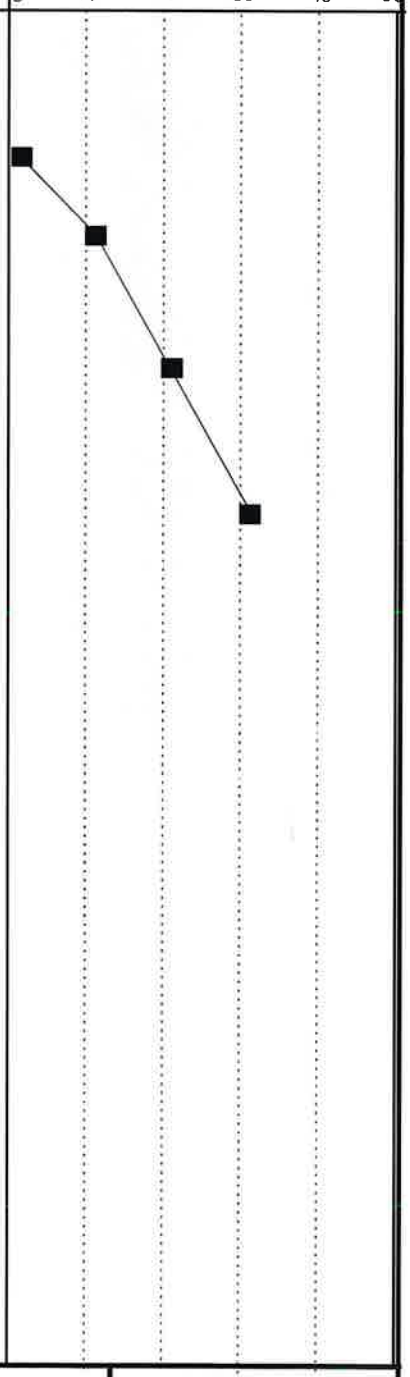
Date: May 13, 2019	Depth: 9'	Initial Groundwater: None
Contractor:	Elevation: N/A	Sample Type: Grab
Method: Hand Auger	Logged By: PH Checked By: SC	Final Groundwater: N/A

Depth (Feet)	Interval	% Recovery	Blows/6"	Graphic Log	USCS Symbol	Material Description
						Vegetation/Topsoil
1					SM/ ML	Loose/medium stiff, silty-fine to medium grained sand trace gravel, dark yellowish brown to yellowish brown, moist. (Fill)
2						
3						
4					SM/ ML	Loose/medium stiff to medium dense/stiff, silty-fine to medium grained sand trace gravel, dark yellowish brown to yellowish brown, moist. (Weathered Glacial Till?)
5						
6					SM	Dense, silty-fine to medium grained sand with gravel, yellowish brown to grayish brown, moist. (Glacial Till)
7						
8						
9						End of Hand Boring 9'
10						

Groundwater

Moisture Content (%)
Plastic Limit — Liquid Limit

DCP Equivalent N-Value
0 10 20 30 40 50



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Hand Boring Log

Log of Hand Auger Boring AB-4

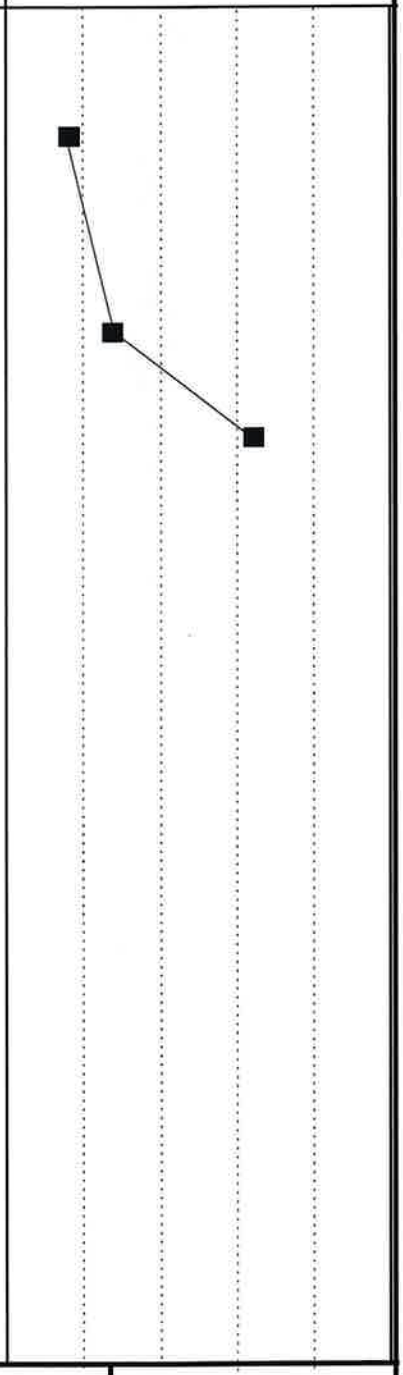
Date: May 13, 2019	Depth: 9'	Initial Groundwater: None
Contractor:	Elevation: N/A	Sample Type: Grab
Method: Hand Auger	Logged By: PH Checked By: SC	Final Groundwater: N/A

Depth (Feet)	Interval	% Recovery	Blows/6"	Graphic Log	USCS Symbol	Material Description
						Vegetation/Topsoil
1					SM/ ML	Loose/medium stiff to medium dense/stiff, silty-fine to medium grained sand trace gravel, dark yellowish brown to yellowish brown, moist. (Weathered Glacial Till?)
2						
3						
4						
5					SM	Dense, silty-fine to medium grained sand with gravel, yellowish brown to grayish brown, moist. (Glacial Till)
6						
7						
8						
9						End of Hand Boring 9'
10						

Groundwater

Moisture Content (%)
Plastic Limit — Liquid Limit

DCP Equivalent N-Value
0 10 20 30 40 50



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P.O. Box 82243
Kenmore, WA 98028
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Hand Boring Log

Log of Hand Auger Boring AB-5

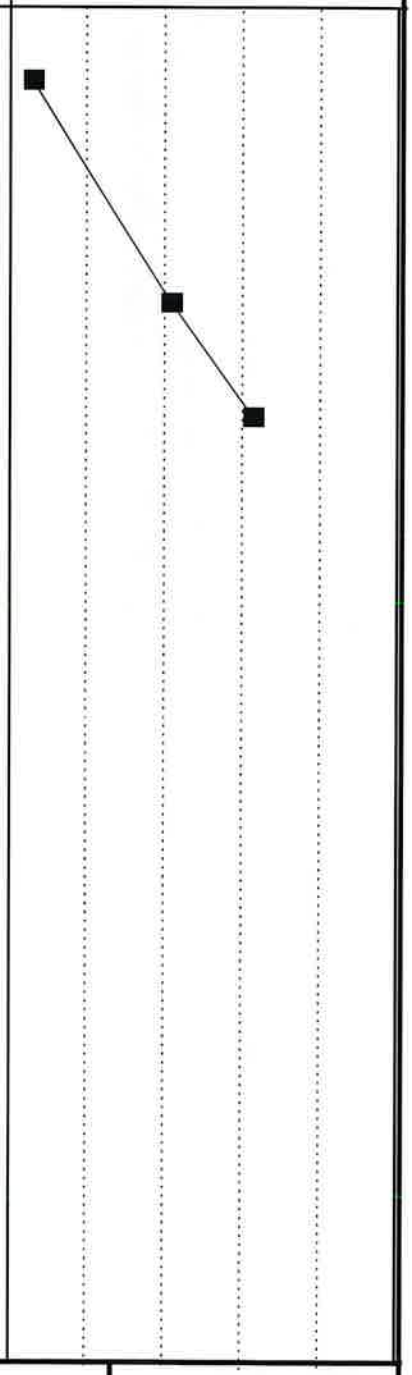
Date: May 13, 2019	Depth: 9'	Initial Groundwater: None
Contractor:	Elevation: N/A	Sample Type: Grab
Method: Hand Auger	Logged By: PH Checked By: SC	Final Groundwater: N/A

Depth (Feet)	Interval	% Recovery	Blows/6"	Graphic Log	USCS Symbol	Material Description
						Vegetation/Topsoil
1					SM/ ML	Loose/medium stiff to medium dense/stiff, silty-fine to medium grained sand trace gravel, dark yellowish brown to yellowish brown, moist. (Weathered Glacial Till?)
2						
3						
4						
5					SM	Dense, silty-fine to medium grained sand with gravel, yellowish brown to grayish brown, moist. (Glacial Till)
6						
7						
8						
9						End of Hand Boring 9'
10						

Groundwater

Moisture Content (%)
Plastic Limit — Liquid Limit

DCP Equivalent N-Value
0 10 20 30 40 50



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Cobalt Geosciences, LLC
P.O. Box 82243
Kenmore, WA 98028
(206) 331-1097
www.cobaltgeo.com
cobaltgeo@gmail.com

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Hand Boring Log

APPENDIX D
Slope Stability Analyses

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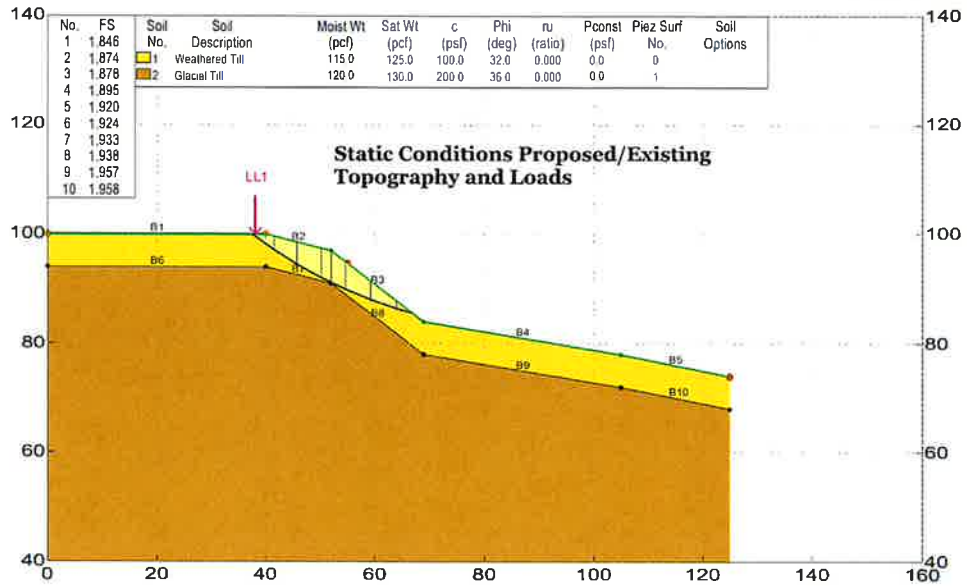

GEOSTASE FS = 1.846

Simplified Bishop Method

GEOSTASE Slope Stability Analysis

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

PLATE C.1

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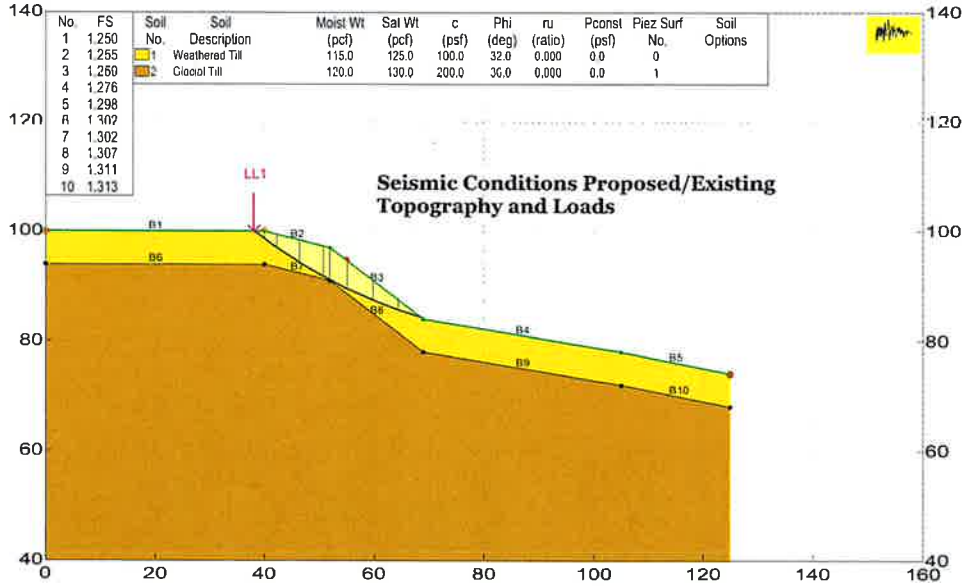

GEOSTASE FS = 1.250

Simplified Bishop Method

GEOSTASE Slope Stability Analysis

GEOSTASE® by GREGORY GEOTECHNICAL SOFTWARE

PLATE C.1

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SLOPE STABILITY FIGURE D1

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www.cobaltgeo.com
cobaltgeo@gmail.com