DEVELOPMENT SERVICES DEPARTMENT
ENVIRONMENTAL COORDINATOR
450 110th Ave NE., P.O. BOX 90012
BELLEVUE, WA 98009-9012

OPTIONAL DETERMINATION OF NON-SIGNIFICANCE (DNS) NOTICE MATERIALS

The attached materials are being sent to you pursuant to the requirements for the Optional DNS Process (WAC 197-11-355). A DNS on the attached proposal is likely. This may be the only opportunity to comment on environmental impacts of the proposal. Mitigation measures from standard codes will apply. Project review may require mitigation regardless of whether an EIS is prepared. A copy of the subsequent threshold determination for this proposal may be obtained upon request.

File No. 14-124438-LL and 14-124437-LO

Project Name/Address: Goldenwood/3736 163rd Avenue SE

Planner: Reilly Pittman

Phone Number: 425-452-4350/rpittman@bellevuewa.gov

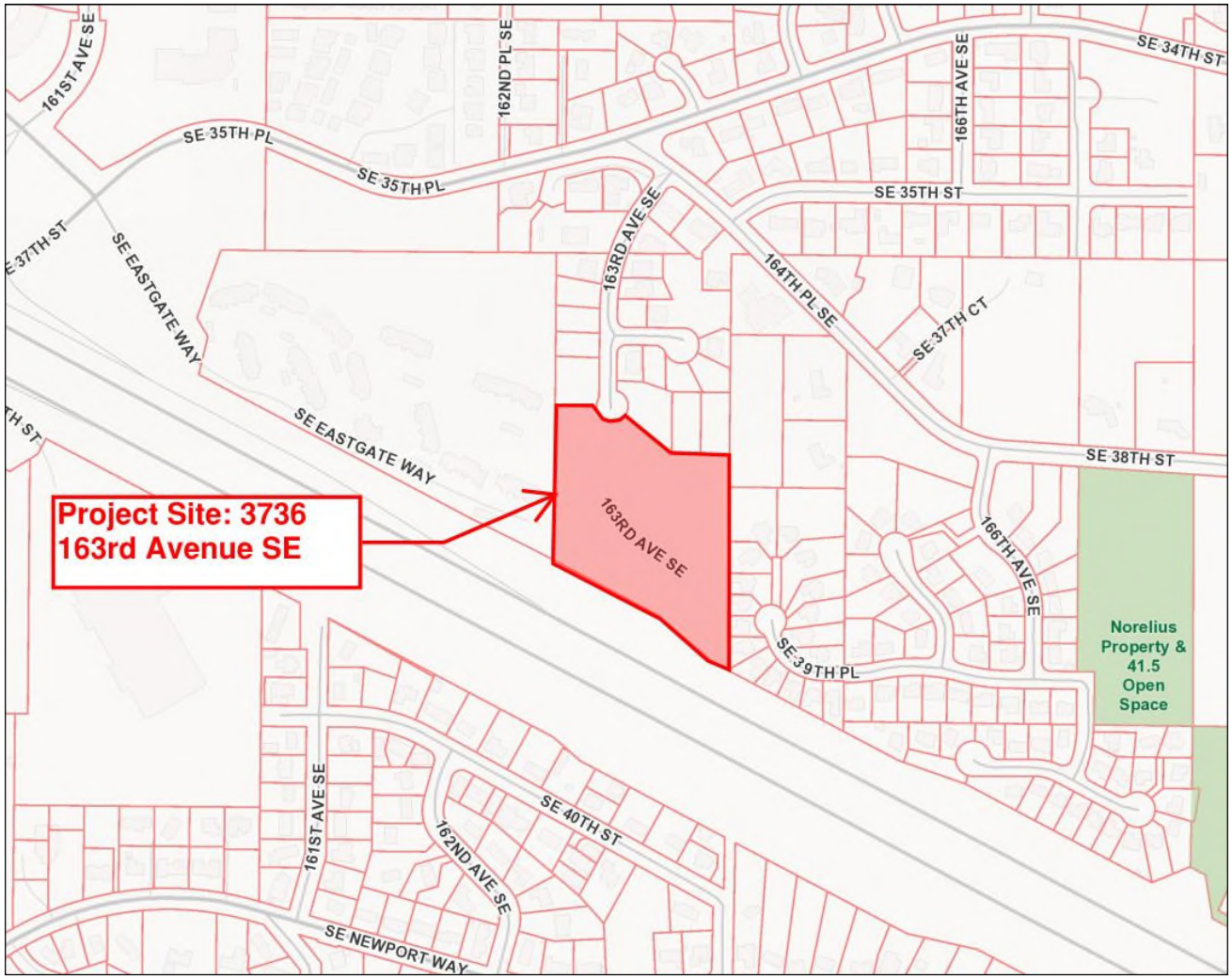
Minimum Comment Period: March 27, 2014

Materials included in this Notice:

☒ Blue Bulletin
☒ Checklist
☒ Vicinity Map
☒ Plans
☐ Other:

OTHERS TO RECEIVE THIS DOCUMENT:
☒ State Department of Fish and Wildlife / Sterwart.Reinbold@dfw.gov; Christa.Heller@dfw.wa.gov;
☒ State Department of Ecology, Shoreline Planner N.W. Region / Jobu461@ecy.wa.gov; sepaunit@ecy.wa.gov
☒ Army Corps of Engineers Susan.M.Powell@nws02.usace.army.mil
☒ Attorney General ecyolyef@atg.wa.gov
☒ Muckleshoot Indian Tribe Karen.Walter@muckleshoot.nsn.us; Fisheries.fileroom@muckleshoot.nsn.us

Goldenwood Vicinity Map



SEPA Checklist reviewed by Reilly Pittman on 3/12/2014

ENVIRONMENTAL CHECKLIST

10/9/2009

Thank you in advance for your cooperation and adherence to these procedures. If you need assistance in completing the checklist or have any questions regarding the environmental review process, please visit or call Development Services (425-452-6800) between 8 a.m. and 4 p.m., Monday through Friday (Wednesday, 10 to 4). Assistance for the hearing impaired: Dial 711 (Telecommunications Relay Service).

INTRODUCTION

Purpose of the Checklist:

The State Environmental Policy Act (SEPA), Chapter 43.21c RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the City of Bellevue identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the City decide whether an EIS is required.

Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Answer the questions briefly, with the most precise information known, or give the best description you can. You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer or if a question does not apply to your proposal, write "do not know" or "does not apply." Giving complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the Planner in the Permit Center can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. Include reference to any reports on studies that you are aware of which are relevant to the answers you provide. The City may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impacts.

Use of a Checklist for Nonproject Proposals: *A nonproject proposal includes plans, policies, and programs where actions are different or broader than a single site-specific proposal.*

For nonproject proposals, complete the Environmental Checklist even though you may answer "does not apply" to most questions. In addition, complete the Supplemental Sheet for Nonproject Actions available from Permit Processing.

For nonproject actions, the references in the checklist to the words *project*, *applicant*, and *property* or *site* should be read as *proposal*, *proposer*, and *affected geographic area*, respectively.

Attach an 8 ½" x 11 vicinity map which accurately locates the proposed site.

RP

ENVIRONMENTAL CHECKLIST

4/11/2013

If you need assistance in completing the checklist or have any questions regarding the environmental review process, please visit or call Development Services (425-452-6800) between 8 a.m. and 4 p.m., Monday through Friday (Wednesday, 10 to 4). Assistance for the hearing impaired: Dial 711 (Telecommunications Relay Service).

BACKGROUND INFORMATION

Property Owner: Goldenwood, LLC

Proponent: Barry Margolese

Contact Person: Josh Beard
(If different from the owner. All questions and correspondence will be directed to the individual listed.)

Address: 14711 NE 20th Place, Bellevue 98007

Phone: 425-885-7877

Proposal Title: Goldenwood, LLC

Proposal Location: 3736 163rd Ave SE, Bellevue, WA
(Street address and nearest cross street or intersection) Provide a legal description if available.

Please attach an 8 ½" x 11" vicinity map that accurately locates the proposal site.

Give an accurate, brief description of the proposal's scope and nature:

1. General description: 18 Lot Preliminary Plat
2. Acreage of site: 5.82 Acres
3. Number of dwelling units/buildings to be demolished: None
4. Number of dwelling units/buildings to be constructed: 18 Single Family Homes
5. Square footage of buildings to be demolished: None
6. Square footage of buildings to be constructed: Approx. 2,500 per lot
7. Quantity of earth movement (in cubic yards): 32,000 +/- cf
8. Proposed land use: Single Family
9. Design features, including building height, number of stories and proposed exterior materials:
   Buildings will meet R-5 zoning Standards and building code. Building materials will be consistent with homes in the area.
10. Other

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Estimated date of completion of the proposal or timing of phasing:

Project will be completed within the time alloted for the preliminary plat to record

Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

None to our knowledge.

List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

- Critical Areas Study by Soundview Consultants, LLC
- Geotechnical Study by GeoResoures, LLC

Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. List dates applied for and file numbers, if known.

None to our knowledge

List any government approvals or permits that will be needed for your proposal, if known. If permits have been applied for, list application date and file numbers, if known.

Preliminary Plat Approval, Critical Areas Permit, SEPA Determination, Drainage Plan Approval, Water and Sewer Construction Plan Approval, Grading Permit, Final Approval, Residential Building Permits .

Please provide one or more of the following exhibits, if applicable to your proposal.
(Please check appropriate box(es) for exhibits submitted with your proposal):

☐ Land Use Reclassification (rezone) Map of existing and proposed zoning

☑ Preliminary Plat or Planned Unit Development
Preliminary plat map

☐ Clearing & Grading Permit
Plan of existing and proposed grading
Development plans

☐ Building Permit (or Design Review)
Site plan
Clearing & grading plan

☐ Shoreline Management Permit
Site plan

A. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site: ☐ Flat ☐ Rolling ☑ Hilly ☑ Steep slopes ☐ Mountains ☐ Other

b. What is the steepest slope on the site (approximate percent slope)?

Six areas of slope greater than 40%

c. What general types of soil are found on the site (for example, clay, sand, gravel, peat, and muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Alderwood and Kitsap soils, Everett gravelly sandy loam, Everett-Alderwood gravelly sandy loam

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

None identified.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

The purpose of grading is to construct the proposed short to City standards and to provide building pads for single family residences, with all cut (29,500 +/- CY)and fill (2,500 +/- CY) material originating from the site.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Yes, however, the use of BMPs is expected to mitigate any modes erosive situations.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

The development will not exceed 50% on-site maximum impervious surfaces as required by City of Bellevue Code.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

A temporary erosion and sedimentation control (TESCP) plan will be prepared and implemented prior to commencement of construction activities. During construction, erosion control measures may include any of the following: siltation fence, siltation ponds and other measures which may be used in accordance with the requirements of the City.

2. AIR

a. What types of emissions to the air would result from the proposal (i.e. dust, automobile odors, and industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

During construction, there will be increased exhaust and dust particle emissions. After construction, the principle source of emissions will be from automobile traffic, lawn equipment, and other typical of a residential neighborhood.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

Off-site sources of emissions are those typical of the residential neighborhoods that surround this site, such as automobile emissions from traffic on adjacent roadways and fireplace emissions from nearby houses.

c. Proposed measures to reduce or control emissions or other impacts to the air, if any:

Construction impacts will not be significant and can be controlled by several methods: watering or using dust suppressants on areas of exposed soils, washing truck wheels before leaving the site, and maintaining gravel construction entrances.

Automobile and fireplace emission standards are regulated by the State of Washington. The site has been included in a “No Burn Zone” by the Puget Sound Air Pollution Control Agency which went into effect on September 1, 1992. No land clearing or residential yard debris fires would be permitted on-site, nor in the surrounding neighborhood in accordance with the regulation.

3. WATER

a. Surface

(1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Yes, Lake Sammamish is to the East. One wetland and two streams are present within property boundaries.

Lake Sammamish is almost half a mile from the property

(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If Yes, please describe and attach available plans.

Yes, proposed span across Stream Z.

Development is proposed within stream buffers

(3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Not applicable

A box culvert is proposed to span the stream to support a bridge for vehicle access. Fill will be placed on either side of the culvert.

(4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

Not applicable

(5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

None known.

(6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No, a public sanitary sewer system will be installed to serve the development.

b. Ground

(1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description.

No groundwater will be withdrawn. Public water mains will be installed as part of the plat construction. No water will be discharged to groundwater except through the incidental infiltration of stormwater.

(2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.) Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Not applicable. The site will be served by sanitary sewers.

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c. Water Runoff (Including storm water)

(1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Stormwater runoff from roadways and other impervious surfaces will be collected and routed to the vault located on-site, treated and released into the downstream drainage course to Lake Sammamish. Flow control is not required due to direct discharge to Lake Sammamish.

(2) Could waste materials enter ground or surface waters? If so, generally describe.

This would be very unlikely. The only materials that could enter ground or surface waters would be those associated with automobile discharges and yard and garden preparations. Pollutants generated during construction include suspended solids and trace petroleum hydrocarbons.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

A City approved storm drainage system will be designed and implemented in order to mitigate any adverse impacts from stormwater runoff. This system will include water quality vault. During construction the storm system and the rest of the site sediment control will include temporary erosion control barriers: Chemical treatment i.e. Chitosan or other chemical flocker, silt fence filtration, ground covering, and either a sediment trap or pond. Soon after the beginning of the site development the permanent storm water collection/treatment will be constructed to not only maintain the future runoff from the site, but also to control erosion and sediment during construction. This permanent system will ensure that prior to the release of stormwater into he downstream storm system the system will have significantly reduced the potential impacts to ground and surface waters.

4. Plants

a. Check or circle types of vegetation found on the site:

- ☑ deciduous tree: alder, maple, aspen, other
- ☑ evergreen tree: fir, cedar, pine, other
- ☑ shrubs
- ☑ grass
- ☐ pasture
- ☐ crop or grain
- ☑ wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
- ☐ water plants: water lily, eelgrass, milfoil, other
- ☐ other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

Select trees will be retained and placed in a NGPA to satisfy the City of Bellevue Tree Retention requirements. Additionally, a substantial amount of significant trees will be retained in the critical areas. The remainder of the site will be cleared for the construction of homes and access/utilities.

c. List threatened or endangered species known to be on or near the site.

No threatened or endangered plants are known to exist on the site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Proposed landscaping may include the use of native or drought resistant plants. Invasive species found on site will be removed to enhance existing vegetation, where retained.

5. ANIMALS

a. Check or circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

- ☑ Birds: hawk, heron, eagle, songbirds, other:
- ☑ Mammals: deer, bear, elk, beaver, other:
- ☐ Fish: bass, salmon, trout, herring, shellfish, other:

The site was observed to have a hawk nest located in the area designated to be NGPA.

b. List any threatened or endangered species known to be on or near the site.

No threatened or endangered species known to be on or near the site.

c. Is the site part of a migration route? If so, explain.

Not to our knowledge

d. Proposed measures to preserve or enhance wildlife, if any:

Per Bellevue Code, the site will retain a minimum of 15% of the existing trees.

LUC 20.20.900.D tree retention is 30% for subdivisions.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy need? Describe whether it will be used for heating, manufacturing, etc.

Electricity and/or natural gas will be the primary source of energy used to provide heating and cooling.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No

c. What kinds of energy conservation features are included in the plans of the proposal? List other proposed measures to reduce or control energy impacts, if any:

The requirements of the Uniform Building Code and the State Energy Code will be incorporated.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

This project will not generate any environmental health hazards.

(1) Describe special emergency services that might be required.

None to our knowledge.

(2) Proposed measures to reduce or control environmental health hazards, if any.

There are no on-site environmental health hazards known to exist today, nor are there any that will be generated as a direct result of this project.

b. Noise

(1) What types of noise exist in the area which may affect your project (for example, traffic, equipment, operation, other)?

The main source of off-site noise in this area originates from the vehicular traffic present on I-90.

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(2) What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (for example, traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Short-term noise impacts will result from the use of construction and building equipment during site development and home construction. These temporary activities will be limited to legal working hours as prescribed by City Code. Long-term impacts will be those associated with the increase of human population, additional traffic and noise associated with residential areas.

(3) Proposed measures to reduce or control noise impacts, if any:

Building construction will be done during the hours prescribed by the City of Bellevue. Construction equipment will be equipped with muffler devices and idling time will be encouraged to be kept to a minimum.

BCC 9.18 regulates noise

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

Single Family Homes

b. Has the site been used for agriculture? If so, describe.

Not to our knowledge

c. Describe any structures on the site.

The site is currently undeveloped.

d. Will any structures be demolished? If so, what?

None

e. What is the current zoning classification of the site?

R-5

f. What is the current comprehensive plan designation of the site?

SF-H

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable.

h. Has any part of the site been classified as an “environmentally sensitive” area? If so, specify.

Yes, stream, wetland and steep slopes exist on the property as shown on the preliminary plat site plan.

i. Approximately how many people would reside or work in the completed project?

Approximately 45 people (18 x 2.5 persons per dwelling unit).

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

None, as the current owners are proponents of the project.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The project will comply with the current zoning of the site, and the homes will be of similar size and style to the surrounding homes.

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9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

The preliminary plat contains 18 new single family residences. The new homes are anticipated to be in the middle/upper income price range.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

None, no homes exist on site.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

35'. The exterior building materials may include: wood, hardwood, masonry, cedar shakes, asphalt shingles

b. What views in the immediate vicinity would be altered or obstructed?

None

c. Proposed measures to reduce or control aesthetic impacts, if any:

The project will comply with the current zoning of the site and will be similar in style to surrounding homes.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Building lighting and exterior lighting and vehicles using the site. Before dawn and evenings.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Not to our knowledge.

c. What existing off-site sources of light or glare may affect your proposal?

Sources from vehicles and street lighting from the adjacent streets and neighborhoods.

d. Proposed measures to reduce or control light or glare impacts, if any:

Street lighting, when deemed necessary, will be installed in a manner that directs the lighting downward.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Spiritridge Park & Trails, Lake Sammamish, Robinswood Park

b. Would the proposed project displace any existing recreational uses? If so, describe.

No

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

The neighborhood will provide a tract that will include active recreation area and a connection to an existing trail south of the lot.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

No

b. Generally describe any landmarks or evidence of historic, archeological, scientific, or cultural importance known to be on or next to the site.

None

c. Proposed measures to reduce or control impacts, if any:

None, there are no known impacts. If an archeological site is found during the course of construction, the State Historical Preservation Officer will be notified.

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

163rd Ave SE

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Yes - bus stop .2 miles away at SE34th St & 163rd Pl SE

c. How many parking spaces would be completed project have? How many would the project eliminate?

69,The spaces will be located in garages, driveways, and street. There are no parking spaces eliminated.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

Yes, a Private road will be constructed connecting to 163rd Ave SE

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

None known.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Approximately 240

g. Proposed measures to reduce or control transportation impacts, if any:

None at this time unless the City requires it during review.

15. Public Services

a. Would the project result in an increased need for the public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

The need for public service such as fire, health, and police protection will be typical of single family development of this size. The school children originating from the homes in this development will attend the schools in the Bellevue School District.

b. Proposed measures to reduce or control direct impacts on public services, if any.

The roads and homes will be constructed to meet all applicable standards and codes of the City and the Uniform Building Code. The proposed development will contribute to the local tax base and provide additional tax revenue for the various public services. The impact to the schools, parks and traffic will be mitigated through the payment of impact fees.

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

Electricity, Natural Gas, Water, Refuse Service, Telephone, Sanitary Sewer

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Electricity & Natural gas - Puget Sound Energy. Water/Sewer - City of Bellevue. Refuse - Republic Services. Telephone - Century Link. Cable TV- Comcast.

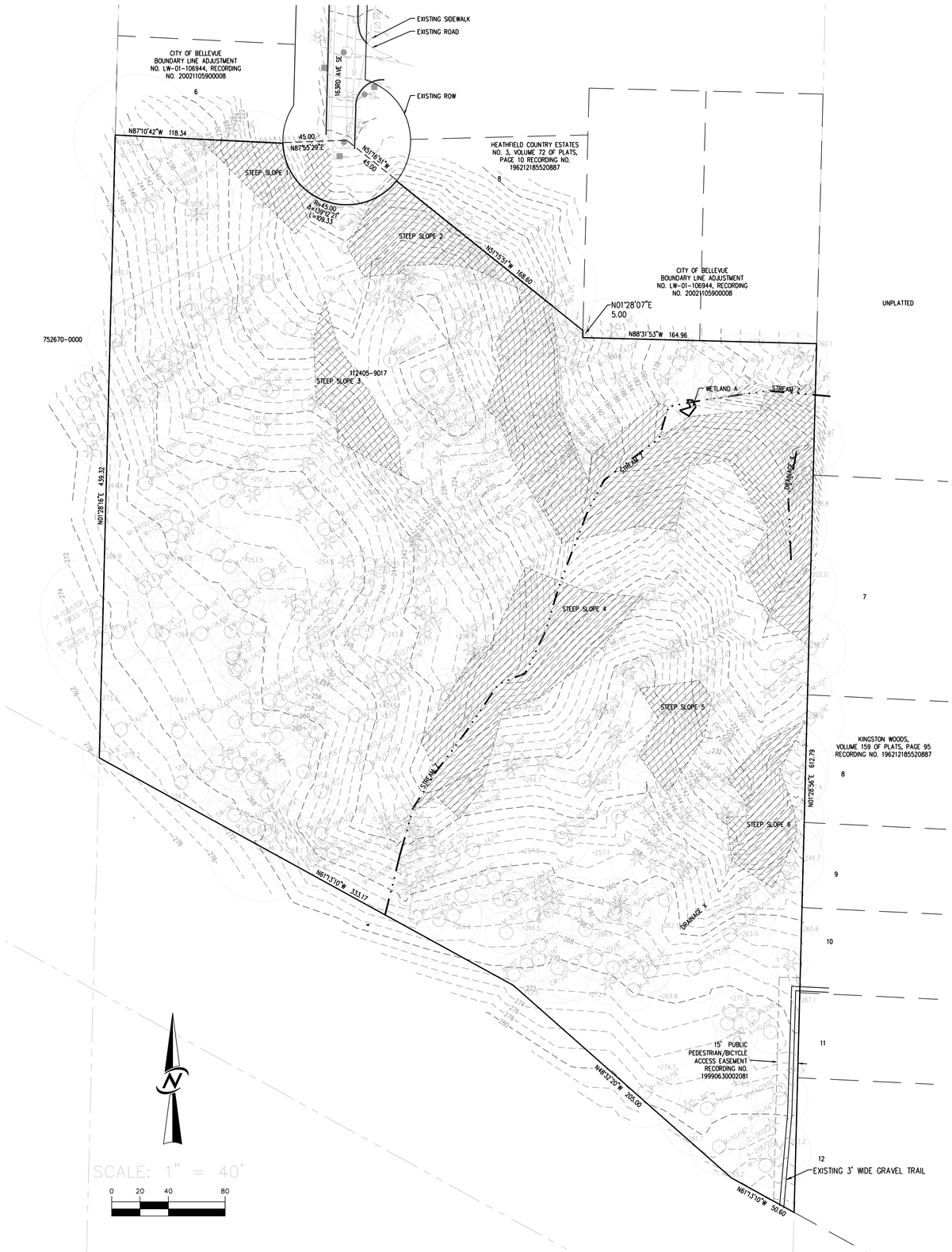
Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature.....

Date Submitted 2/12/14

RP



VERTICAL DATUM

NAVD 88

BENCHMARK

CITY OF BELLEVUE BENCHMARK 410- FOUND MONUMENT IN CASE AT THE INTERSECTION OF 163RD PLACE AND SE 34TH STREET
ELEVATION=132.22

LEGEND

- STORM DRAINAGE MARKER
- SANITARY SEWER MARKER
- TELEVISION PEDESTAL
- TELEPHONE PEDESTAL
- STORM DRAINAGE CLEAN OUT
- POWER CONDUIT CLUSTER
- FOUND SURVEY MARKER AS NOTED
- TYPE 1 STORM CATCH BASIN
- TYPE 2 STORM CATCH BASIN
- SANITARY SEWER MANHOLE
- WATER VALVE
- FIRE HYDRANT
- WATER BLOW OFF
- TRAFFIC SIGN AS NOTED
- WATER MANHOLE
- POWER POLE WITH LIGHT
- FLAG XXX WETLAND FLAG LOCATION WITH FLAG NUMBER
- TEST PIT LOCATION
- DECIDUOUS TREE
  CW-COTTONWOOD
  M-MAPLE
  A-ALDER
- EVERGREEN TREE
  F-FIR
  C-CEDAR
- VBF VERTICAL BOARD FENCE
- CLF CHAIN LINK FENCE
- —SS— UNDERGROUND SANITARY SEWER LINE
- —S— UNDERGROUND STORM DRAINAGE LINE
- —W— UNDERGROUND WATER LINE
- —X— FENCE LINE
- SURVEY MONUMENT AS NOTED
- TREE DRIP LINE DIAMETER
- 40% SLOPES

BASIS OF BEARINGS

N44°15'12"W BETWEEN MONUMENTS FOUND IN PLACE ALONG 164TH PLACE SE DESCRIBED AS COB HORIZONTAL STATION #2854 BEING A 1/2" BRASS PLUG WITH PUNCH MARK SET IN CONCRETE DOWN ±0.5' IN A MONUMENT CASE AT THE INTERSECTION OF 164TH PLACE SE AND 163RD AVENUE SE, AND COB HORIZONTAL STATION #2858 BEING A 5/8" REBAR WITH CITY OF BELLEVUE RED CAP ON THE SOUTH SIDE OF 164TH PLACE SE ±325 FEET FROM THE INTERSECTION OF 166TH AVENUE SE AND 164TH PLACE SE/SE 38TH STREET, ±44.5 SOUTHWESTERLY OF POWER POLE NO. 3656.

REFERENCES

1. PARKWOOD LANE BOUNDARY LINE ADJUSTMENT NO. 07-112237, RECORDING NUMBER 20070809900012, KING COUNTY, WASHINGTON.

LEGAL DESCRIPTION

PARCEL A OF PARKWOOD LAND BOUNDARY LINE ADJUSTMENT NO. 07-112237, AS RECORDED UNDER RECORDING NO. 20070809900012, RECORDS OF KING COUNTY, WASHINGTON.

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON

RESTRICTIONS

4. THIS SITE IS SUBJECT TO THE TERMS AND PROVISIONS AS CONTAINED IN AN INSTRUMENT IN OFFICIAL RECORDS KING KING COUNTY SUPERIOR COURT CAUSE NO. 735382 WHICH, AMONG OTHER THINGS, PROVIDES: CONDEMNATION OF ACCESS TO STATE HIGHWAY NUMBER SR 90 AND OF LIGHT, VIEW AND AIR BY KING COUNTY DECREE TO THE STATE OF WASHINGTON. INSUFFICIENT INFORMATION TO LOCATE

5. THIS SITE IS SUBJECT TO THE TERMS AND CONDITIONS IN AN EASEMENT GRANTED TO PUGET SOUND POWER AND LIGHT COMPANY AFFECTING A STRIP OF LAND 10 FEET IN WIDTH ACROSS AN UNDISCLOSED PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 11, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M. FOR THE INSTALLMENT AND MAINTENANCE OF A TRANSMISSION LINE RECORDED UNDER RECORDING NUMBER 3534243, IN KING COUNTY, WASHINGTON. INSUFFICIENT INFORMATION TO LOCATE.

6. THIS SITE IS SUBJECT TO THE TERMS AND CONDITIONS IN AN EASEMENT GRANTED TO THE CITY OF BELLEVUE FOR A PATHWAY FOR PEDESTRIAN AND BICYCLE ACCESS RECORDED UNDER RECORDING NUMBER 19990630002081, IN KING COUNTY, WASHINGTON, AND IS SHOWN HEREON.

7. THIS SITE IS SUBJECT TO THE TERMS AND CONDITIONS CONTAINED IN THE PARKWOOD LANE BOUNDARY LINE ADJUSTMENT NO. 07112237 RECORDED UNDER RECORDING NUMBER 20070809900012, KING COUNTY, WASHINGTON.

8. THIS SITE IS SUBJECT TO THE TERMS AND CONDITIONS OF A DEED EXECUTED BY MOUNTAIN DEVELOPMENT COMPANY UNDER RECORDING NUMBER 4437841, KING COUNTY, WASHINGTON, WHICH, AMONG OTHER THINGS, PROVIDES: WHEREBY THE FIRST PARTY EXPRESSLY SAVES, EXCEPTS AND RESERVES OUT OF THE GRANT HEREBY MADE, UNTO ITSELF, ITS SUCCESSORS AND ASSIGNS FOREVER, ALL ORES AND MINERALS OF ANY NATURE WHATSOEVER IN OR UPON SAID LANDS, INCLUDING COAL, OIL AND GAS, TOGETHER WITH THE RIGHT TO ENTER UPON SAID LANDS FOR THE PURPOSE OF EXPLORING THE SAME FOR SUCH ORES AND MINERALS AND FOR THE PURPOSE OF DRILLING, OPENING, DEVELOPING AND WORKING MINES AND WELLS THEREON, AND TAKING OUT AND REMOVING THEREFROM ALL SUCH ORES AND MINERALS, AND TO OCCUPY AND MAKE USE OF SO MUCH OF THE SURFACE OF SAID LAND AS MAY BE REASONABLY NECESSARY FOR SAID PURPOSE; PROVIDED THAT THE SECOND PARTY, THEIR HEIRS, REPRESENTATIVES, SUCCESSORS OR ASSIGNS SHALL BE PAID JUST AND REASONABLE COMPENSATION FOR ANY INJURY OR DAMAGE TO THE SURFACE OF SAID LAND, AND TO THE CROPS OR TO THE IMPROVEMENTS THEREON BY THE EXERCISE OF ANY RIGHTS HEREIN RESERVED; BUT PROVIDED FURTHER THAT THE EXERCISE OF SUCH RIGHTS BY THE FIRST PARTY SHALL NOT BE POSTPONED OR DELAYED PENDING REASONABLE EFFORTS TO AGREE UPON OR HAVE DETERMINED SUCH JUST AND REASONABLE COMPENSATION.

NOTES

1. ALL TITLE INFORMATION SHOWN ON THIS MAP HAS BEEN EXTRACTED FROM OLD REPUBLIC TITLE, LTD. PLAT CERTIFICATE NO. 5207113793. IN PREPARING THIS MAP, CORE DESIGN, INC. HAS CONDUCTED NO INDEPENDENT TITLE SEARCH NOR IS CORE DESIGN, INC. AWARE OF ANY TITLE ISSUES AFFECTING THE SURVEYED PROPERTY OTHER THAN THOSE SHOWN ON THE MAP AND DISCLOSED BY THE REFERENCED OLD REPUBLIC TITLE, LTD. PLAT CERTIFICATE. CORE DESIGN, INC. HAS RELIED WHOLLY ON OLD REPUBLIC'S REPRESENTATIONS OF THE TITLE'S CONDITION TO PREPARE THIS SURVEY AND THEREFORE CORE DESIGN, INC. QUALIFIES THE MAP'S ACCURACY AND COMPLETENESS TO THAT EXTENT.

2. THIS SURVEY REPRESENTS VISIBLE PHYSICAL IMPROVEMENT CONDITIONS EXISTING ON MAY 21, 2013. ALL SURVEY CONTROL INDICATED AS "FOUND" WAS RECOVERED FOR THIS PROJECT IN MAY, 2013.

3. PROPERTY AREA = 253,310.71± SQUARE FEET (5.8152± ACRES).

4. ALL DISTANCES ARE IN FEET.

5. THIS IS A FIELD TRAVERSE SURVEY. A SOKKIA FIVE SECOND COMBINED ELECTRONIC TOTAL STATION WAS USED TO MEASURE THE ANGULAR AND DISTANCE RELATIONSHIPS BETWEEN THE CONTROLLING MONUMENTATION AS SHOWN. CLOSURE RATIOS OF THE TRAVERSE MET OR EXCEEDED THOSE SPECIFIED IN WAC 332-130-090. ALL MEASURING INSTRUMENTS AND EQUIPMENT ARE MAINTAINED IN ADJUSTMENT ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

6. UTILITIES OTHER THAN THOSE SHOWN MAY EXIST ON THIS SITE. ONLY THOSE UTILITIES WITH EVIDENCE OF THEIR INSTALLATION VISIBLE AT GROUND SURFACE ARE SHOWN HEREON. UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE ONLY. UNDERGROUND CONNECTIONS ARE SHOWN AS STRAIGHT LINES BETWEEN SURFACE UTILITY LOCATIONS BUT MAY CONTAIN BENDS OR CURVES NOT SHOWN. SOME UNDERGROUND LOCATIONS SHOWN HEREON MAY HAVE BEEN TAKEN FROM PUBLIC RECORDS. CORE DESIGN ASSUMES NO LIABILITY FOR THE ACCURACY OF PUBLIC RECORDS.

NO	REVISIONS	DATE

WILLIAM P. BEARD
STATE OF WASHINGTON
38486
REGISTERED PROFESSIONAL LAND SURVEYOR
2/22/2014

CORE DESIGN
14711 NE 29th Place Suite 101
Bellevue, Washington 98007
425.885.7877 Fax 425.885.7963
ENGINEERING • PLANNING • SURVEYING

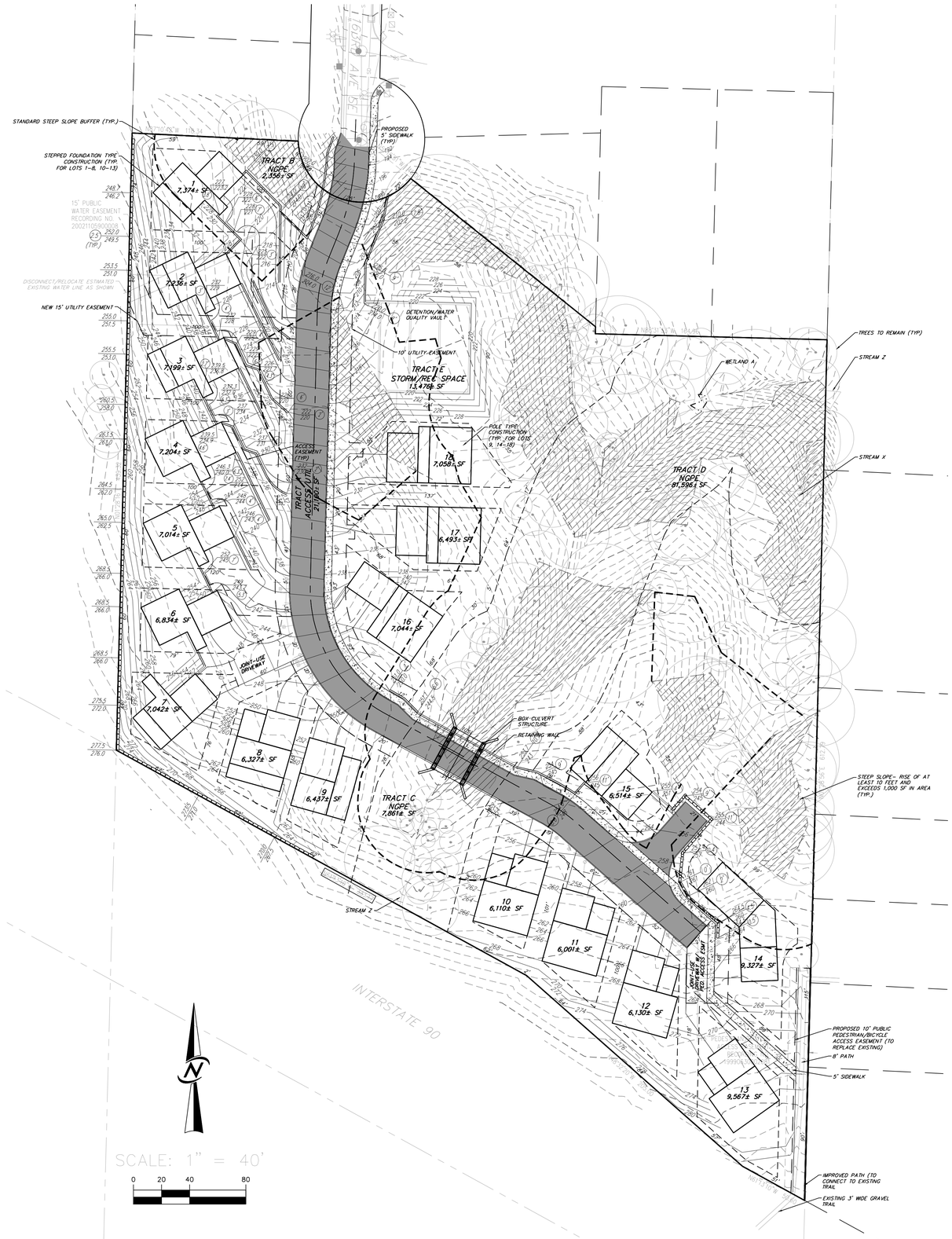
BOUNDARY & TOPOPHOGRAPHY
GOLDENWOOD

GOLDENWOOD, LLC
105 S. MAIN STREET #240
SEATTLE, WA 98104

DATE	FEBRUARY 2014
DESIGNED	JPB
DRAWN	JPB
APPROVED	JPB
JOSH BEARD, PROJECT MANAGER	

SHEET	OF
P02	7

PROJECT NUMBER
13050



PROJECT NARRATIVE

IT IS PROPOSED THAT A 18 LOT PLAT BE DEVELOPED ON A 5.82 ACRE SITE LOCATED AT 3736 163RD AVENUE SOUTHEAST BELLEVUE. DUE TO THE PRESENCE OF CRITICAL AREAS ON SITE THE PROPOSED DEVELOPMENT WOULD GO THROUGH THE CONSERVATION SUBDIVISION PROCESS AND WOULD INCLUDE REQUESTED MODIFICATIONS TO SAID CRITICAL AREAS, AS ALLOWED UNDER LUC 20.25H.055 (PRIVATE ROADS, CULVERTS, STORMWATER FACILITIES), AND MODIFICATIONS TO CRITICAL AREA BUFFERS AND SETBACKS PER THE CRITICAL AREA REPORT PROCESS.

THROUGH THIS PROCESS THE PROJECT WILL RESULT IN AN EQUIVALENT OR BETTER PROTECTION OF ON-SITE CRITICAL AREA FUNCTIONS AND VALUES THAN WOULD RESULT FROM CONFORMANCE WITH THE CODE REQUIREMENTS, PER INCREASED PERFORMANCE STANDARDS BUILDING CONSTRUCTION AND MITIGATION. THE FINAL DELINEATED AND ADDITIONAL AREA WILL BE DESIGNATED AS NGPA.

SITE STATISTICS (CONSERVATION SUBDIVISION)

PARCEL:	112405-9017
GROSS SITE AREA	253,310 (5.82 AC)
ZONE:	R-5
MIN. LOT AREA:	4,680 S.F.
MIN. LOT WIDTH:	60' MIN.
MAX. LOT COVERAGE:	45%
- PROPOSED:	35%
MAX. IMPERVIOUS SURFACE:	50%
-PROPOSED:	86,937 +/- SF (APPROX 34%)
SETBACKS:	
FRONT:	10'
REAR:	15'
SIDE:	5' (15' COMBINED)
EST. CUT/FILL:	29,500 +/- CY/2,500 +/- CY

DENSITY CALCULATIONS

GROSS SITE AREA	253,310 (5.82 AC)
ZONE:	R-5
AREAS IN CRITICAL AREAS & BUFFERS (EST.):	133,555 S.F. OR 3.07 AC
BUILDABLE AREA (EST.):	119,755 S.F. OR 2.75 AC
DEVELOPMENT FACTOR:	0.47
MAXIMUM DENSITY (5X2.75) + ((5X3.07)X0.47):	20.96 (20)
UNITS PROPOSED:	18
PROPOSED NGPE AREA:	91,813 S.F.

LEGEND

- PROPOSED EASEMENTS
- SETBACKS
- 220 — 222 — EXISTING &
- 220 — 222 — PROPOSED CONTOURS
- STREAMS & WETLAND
- PEDESTRIAN CIRCULATION
- VEHICULAR CIRCULATION
- STORM DRAINAGE MARKER
- SANITARY SEWER MARKER
- TELEVISION PEDESTAL
- TELEPHONE PEDESTAL
- STORM DRAINAGE CLEAN OUT
- POWER CONDUIT CLUSTER
- FOUND SURVEY MARKER AS NOTED
- TYPE 1 STORM CATCH BASIN
- TYPE 2 STORM CATCH BASIN
- SANITARY SEWER MANHOLE
- WATER VALVE
- FIRE HYDRANT
- WATER BLOW OFF
- TRAFFIC SIGN AS NOTED
- WATER MANHOLE
- POWER POLE WITH LIGHT
- FLAG XXX WETLAND FLAG LOCATION WITH FLAG NUMBER
- TEST PIT LOCATION
- DECIDUOUS TREE
  - CW-COTTONWOOD
  - M-MAPLE
  - A-ALDER
- EVERGREEN TREE
  - F-FIR
  - C-CEDAR
- VBF VERTICAL BOARD FENCE
- CLF CHAIN LINK FENCE
- SS UNDERGROUND SANITARY SEWER LINE
- S UNDERGROUND STORM DRAINAGE LINE
- W UNDERGROUND WATER LINE
- X FENCE LINE
- SURVEY MONUMENT AS NOTED
- TREE DRIP LINE DIAMETER

PROPERTY OWNER/APPLICANT

GOLDENWOOD, LLC
105 S. MAIN STREET, #230
SEATTLE, WASHINGTON 98104
(206) 910-2728

CONTACT: BARRY MARGOLESE

CONTACT

CORE DESIGN, INC.
14711 NE 29TH Pl., SUITE 101
BELLEVUE, WASHINGTON 98007
(425) 885-7877

CONTACT: JOSH BEARD

LEGAL DESCRIPTION

PARCEL A OF PARKWOOD LAND BOUNDARY LINE ADJUSTMENT NO. 07-112237, AS RECORDED UNDER RECORDING NO. 20070809900012, RECORDS OF KING COUNTY, WASHINGTON.

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON

VERTICAL DATUM

NAVD 88

BENCHMARK

CITY OF BELLEVUE BENCHMARK 410- FOUND MONUMENT IN CASE AT THE INTERSECTION OF 163RD PLACE AND SE 34TH STREET
ELEVATION=132.22

NOTES

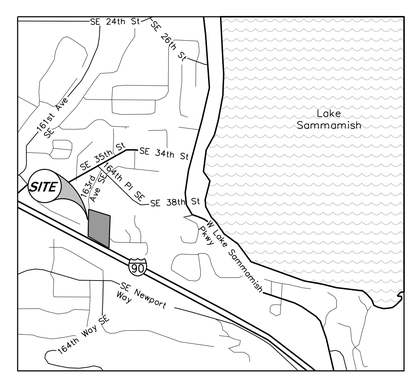
1. BUILDINGS SHOWN ARE CONCEPTUAL IN NATURE AND SHOWN FOR GENERAL CONSTRUCTION TYPE. FINAL LOCATION, SIZE AND CONFIGURATIONS TO BE DETERMINED UPON THE REVIEW PROCESS.

2. BOX CULVERT: CONTECH BRIDGECORE STRUCTURE WITH 25'-6" SPAN AND 12'-9" RISE TO BE SUPPORTED WITH PRECAST REINFORCED CONCRETE EXPRESS FOUNDATIONS. FINAL STRUCTURE DETAILS AND FOOTING SIZES TO BE FINALIZED DURING FINAL ENGINEERING.

3. ENTRY MONUMENTATION QTY 1

SHEETS

P01 - SITE PLAN B
P02 - BOUNDARY & TOPOGRAPHIC SURVEY
P03 - CRITICAL AREAS PLAN
P04 - PRELIMINARY PLAT
P05 - PRELIMINARY CLEARING & GRADING PLAN
P06 - PRELIMINARY UTILITIES PLAN
P07 - PRELIMINARY ROAD PLAN



VICINITY MAP

GRID NO.: M-12
UTILITY NO.: M-12
SITE ADDRESS: NOT ASSIGNED (END OF 163RD AVE SE)

NO.	REVISIONS	DATE

CORE DESIGN
14711 NE 29th Place Suite 101
Bellevue, Washington 98007
425.885.7877 Fax 425.885.7963
ENGINEERING • PLANNING • SURVEYING

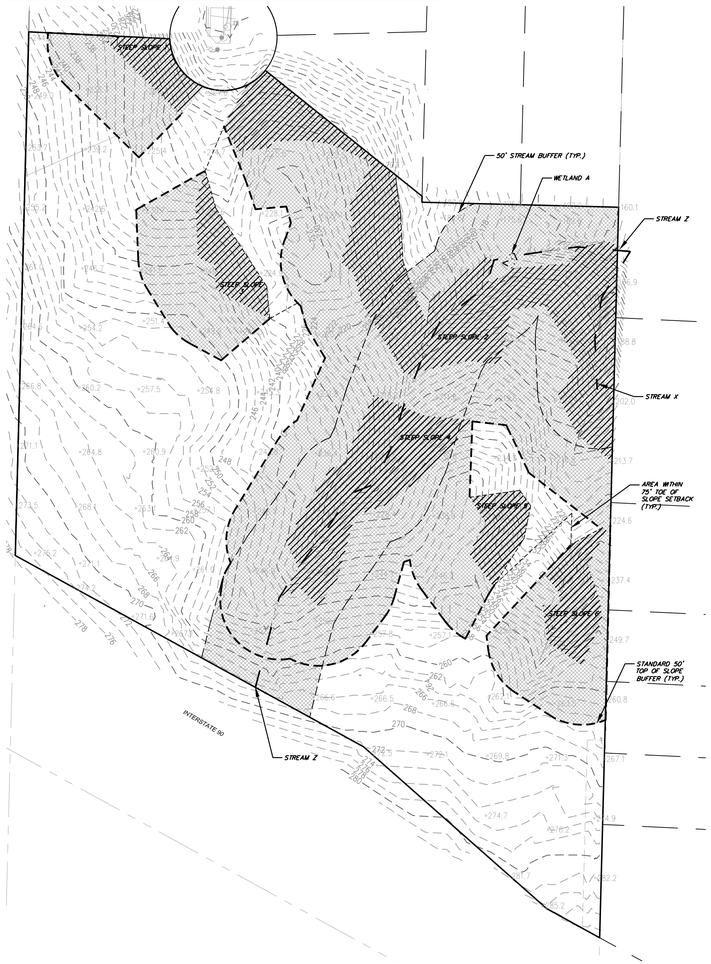
SITE PLAN B
GOLDENWOOD
GOLDENWOOD, LLC
105 S. MAIN STREET #240
SEATTLE, WA 98104

DATE	FEBRUARY 2014
DESIGNED	JPB
DRAWN	JPB
APPROVED	JPB
PROJECT MANAGER	JOSH BEARD

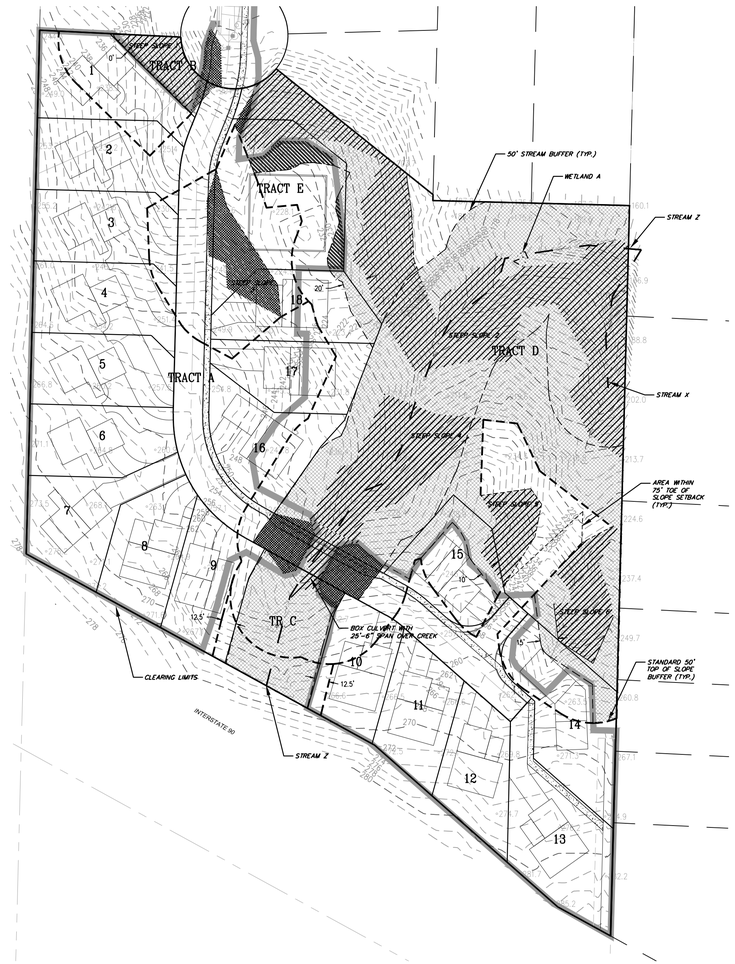
SHEET	OF
P01	7

PROJECT NUMBER 13050

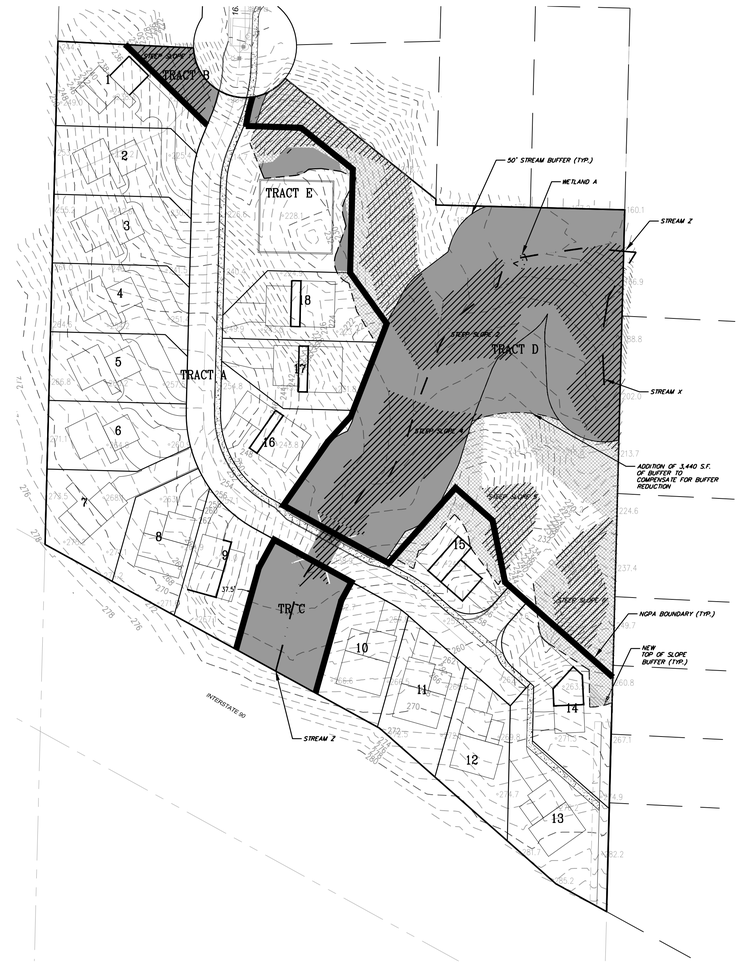
EXISTING CONDITIONS



PROPOSED MODIFICATIONS/IMPACTS



PROPOSED RESTORATION/MITIGATION



LEGEND

- STREAM
- 50' STREAM BUFFER
- 40% SLOPES
- 50' TOP OF SLOPE BUFFER
- 75' TOE OF SLOPE SETBACK AREA
- UNDISTURBED CRITICAL AREA/BUFFER CONDITION
- DEGRADED CRITICAL AREA/BUFFER CONDITION (PREVIOUS IMPACTS, INVASIVE SPECIES)

CRITICAL AREA CALCULATIONS

GROSS SITE AREA	253,310 (5.82 AC)
AREAS IN CRITICAL AREAS & BUFFERS (EST.):	133,555 S.F. OR 3.07 AC
BUILDABLE AREA (EST.):	119,755 S.F. OR 2.75 AC
DEVELOPMENT FACTOR:	0.47
MAXIMUM DENSITY (5X2.75) + ((5X3.07)X0.47):	20.96 (20)
UNITS PROPOSED:	18
PROPOSED NGPE AREA:	91,813 S.F.

NOTES

1. PER FIELD WALKS AND SITE VISITS IT IS ESTIMATED THAT ENGLISH IVY AND OTHER INVASIVES ARE PRESENT IN APPROXIMATELY 50% OF THE BUFFER AREAS

LEGEND

- SLOPE IMPACT (DUE TO ALLOWED MODIFICATIONS LUC 20.25H.055)
- MODIFIED (REDUCED) BUFFER/SETBACK
- TEMPORARY BUFFER IMPACT

MODIFICATIONS/IMPACT CALCULATIONS

PERMANANT IMPACTED SLOPE AREA:	
– STEEP SLOPE 1:	829 S.F. (592 S.F. OFF-SITE)
– STEEP SLOPE 2:	216 S.F.
– STEEP SLOPE 3:	3,041 S.F.
– STEEP SLOPE 4:	1,114 S.F.
– STREAM BUFFER:	2,263 S.F.
– TOTAL:	7,463 S.F.
REDUCED BUFFER/SETBACK AREA:	40,974 S.F.
TEMPORARY BUFFER IMPACT AREA:	1,609 S.F.

NOTES

1. DUE TO GRADING FOR ROAD AND DRAINAGE FACILITY STEEP SLOPE 3 WILL BE ELIMINATED INCLUDING ASSOCIATED BUFFER AND SETBACK.
2. POLE TYPE CONSTRUCTION PROPOSED FOR LOTS 9, & 14–18.

LEGEND

- RESTORATION
- VERTICAL FOOTING EXTENSION

RESTORATION/MITIGATION CALCULATIONS

BUFFER ADDITION AREA:	3,440 S.F.
RESTORATION AREA	33,351 S.F.

NOTES

1. FOR MITIGATION AND VEGETATION MANAGEMENT PLAN DETAILS SEE CRITICAL AREAS STUDY BY SOUNDVIEW CONSULTANTS).
2. FOR VERTICAL FOOTING EXTENSION DETAILS SEE GEOTECHNICAL ENGINEERING REPORT BY GEORESOURCES)

SCALE: 1" = 60'

0 30 60 120

NO.	REVISIONS	DATE

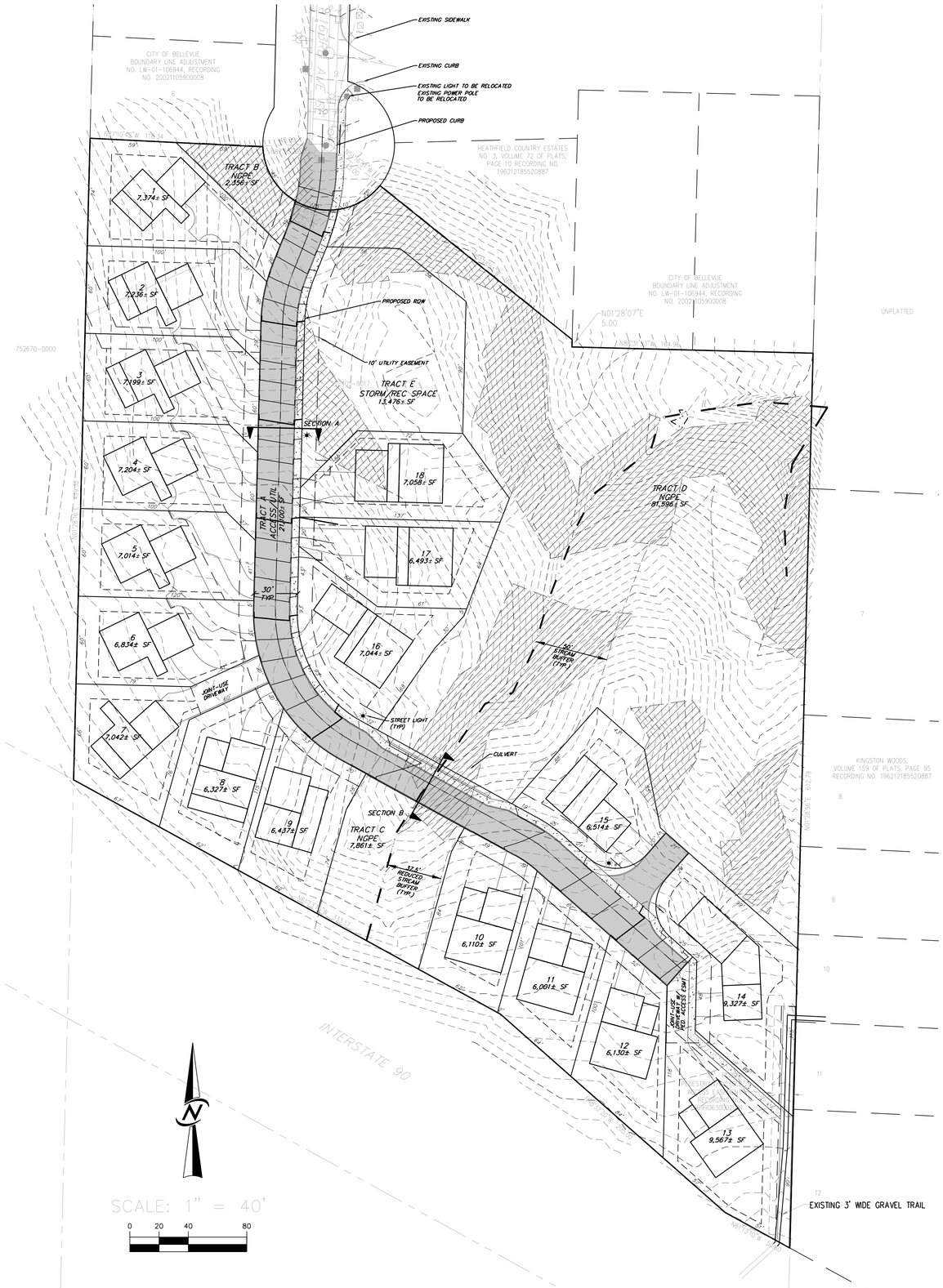
CORE DESIGN
ENGINEERING · PLANNING · SURVEYING
14711 NE 29th Place, Suite 101
Bellevue, Washington 98007
425.883.7877 Fax 425.883.7963

CRITICAL AREAS PLAN
GOLDENWOOD
GOLDENWOOD, LLC
105 S. MAIN STREET #240
SEATTLE, WA 98104

DATE	FEBRUARY 2014
DESIGNED	JPB
DRAWN	JPB
APPROVED	JPB
PROJECT MANAGER	JOSH BEARD

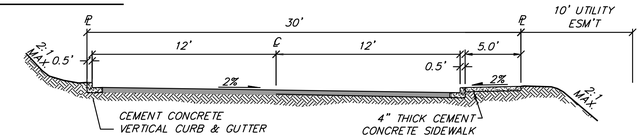
SHEET P03 OF 7

PROJECT NUMBER 13050



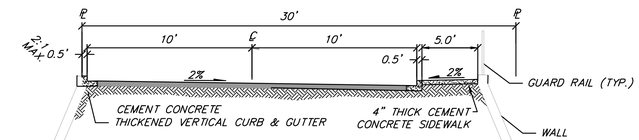
LEGEND

- PROPOSED EASEMENTS
- SETBACKS
- EXISTING & PROPOSED CONTOURS
- CRITICAL AREAS
  - 40% SLOPES
  - STREAMS
- PEDESTRIAN CIRCULATION
- VEHICULAR CIRCULATION
- STREET LIGHT



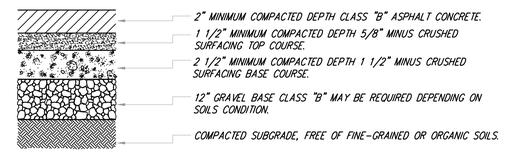
SECTION A - ROAD A

NO SCALE



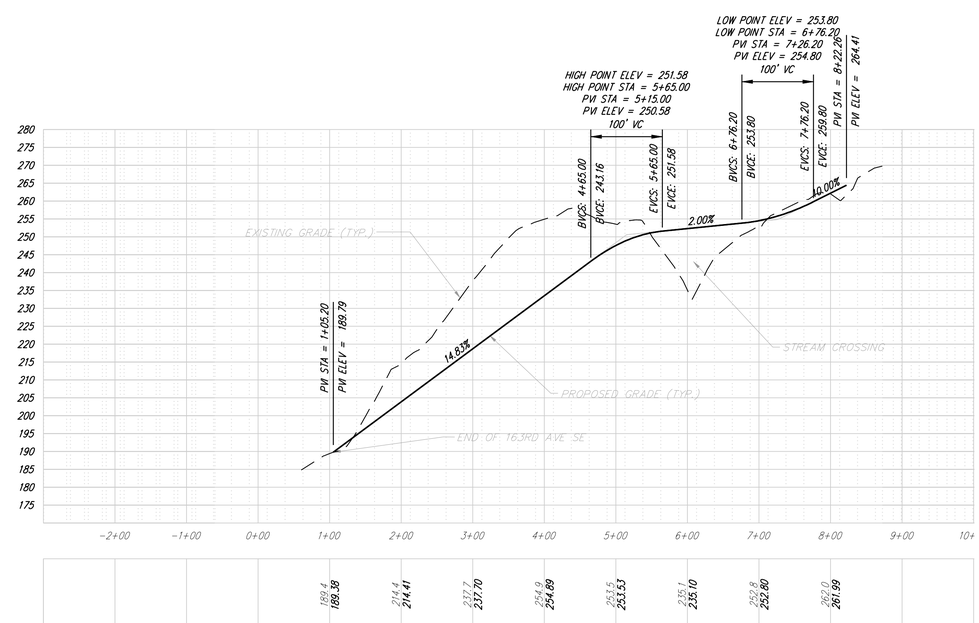
SECTION B - CROSSING

NO SCALE



ONSITE PAVEMENT SECTION

NO SCALE



ROAD A PROFILE

HORIZ. SCALE 1"=100'
VERT. SCALE 1" =20'

NO	REVISIONS	DATE

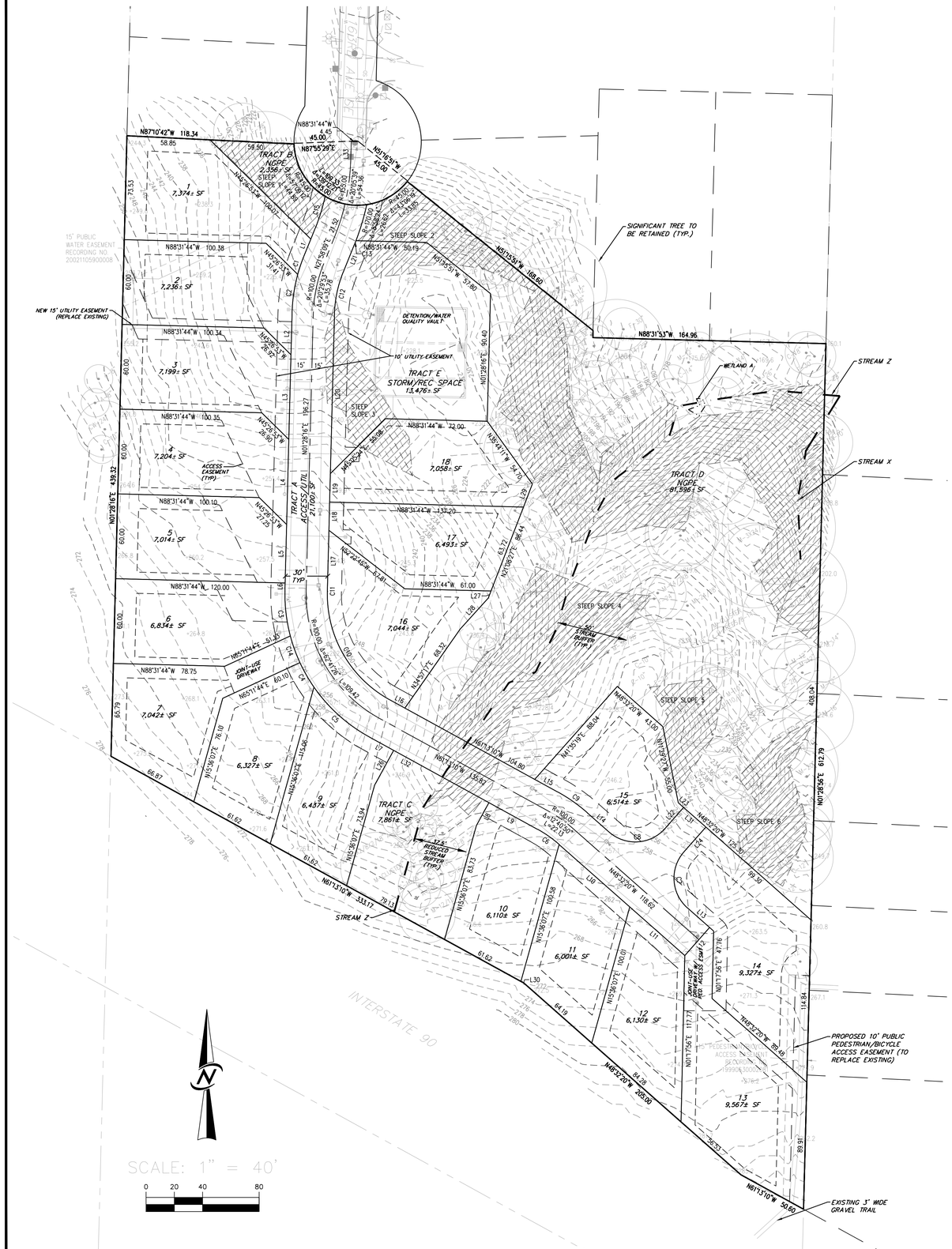
CORE DESIGN
14711 NE 29th Place Suite 101
Bellevue, Washington 98007
425.885.7877 Fax 425.885.7963
ENGINEERING • PLANNING • SURVEYING

ROAD PLAN
GOLDENWOOD
GOLDENWOOD, LLC
105 S. MAIN STREET #240
SEATTLE, WA 98104

DATE	FEBRUARY 2014
DESIGNED	JPB
DRAWN	JPB
APPROVED	JPB
PROJECT MANAGER	JOSH BEARD

SHEET	OF
P07	7

PROJECT NUMBER 13050



SITE STATISTICS

PARCEL:	112405-9017
GROSS SITE AREA	253,310 (5.82 AC)
ZONE:	R-5
MIN. LOT AREA:	4,680 S.F.
- PROPOSED:	7,051 S.F. (AVERAGE)
MIN. LOT WIDTH:	60' MIN.
MAX. LOT COVERAGE:	45%
MAX. IMPERVIOUS SURFACE:	50%
-PROPOSED:	86,937 +/- SF (APPROX 34%)
SETBACKS:	
FRONT:	10'
REAR:	15'
SIDE:	5' MIN. (15' COMBINED)

DENSITY CALCULATIONS

GROSS SITE AREA	253,310 (5.82 AC)
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UNITS PROPOSED:	18
PROPOSED NGPE AREA:	91,813 S.F.

NOTES

ENTRY MONUMENTATION QTY 1

LEGEND

- PROPOSED EASEMENTS
- SETBACKS
- 220 222 EXISTING &
- 220 222 PROPOSED CONTOURS
- CRITICAL AREAS
  - 40% SLOPES
  - STREAMS
- STORM DRAINAGE MARKER
- SANITARY SEWER MARKER
- TELEVISION PEDESTAL
- TELEPHONE PEDESTAL
- STORM DRAINAGE CLEAN OUT
- POWER CONDUIT CLUSTER
- FOUND SURVEY MARKER AS NOTED
- TYPE 1 STORM CATCH BASIN
- TYPE 2 STORM CATCH BASIN
- SANITARY SEWER MANHOLE
- WATER VALVE
- FIRE HYDRANT
- WATER BLOW OFF
- TRAFFIC SIGN AS NOTED
- WATER MANHOLE
- POWER POLE WITH LIGHT
- FLAG XXX WETLAND FLAG LOCATION WITH FLAG NUMBER
- TEST PIT LOCATION
- DECIDUOUS TREE
  - CW-COTTONWOOD
  - M-MAPLE
  - A-ALDER
- EVERGREEN TREE
  - F-FIR
  - C-CEDAR
- VBF VERTICAL BOARD FENCE
- CLF CHAIN LINK FENCE
- -SS- UNDERGROUND SANITARY SEWER LINE
- -S- UNDERGROUND STORM DRAINAGE LINE
- -W- UNDERGROUND WATER LINE
- -X- FENCE LINE
- SURVEY MONUMENT AS NOTED
- TREE DRIP LINE DIAMETER

PROPERTY OWNER/APPLICANT

GOLDENWOOD, LLC
105 S. MAIN STREET, #230
SEATTLE, WASHINGTON 98104
(206) 910-2728

CONTACT: BARRY MARGOLESE

CONTACT

CORE DESIGN, INC.
14711 NE 29TH PL, SUITE 101
BELLEVUE, WASHINGTON 98007
(425) 885-7877

PROJECT MANAGER: JOSH BEARD

SURVEYOR: KENNETH WILLIAM SHIPLEY, PLS 38488

LEGAL DESCRIPTION

PARCEL A OF PARKWOOD LAND BOUNDARY LINE ADJUSTMENT NO. 07-112237, AS RECORDED UNDER RECORDING NO. 20070809900012, RECORDS OF KING COUNTY, WASHINGTON.

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON

VERTICAL DATUM

NAVD 88

BENCHMARK

CITY OF BELLEVUE BENCHMARK 410- FOUND MONUMENT IN CASE AT THE INTERSECTION OF 163RD PLACE AND SE 34TH STREET
ELEVATION=132.22

BASIS OF BEARINGS

N44°15'12"W BETWEEN MONUMENTS FOUND IN PLACE ALONG 164TH PLACE SE DESCRIBED AS COB HORIZONTAL STATION #2854 BEING A 1/2" BRASS PLUG WITH PUNCH MARK SET IN CONCRETE DOWN ±0.5' IN A MONUMENT CASE AT THE INTERSECTION OF 164TH PLACE SE AND 163RD AVENUE SE, AND COB HORIZONTAL STATION #2858 BEING A 5/8" REBAR WITH CITY OF BELLEVUE RED CAP ON THE SOUTH SIDE OF 164TH PLACE SE ±325 FEET FROM THE INTERSECTION OF 166TH AVENUE SE AND 164TH PLACE SE/SE 38TH STREET, ±44.5 SOUTHWESTERLY OF POWER POLE NO. 3656.

TREE TABLE

SPECIES	TOTAL WEIGHING DIAMETER
ALDER	143
CEDAR	1,722
COTTONWOOD	158
FIR	784
MAPLE	6,372
EXISTING INCHES TOTAL	9,179
REQ'D INCHES TO SAVE	1,377
PROPOSED INCHES SAVED	5,803

LINE & CURVE TABLE

TAG #	RADIUS	BEARING/DELTA	LENGTH
C15	140.00	9°40'40"	23.65
L1		N21°58'09"E	13.25
L2		N01°28'16"E	29.49
L3		N01°28'16"E	59.99
L4		N01°28'16"E	60.24
L5		N01°28'16"E	41.39
L6		N01°28'16"E	5.16
L7		N61°13'10"W	19.79
L8		N28°45'52"E	18.48
L9		N61°13'10"W	39.13
L10		N48°32'20"W	66.68
L11		N48°32'20"W	51.95
L12		N41°27'40"E	26.50
L13		N48°32'20"W	24.81
L14		N48°32'20"W	20.62
L15		N61°13'10"W	18.68
L16		N61°13'10"W	12.34

LINE & CURVE TABLE

TAG #	RADIUS	BEARING/DELTA	LENGTH
L17		N01°28'16"E	43.24
L18		N01°28'16"E	20.00
L19		N01°28'16"E	20.12
L20		N01°28'16"E	112.91
L21		N21°58'09"E	21.52
L22		N41°27'40"E	20.00
L23		N48°32'20"W	125.30
L24		N41°27'40"E	23.50
L26		N28°45'52"E	28.00
L27		N21°08'27"E	5.27
L28		N42°08'27"E	29.65
L29		N21°08'27"E	17.45
L30		N61°13'10"W	2.30
L31		N48°32'20"W	21.00
L32		N61°13'10"W	76.91
L33		N01°52'30"E	14.05

NO.	REVISIONS	DATE

CORE DESIGN
14711 NE 29th Place Suite 101
Bellevue, Washington 98007
425.885.7877 Fax 425.885.7963
ENGINEERING • PLANNING • SURVEYING

PRELIMINARY PLAT
GOLDENWOOD

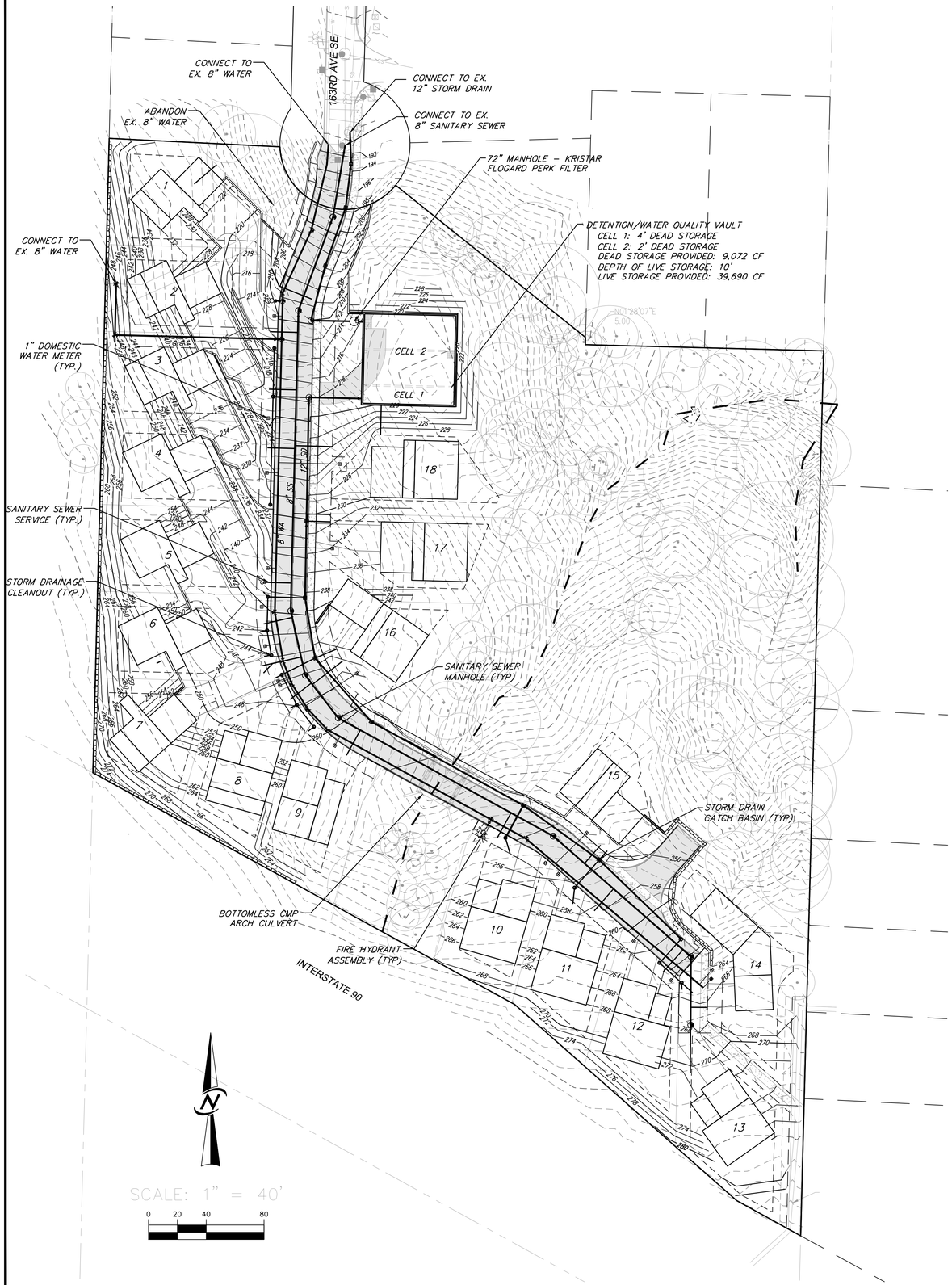
GOLDENWOOD, LLC
105 S. MAIN STREET #240
SEATTLE, WA 98104

DATE	FEBRUARY 2014
DESIGNED	JPB
DRAWN	JPB
APPROVED	JPB

JOSH BEARD
PROJECT MANAGER

SHEET	OF
P04	7

PROJECT NUMBER
13050



VERTICAL DATUM

NAVD 88

BENCHMARK

CITY OF BELLEVUE BENCHMARK 410- FOUND MONUMENT IN CASE AT THE INTERSECTION OF 163RD PLACE AND SE 34TH STREET
ELEVATION=132.22

BASIS OF BEARINGS

N44°15'12"W BETWEEN MONUMENTS FOUND IN PLACE ALONG 164TH PLACE SE DESCRIBED AS COB HORIZONTAL STATION #2854 BEING A 1/2" BRASS PLUG WITH PUNCH MARK SET IN CONCRETE DOWN ±0.5' IN A MONUMENT CASE AT THE INTERSECTION OF 164TH PLACE SE AND 163RD AVENUE SE, AND COB HORIZONTAL STATION #2858 BEING A 5/8" REBAR WITH CITY OF BELLEVUE RED CAP ON THE SOUTH SIDE OF 164TH PLACE SE ±325 FEET FROM THE INTERSECTION OF 166TH AVENUE SE AND 164TH PLACE SE/SE 38TH STREET, ±44.5 SOUTHWESTERLY OF POWER POLE NO. 3656.

LEGEND

- STORM DRAIN PIPE - 12" LCPE*
- TYPE I CATCH BASIN
- TYPE I CATCH BASIN w/ SOLID LOCKING LID
- TYPE I CATCH BASIN w/ THRU-CURB FRAME
- TYPE II CATCH BASIN
- TYPE II CATCH BASIN w/ SOLID LOCKING LID
- TYPE II CATCH BASIN w/ THRU-CURB FRAME
- STORM DRAIN SERVICE - 6" OR 8" LCPE*
- STORM DRAIN CLEANOUT
- LOT/ROOF DRAIN SHEET FLOW SPREADER
- SANITARY SEWER - 8" PVC*
- SANITARY SEWER SERVICE - 6" PVC*
- SANITARY SEWER MANHOLE
- SANITARY SEWER CLEANOUT
- WATER MAIN
- WATER METER & SERVICE - 2" PVC
- FIRE HYDRANT

*PIPE SIZE & MATERIAL ARE TYPICAL, UNLESS NOTED OTHERWSE.

- PROPOSED EASEMENTS
- SETBACKS
- EXISTING & 222
- 220 PROPOSED CONTOURS 222
- STREAMS
- PEDESTRIAN CIRCULATION
- VEHICULAR CIRCULATION
- EXISTING TREE TO REMAIN

NO.	REVISIONS	DATE

CORE DESIGN
14711 NE 29th Place Suite 101
Bellevue, Washington 98007
425.885.7877 Fax 425.885.7963
ENGINEERING • PLANNING • SURVEYING

PRELIM UTILITY PLAN
GOLDENWOOD

GOLDENWOOD, LLC
105 S. MAIN STREET #240
SEATTLE, WA 98104

DATE	FEBRUARY 2014
DESIGNED	JPB
DRAWN	JPB
APPROVED	JPB
	JOSH BEARD, PROJECT MANAGER

SHEET	OF
P06	7

PROJECT NUMBER 13050

Critical Areas Report Summary

Amalani LLC/Goldenwood

February, 2014

Purpose

The purpose of this document is to summarize material provided within the Critical Areas Study (Soundview Consultants), the Ggeotechnical Report (GeoResources), and the Preliminary Drainage Report (Core Design). For complete detailed information please refer to the stated sources.

Introduction

It is proposed that an 18 lot plat be developed on a 5.82 acre site located at 3736 163rd Avenue SE, Bellevue, WA. Due to the presence of critical areas on site the proposed development would go through the conservation subdivision process and would include requested modifications to said critical areas, as allowed under LUC 20.25h.055 (private roads, culvert, stormwater facilities), and modifications to critical area buffers and setbacks per the critical area report process.

Through this process the project will result in an equivalent or better protection of on-site critical area functions and values than would result from conformance with the code requirements, per increased performance standards building construction and mitigation. The final delineated and additional area will be designated as NGPA.

The residential single family subdivision proposal is located on one parcel at 3736 163rd Avenue Southeast Bellevue, Washington. The subject property is situated in the Southeast ¼ of Section 11, Township 24 North, Range 5 East, W.M. within King County (King County Tax Parcel Number 1124059017).

The site currently exists within the Bellevue Urban Growth Boundary and is surrounded by existing multifamily/single family residential structures to the north, west, and east and is bordered by Interstate 90 to the south.

The existing critical areas on site include a Type IV wetland (Wetland A), two unnamed streams identified as Streams X and Z (classified Np and Ns by the Department of Natural Resources), an unregulated seep and several areas with steep slopes. Both streams are identified as Type N non-fish bearing water bodies since they are not inventoried as shorelines of the state (Type S). The streams do not contain fish habitat (Type F), nor are they physically connected to a Type S or F stream by an above ground channel (Type N). The proposed project activities include a road crossing Stream Z in the SE portion of the subject property and several areas of reduced buffers as demonstrated in the Critical Areas Plan.

Existing Conditions Summary

Figure 1 - Aerial Map Depicting Subject Property (Soundview Consultants LLC)

Per the Critical Areas Report, prepared by Soundview Consultants LLC, the existing property is primarily undeveloped vacant land. Surrounding areas to the north, east, and west contain residential use areas. To the west are multi-family units, to the east is a subdivision, and to the north are single-family residences and the Eastside Christian Community Church. The south side of the parcel abuts the right-of-way to Interstate 90.

The project site is elevated above the 163th Avenue residences located to the north and is zoned for single-family residence under Bellevue Land Use Code (BLUC). The topography of the site consists of a draw sloping from the south central portion to the northeast portion of the parcel forming upland ridges on the west side and eastern corner. The lower areas of the draws contain Wetland A and Streams X and Z. Water from the streams converge off site and flow into a road side ditch along 164th Place Southeast, then into a catch basin located at the corner of 164th Place Southeast and 166th Avenue Southeast, which likely drains into Lake Sammamish. The catch basin functions as a downstream fish barrier; in addition, on-site steep slopes and subsurface flows also present fish passage barriers[1].

The topographic character of the site is hilly with five (5) slopes identified as slopes of greater than 40% meeting the City of Bellevue critical area steep slope criteria. The slopes begin at the end of 163rd Ave SE, where the site slopes up at inclinations of about 30 – 50%. About 200 feet south of 163rd Ave, the slopes flatten to about 8 – 20%. These flatter slopes extend to the south property line, and appear to be a large fill slope associated with the construction of the I-90 highway embankment. The eastern portion of the site has a stream channel that flows from south to north. Topography on the eastern half of the site slopes down to the stream channel at inclinations that vary from 20 – 50%. Total topographic relief across the parcel is on order of 100 feet[2].

The upland areas consist of second and third-growth mixed coniferous and deciduous forest. The upland vegetation in the forested areas of the subject property contains western red cedar, Douglas fir, big-leaf maple and aspen over vine maple, salmonberry, red huckleberry, Indian plum, twinberry salal, and Oregon grape. Groundcover within these areas consists of sword fern, English ivy, trailing blackberry, and youth-on-age.[3]

[1] Soundview Consultants LLC – Critical Areas Report
[2] GeoResources, LLC – Revised Geotechnical Engineering Report
[3] Soundview Consultants LLC – Critical Areas Report

Several reports relevant reports/studies/exhibits have been prepared and are referenced in this Critical Areas Report Summary. These include:

- Critical Areas Study - prepared by Soundview Consultants LLC - January 2014
- Geotechnical Report – prepared by GeoResources, LLC - February 2014
- Preliminary Storm Drainage Report – prepared by Core Design, Inc. – February 2014
- Exhibit A – Critical Areas Plan

Critical Areas Report (CAR) Process Criteria Summary

The proposed subdivision meets the two conditions outlined by the City of Bellevue in the Development Services Handout CA-6 as summarized below.

1. Critical areas on site are degraded to the point that they are no longer providing the functions for which they are protected:
    a. The existing conditions of the parcel can be described as vegetated with mature trees and understory plant species. Many of these species include non-native invasive plant species, (due to impacts from previous logging activities) which limits plant diversity and habitat potential.
    b. Although critical area hydraulic features are currently undeveloped, buffers associated with these features have been impacted by previous logging efforts.
    c. Existing critical areas have been determined to be non-fish bearing and are low in habitat functionality.

2. The proposed project will offer the following critical area enhancements which will provide equivalent or better protection of the critical areas:
    a. Remove and control non-native invasive vegetation using herbicidal treatment (BLUC 20.25H.055)
    b. Minor excavation of non-native vegetation rhizomal mats
    c. Non-disturbance of large, significant trees within the buffers including protection from future non-invasive plant species.
    d. Minimal impact to the existing critical areas by careful site planning which should provide a meaningful benefit to the Cedar-Sammamish watershed[4]
    e. Construction techniques will be utilized to minimize disturbance to steep slopes (eg benching foundations, extended vertical extension, pole-type construction).

I. FEASIBILITY ALTERNATIVE ANALYSIS

Per the density formula provided in 20.25H.045, 20 dwelling units are allowed to be developed on the site, and will be used as the base standard for feasibility as combined with the developed uses such as a new road, new stormwater facility and stream crossing with new culvert or bridge as allowed per 20.25H.055 within the general developable area bound by the property line to the west and south, and critical areas generally to the north and east.

[4] Soundview Consultants LLC – Critical Areas Report

In regards to the allowed uses it is assumed that the stormwater facility (low point developable area), and the stream crossing would remain in their general locations, and the road alignment would vary per alternative upon entry of the subject property Both alternatives would assume the impact/regarding of Steep Slope 3 due to the development of the road (the existing grade at the end of developed 163rd Avenue SE and the entering grade at the property (+14' elevation change), and the maximum road grade of 15%, requires an immediate cut into the site), and the stormwater facility location, and associated grading.

1. Preferred Alternative

   The preferred alternative, which is the action proposed in this critical area study, proposes 18 dwelling units, therefore it immediately mitigates impacts compared to Alternative A. The alignment for the preferred alternative follows an existing ridge line and therefore reduces the amount of cut into the slope compared to Alternative A. However in an effort to reduce this impact to the site it requires longer lots along the western/southern side of the road. To compensate for this a buffer reduction modification is requested to reduce the top of slope buffer east and north of the road. In order to mitigate impacts the critical area it is proposed that pole-type construction be proposed for portions of the units that are adjacent to the central buffer area, and the remainder portion of those units would use extended vertical footings to stabilize the slope. Proposed restoration/mitigation would include the entire stream corridor and added buffer area. Although the modifications to this alternative are greater than Alternative A, the overall reduction in site impacts due to reduced grading, sensitive construction methods and the increased amount of restoration/mitigation will create a more net gain in function.

2. Alternative A

   Alternative A would propose the minimum lot size of 4,680 sf and lot dimensions of 60'x80' to maximize development. in order to accomplish this the road alignment would need to shift an additional 35' to the west (compared to the preferred Altrnative) thus cutting into the hillside drastically increasing amount of volume needed to be hauled off-site (potentially a 33% increase) and grading work related impacts. The road would be double loaded west of the stream crossing with 14 lots with the remaining 6 east of the crossing. Bench foundation type construction would be proposed for all units and it is perceived that grading activity would encumber the entire developable area including those areas closer to the more sensitive portions of the site (creek). Modifications for this alternative would include a slight buffer modification to steep slopes 1 and 2 (stormwater facility), and a reduced 37.5' stream buffer. Mitigation/restoration would include the added buffer area and the minimum necessary to compensate for impacts but would not be equal to the area compared to the Preferred Alternative (14,000 +/- sf vs. 37,000 +/- sf.).

II. Summary of Standards Proposed for Modification

The proposal seeks to modify/reduce the steep slope buffer in several areas. One stream crossing and stream buffer reduction is also proposed. The modifications proposed are summarized below. Details pertaining to these items are contained within the Critical Areas Report and in the corresponding studies/exhibits.

A. Modification– Reduction to stream buffer of a Type N stream in southern portion of Stream Z. (see Exhibit A – Map for specific location).

Code Reference: BLUC 20.25H.075	Required: 50' buffer from stream
Code Reference: BLUC 20.25H.230	Requested: Buffer reduction to 37.5' from stream to allow for adequate lot sizing and construction of residential structures consistent with the development standards of the City of Bellevue. Buffer reduction will be compensated for through buffer averaging along the northern onsite portion of the stream. All mitigation efforts will be in accordance with BLUC 20.25H.210 – 20.25H.225
Code Reference: BLUC 20.25H.075.C.2	Buffer averaging will result in an increased width in stream buffer in the northern portion of the site to compensate for proposed buffer reduction along onsite southern portions of Stream Z.

B. Modification – Development allowed within steep slopes

Code Reference: BLUC 20.25H.55	New roads, new stormwater facilities, new bridges and culverts are all allowed uses.

C. Modification – Reduction of steep slope setbacks in multiple areas

Code Reference: BLUC 20.25H.120.A.2	Required: 50' buffer for slopes of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.
Code Reference: BLUC 20.25H.125	Requested: Reduce buffers of the slopes near Lots 1, 9, 10, 14, 15, 16, 17, and 18 to allow for development of single-family residential structures. Impacts will be offset by using appropriate building techniques as outlined by the City of Bellevue. The primary access road will encroach on a stream buffer and steep slope buffers. The access road will cross Stream Z.

All mitigation efforts will be in accordance with BLUC 20.25H.125 & 20.25H.135.

III. Habitat and Cumulative Impacts Assessments

In accordance with BLUC 20.25H.250.B.3&4, a Critical Areas Habitat Assessment Report outlining project impacts has been prepared for Amalani LLC by Soundview Consultants LLC. A summary of the existing habitat conditions and mitigation proposal are included here:

Descriptive Summary of Existing Habitat Conditions

(per Soundview Consultants LLC Critical Areas Study Report, 2014)

The existing vegetation consists of coniferous and deciduous trees mainly consisting of western red cedar, Douglas fir, big-leaf maple and aspen over vine maple, salmonberry, red huckleberry, Indian plum, twinberry, salal, and Oregon grape. Groundcover within these areas consists of sword fern, English ivy, and trailing blackberry. To improve critical areas and buffer functions, the project proposes to remove and control non-native invasive vegetation using herbicidal treatment, in accordance with BLUC 20.25H.055, and minor excavation of non-native vegetation rhizomal mats. Large trees, including non-native domestic cultivars, within the buffer areas will not be disturbed, but will be maintained to ensure species are not overtaken by English ivy, Himalayan blackberry, or other non-native, invasive vegetation in the future.

Stream Z bisects the project property into eastern and western portions, making it necessary to construct stream crossing infrastructure to allow property access and to meet project goals.

Very little development will occur inside the stream and wetland buffer areas. The culvert near the Interstate 90 right-of-way will have minimal buffer protection. The buffer downstream of the culvert will be protected and enhanced; the project is designed to avoid critical fish and wildlife habitat areas to the greatest extent possible.

Summary of Habitat Mitigation Efforts

(per Soundview Consultants LLC Critical Areas Study Report)

The objective of the proposed stream buffer mitigation actions is to restore and enhance diminished water quality and hydrologic function resulting from site development and provide an overall net benefit in critical area functions by removing non-native invasive plant species and replanting native vegetation where necessary. This proposal has utilized, to the maximum extent possible, the best available construction, design, and development techniques to ensure the least amount of impact on the critical area and associated buffer area within the subject property. Temporary erosion and sediment control (TESC) measures consisting of a construction entrance, silt fencing, seeding of disturbed soils, and brush barriers will be installed using BMPs outlined in the City of Bellevue's "Environmental Best Management Practices Manual".

Stream buffer enhancement actions will include removing non-native invasive plant species, English ivy, that is dominant in the existing buffer area and replace removed plant cover with native shrubs and plants. Replacing invasive species with native vegetation will enhance the habitat functions provided by the site. A diverse herbaceous layer will be established to provide browse, cover and nesting for small mammals, which in turn provide prey for raptors and other small mammals.

IV. Functional Lift Analysis

Critical Area/Buffer Functions	Existing Conditions	Proposed Conditions	Functional Improvement
Water Quality	Wetland buffer and stream buffers have a significant amount of non-native invasive plant species and contains some antropogenic debris.	Improve and enhance stream buffer and wetland buffer areas by removing non-native invasive vegetation and debris and replanting with native vegetation where necessary.	Yes; water quality will be improved. New vegetation plantings will filter stormwater prior to entering streams and wetlands and draining offsite.
Hydrology	Onsite hydrologic support provided by ground seeps, precipitation, and surface runoff. Water discharges offsite via a ditch along 164th Place. Evidence of stormwater scour and wash.	Wetland and stream shoreline will be improved through the establishment of native plantings and groundcover and removal of debris.	An increase in vegetation diversity onsite will reduce surface water peak flows and reduce stream erosion and sediment deposits downstream of the subject property.
Habitat	Some habitat exists for small mammals, passerine birds, and amphibians.	An increase in native vegetation and vegetation diversity will provided added wildlife habitat.	Increased vegetation complexity will increase species diversity onsite. More vegetation will provide organic matter for the forested areas, streams, and wetlands. Plantings will provide maximum habitat availability to wildlife species.
Net Condition	Degreaded streams and wetland buffers with limited vegetation diversity for habitat for wildlife. There is currently no flow control provided for the disturbed areas on site. Therefore, the peak 2-year flow rates with a "pasture" or "grass" land cover is discharged to the creek.	Enhanced stream buffer habitats and vegetation complexity with native vegetation plantings. Flow control provided onsite will reduce the 2-year peak flow to half of the pre-developed condition assuming a land cover of forest.	An improveed vegetation community will allow an increase in stormwater filtering and storage capacity along with habitat structural complexity and organic input into the environment. Less water and thus sediment will be released to the fish bearing creek during the 2-year storm event.

V. Wildlife Management Standards

The two identified onsite streams (Streams X and Z) are both Type N, non-fish-bearing streams and the one onsite wetland provides some small mammal and avian foraging. Functional limitations for wildlife presence exist due to the small size of the subject property and onsite aquatic features. WDFW Priority Habitat and Species (PHS) online resource shows there are no identified species or habitat of local priority onsite.

One wetland (Wetland A) was identified on the project site. The habitat functions provided by the wetland are extremely limited, but may include foraging area for small mammals and birds. The limited functionality of the property for wildlife is provided due to small wetland size and a lack of vegetation and associated habitat complexity.

Removal of invasive plant species from the buffer and upland areas along with critical area designation signs will increase and provide sensitive areas protection. This along with restorative actions will provide habitat and wildlife protection. These actions are anticipated to be favorable native plant and wildlife biodiversity areas.

VI. Mitigation and Restoration

Summary - Slopes

Based on data review, and site observations and evaluation the steep slope areas can be mitigated by the proposed site development. The project proposes the two identified steep-slope areas will be modified to allow for the development of the site roads, infrastructure, and residential lots. The remaining steep slopes will remain undeveloped. It is recommended, based on the observed field conditions and recommendations contained herein, that setbacks along portions of the site be reduced or modified.

The development of the site will include the construction of engineered retaining walls that will act as basement walls for the residential structures. The residential structures will likely include several levels of basement to extend through and stabilize the previously disturbed soils at the site. The cut slopes required to install these walls will require staging and a terraced (benched) methodology, or the installation of temporary/permanent shoring walls with drainage. The construction methodology will likely be controlled by the type and extent of the final project development. Typically it is more cost-effective to install terraced walls rather than one tall wall. Preliminary geotechnical recommendations and design criteria are provided herein.

The proposed project layout makes every effort to reduce direct impacts Streams X and Z, Wetland A , and associated steep slopes by carefully configuring the access, infrastructure, and proposed building lots to avoid such elements. Due to the hilly nature of the site, one stream crossing and buffer reduction and several steep slope buffer reductions are necessary to develop the site. Significant analysis and site plan layout versions have been produced to balance both the needs of creating a residential neighborhood and the negative impacts to critical areas.

The site is located within the City of Bellevue Urban Growth Boundary and borders a heavily used interstate making the location a good candidate to provide urban infill.

City of Bellevue Code References

Slopes: The mitigation requirements are as follows per BLUC 20.25H.125 and 20.25H.13

20.25H135 – Mitigation and Monitoring (direct code references are italicized)

The proposed project will meet or exceed the following mitigation standards relating to steep slopes.

A. Erosion and Sediment Control Plan

An erosion and sediment control plan will be prepared in accordance with Chapter 23.76. The plan will include (unless otherwise addressed in Chapter 23.76, the location and methods of drainage, surface water management, locations and methods of erosion control, a vegetation management and/or replanting plan, and/or other means for maintaining long-term soil stability.

B. Drainage Plan

A technical plan will be created for the collection, transport, treatment, discharge, and/or recycle of water prepared in accordance with applicable City codes and standards. There is no on-site septic system.

C. Monitoring Surface Waters

Surface waters will be monitored if determined necessary by the City Director.

20.25H125 – Steep Slopes (direct code references are italicized)

The proposed project will meet or exceed the following mitigation standards relating to steep slopes.

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.

Benched foundations will be used for lots 1-8, & 10-13 to more closely follow existing grade and minimize grading.

The structures on Lots 9, 14 – 18 will be constructed with post and beam techniques with minimal disturbance to the slope below the structure. The proposed project will also use retaining walls and building foundations to ensure slope stability.

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

The layout of the access road, infrastructure and lots are designed to minimize impacts on the site. Over 50% of the residential structures will be constructed outside of the buffers without requiring buffer modifications. Lot development and supporting infrastructure that necessitate reduced buffers will be designed to minimize impacts including the use of post and beam construction on 6 residences, retaining walls and using building foundations as retaining walls.

Direct impact of the critical areas is avoided in all cases with the exception of the direct crossing of the Stream Z. This crossing will be designed to minimize impact to the stream and be constructed to fish-bearing stream standards (even though Stream Z is not currently a fish-bearing stream).

Twelve percent of the undeveloped site is either wetland, stream, or associated buffer areas. Fencing will be installed along with a critical areas designation sign outside the boundary of the stream and wetland buffers. Compensatory mitigation actions will occur within the same watershed as the negatively impacted subject property.

The proposed project will also involve upland work including: installation of temporary erosion and sediment control measures, grade and fill activities, installation of utilities, construction of public roads, construction of single-family residential homes, and installation of stormwater collection and treatment systems designed in accordance with the City of Bellevue's approved stormwater design standards.

The proposed stream crossing was designed in a manner that will allow for unimpeded flow and fish passage as stipulated by Washington Department of Fish and Wildlife under the crossing thus helping to protect Stream Z. In addition, some buffer areas of Stream Z will be narrowed or temporarily altered by necessary grading and restoration actions and some buffer areas nearest the southern boundary of Stream Z will be modified by proposed compensatory mitigation actions and buffer averaging. Most buffer impacts are temporal, and buffers will be restored without a net loss of habitat or function.

A new stream crossing will consist of a box culvert to allow for minimal adverse impact on overall aquatic area flow peaks. The box culvert will be designed in accordance with the Washington State Department of Fish and Wildlife "Design of Road Culverts for Fish Passage". The span of the box culvert will be thirty (30) feet wide to encompass both the road and sidewalks. The box culvert will be twelve (12) feet nine (9) inches tall and thirty-eight (38) feet one (1) inch in length.

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

Development within the buffer modifications does not border adjacent properties with the exception of Lot 1 and Lot 14 and the access road into the site. The majority of the buffer reductions are internalized towards the middle of the property. Neighboring parcels will benefit by the extra mitigation necessary to approve the reduced buffers such as the removal of onsite non-native invasive species that could potentially impact their property as well.

Only two of the steep slopes are proposed to be modified to allow for development (Steep Slope 1 and 4). Modifications to the slope will follow City of Bellevue standards of development as outlined in this report, the Geo-tech report and subsequent engineering construction documents.

E. *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;*

The development proposes the use of retaining walls in (x) locations. Grading will be limited to (x) locations. Additionally, structures located on Lots 9, 14 – 18 will be constructed with post and beam techniques. Please see the Clearing and Grading plan for more information.

Retaining walls are likely to be proposed along the eastside of the proposed roadway along Tract E, Lot 1 to the west, and Tract B. Retaining walls may also be proposed along the backside of the proposed hammerhead turn-around and adjacent to Lot 14 and 15.

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

The development has been designed to minimize increases in surface area of impervious surfaces within the critical area and the critical area buffer. The amount of impervious are on the project site will be less than the amount of area that is left undeveloped.

F. Where change in grade outside the building footprint is necessary, the site retention system should be stopped 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;

All efforts to minimize grade disruption outside the building footprint are proposed. Additionally, the structures on Lot 9, 14 – 18 will be of post and beam construction to further minimize (otherwise necessary) grade changes. Please see the Clearing and Grading Plan for more information.

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;

Building foundation walls will be utilized as retaining walls whenever possible. Several of the lots will have daylight basements to accommodate the relief. Please see the Geotechnical Report for details and the Clearing and Grading for more information on the locations where this is proposed.

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;

Lots proposed for development near slopes in an excess of 40% will utilize post & beam construction techniques where appropriate (Lots 9, 14 – 18).

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

Piled deck support structures are not proposed. Parking/garages will be constructed on-grade. In some areas, the foundation walls will be used as retaining walls. Please see the Geotech Report & the Clearing and Grading Plan more information.

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

Areas of disturbance will be mitigated pursuant to the requirements of LUC 20.25H.210.

City of Bellevue Code References – Mitigation and Monitoring

Streams: The mitigation requirements are as follows per 20.25H.210 - 20.25H.13

20.25H215 – Mitigation and Monitoring (direct code references are italicized)

Every reasonable effort has been made to ensure that that the proposed development avoids impacts to critical areas, especially the most sensitive, and serves to enhance existing degraded critical area conditions. Over 36%? (verify) of the site will remain undisturbed and the direct impact to critical areas has been avoided in all cases with the exception of the road crossing of Stream Z. Please see Exhibit X for more information.

The objective of the proposed stream buffer mitigation actions is to restore and enhance diminished water quality and hydrologic function resulting from buffering averaging and provide an overall net

benefit in critical area functions by removing non-native invasive plant species and replanting native vegetation where necessary. This proposal has utilized to the maximum extent possible the best available construction, design, and development techniques to ensure the least amount of impact on the critical area and associated buffer area within the subject property. Temporary erosion and sediment control (TESC) measures consisting of a construction entrance, silt fencing, seeding of disturbed soils, and brush barriers will be installed using BMPs outlined in the City of Bellevue's "Environmental Best Management Practices Manual." Stream buffer enhancement actions will include removing non-native invasive plant species, English ivy, that is dominant in the existing buffer area and replace removed plant cover with native shrubs and plants. Replacing invasive species with native vegetation will enhance the habitat functions provided by the site. A diverse herbaceous layer will be established to provide browse, cover, and nesting for small mammals, which in turn provide prey for raptors and other small mammals.

A. Avoiding the impact altogether by not taking a certain action or parts of an action;

Over 36% of the site will remain undisturbed with the exception of removal of invasive plant species and planting of native vegetation to encourage an increase of habitat biodiversity and critical area function. The site layout has been carefully planned to avoid as much direct impact as possible to the critical area and recommended construction techniques as outlined in 20.25H125 will be adhered to whenever possible. Alternative versions of the site plan have been examined and have been determined to be not feasible due to an increased need for buffer reductions and potential impact on critical areas.

The direct stream crossing actives will occur outside the 15' setback from the stream buffer boundary. Upon project completion there will be an overall net gain in stream buffer area and functions.[5]

B. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;

C. Performing the following types of mitigation (listed in order of preference):

1. *Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;*

2. *Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or*

3. *Compensating for the impact by replacing, enhancing, or providing substitute resources or environments;*

In summary, Objectives 1- 3 are met by the following repair, rehabilitation and restoring techniques are proposed as a result of this development (Please also refer to the Function Lift Analysis, Critical Areas Study and Geotech Report for more specific information):

- Strategic site planning to balance the desires of the City of Bellevue Urban Growth Boundary objectives and the critical areas onsite.

[5] Soundview Consultants LLC – Critical Area Report

- Removal of invasive plant species
- Re-planting of native vegetation and slope stabilization plants
- Retainment of existing mature trees
- Post & Beam home construction techniques
- Retaining walls
- Building foundations used as structure foundations.
- Construction activities have/will continue to include substantial coordination with a Wetland Scientist, Geologist and Hydrologist to complete all mitigation actions.
- Erosion control and pollution prevention will be avoided by adhering to the Temporary erosion and sediment control standards and by implementing BMP's outlined in the project storm water pollution prevention plan.
- All mitigation efforts will be proposed in accordance with the standards of 20.25H.220

D. Monitoring the hazard or other required mitigation and taking remedial action when necessary.

Monitoring is proposed as recommended in the Critical Areas Study. Please see the Critical Areas Study prepared by Soundview Consulants LLC for more information.

Mitigation for individual actions may include a combination of the above measures. (Ord. 5680, 6-26-06, § 3)

VII. Conclusion – Summary of Critical Areas Report 20.25H.145

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 proposed development will not increase the threat of geological hazard to adjacent properties due to proposed construction techniques as outlined in this report including: the substantial avoidance of critical areas due to careful site planning, the use of TESC and BMP construction methods, development of retaining walls, foundations used as retaining walls and post/beam construction where appropriate.

B. Will not adversely impact other critical areas;

The critical areas that current exist on site are surrounded by residential development and Interstate 90. The enhancement of existing vegetation on site by preserving existing significant trees, removal of invasive plant species (and accordingly avoiding spread to adjacent critical areas) and re-planting of native vegetation should enhance opportunities for habitat and biodiversity increase for other critical areas.

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;

The project is proposed to eliminate hazards or further degradation to the critical areas through careful site planning. Impacts that cannot be avoided will be mitigated as described in this report.

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

A Critical Areas Report, Geotech report and engineering construction documents will certify that the project as proposed is designed to be 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;

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

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. (Ord. 5680, 6-26-06, § 3)

Professional reports including a Critical Area Study, a geotechnical study and engineering documentation will demonstrate the project will not have a negative geological or critical area impact and mitigation efforts will be proposed in addition to strategic site planning and construction practices.

GeoResources, LLC
5007 Pacific Hwy. E, Suite 16
Fife, Washington 98424

Ph. 253-896-1011
Fx. 253-896-2633

September 23, 2013
Rev February 6, 2014

Goldenwood Bellevue LLC
105 South Main Street, Suite 230
Bellevue, Washington 98104

Attn: Mr. Dan Lungren
Mr. Barry Margolese

Revised Geotechnical Engineering Report
Goldenwood Residential Plat
xxx – 163rd Avenue SW
Bellevue, Washington
PN: 1124059017
Job: GoldenwoodBellevueLLC.Goldenwood.RGr1

INTRODUCTION

This revised geotechnical report presents the results of site visit, subsurface explorations, literature research, and engineering analysis for the proposed Goldenwood residential plat to be constructed on the above referenced parcel, **and addresses comments from the City of Bellevue contained in their October 25, 2013 review letter. This report also includes design revisions pertaining to the box culvert crossing and other geotechnical aspects of the proposed development. The** location of the site is shown on the attached Site Vicinity Map, Figure 1.

Our understanding of the project is based on our discussions with you, our multiple site visits, including our April 24, 2013 and May 1, 2013 site visit when we observed the drilling of four borings and eight test pits, and our past experience within the City of Bellevue (COB). Based on our September 12, 2013 meeting with your site designer and review of the current site plan dated September 16, 2013, we understand the development will include the construction of 18 single family residences, a new stormwater tract, three native growth tracts, a new roadway and associated underground utilities. According to our understanding of the proposed grading plan, we anticipate that new retaining wall as tall as 12 feet will be required along the roadside adjacent to Tract B and Lot 1 to the west, and Tract E to the east. Walls up to 11 feet are proposed along the backside of the proposed hammerhead turn-around. Additional retaining walls are proposed along the backside of Lots 1 to 9, and adjacent Lots 14 and 15. **In order to minimize site grading on some of the parcels above the steep slope areas, isolated pier or column foundations will be used. These foundations will be supported by either small diameter drilled piers or small diameter driven pipe piles. Where the new road cross the existing stream channel, a new The CONTECH box culvert, with and a precast foundation will be a installed in order to minimize disturbance to the stream and adjacent buffers.** Initial planning considered the use of low-impact measure for the treatment and dispersion of collected stormwater, however, given the shallow depth of perched groundwater and indurate soils, the current design includes a large stormwater detention vault in the stormwater tract.

The site is listed by the City of Bellevue as meeting a number of critical area criteria including landslide hazards and steep slope hazards per the City of Bellevue Critical Areas

Ordinance, 20.25H.025. In addition to providing geotechnical engineering design recommendations for site development, this report will address the City of Bellevue (COB) Critical Areas ordinance, identification of geologically hazard areas, and recommended buffers, as required by the COB Land Use Code (LUC) 20.25H.035.

The services described in this report were prepared under the responsible charge of Mr. Keith Schembs and Mr. Dana C. Biggerstaff, PE who both meet the definitions of "geologist" and "geotechnical/civil engineer", respectively, according to BMC 20.25H.145. We understand that according to the City of Bellevue, a "geotechnical report" is required to address the potential buffer and setback reductions from the Bellevue Critical Areas Ordinance, 20.25H.025.

SCOPE

The purpose of our services was to evaluate the surface and subsurface conditions at the site as a basis for assessing potential adverse impacts to and from the slopes located across the site. Specifically, our scope of services for the project included the following:

1. Conducting a geologic reconnaissance of the site area;
2. Reviewing the available geotechnical, geologic and hydrogeologic data for the site area.
3. Monitoring the drilling of borings and excavation of test pits across the site to observe the subsurface soil and groundwater conditions at the site;
4. Collecting select soil samples from the explorations and conducting grain size tests, as appropriate;
5. Addressing the appropriate criteria for geologic hazards per the current City of Bellevue ordinance;
6. Providing geotechnical conclusions and recommendations regarding site grading activities, including site preparation, subgrade preparation, fill placement criteria, suitability of on-site soils for use as structural fill, temporary and permanent cut and fill slopes, and drainage and erosion control measures;
7. Providing conclusions regarding foundation and floor slab support and design criteria, including bearing capacity and subgrade modulus;
8. Providing conclusions regarding conventional subgrade/retaining walls including temporary shoring recommendations.

Our services were completed in general accordance with our April 14, 2013 Geotechnical Engineering Proposal. Because of site limitations encountered during our field work and unknown COB permitting requirements, some of the originally proposed borings and wells were completed as test pits. We received your written notice to proceed on April 17, 2013.

SITE CONDITIONS

Surface Conditions

The subject parcel is located at the south terminus of 163rd Avenue SW in the Vasa Creek area of Bellevue, Washington, as shown on the Site Location Map, Figure 1. According to the King County iMap and Assessor's website, the irregular shaped parcel measures about 520 to 585 feet wide (east to west) by about 441 to 601 feet deep (north to south), and encompasses about 5.82 acres. The site is bounded by existing single family residences on the north and east, a walking path and Interstate 90 right-of-way on the south, and an

apartment complex on the west. The site is current undeveloped, however an underground sanitary sewer and water service crosses through the northwest corner of the project site.

The parcel is located in an area that generally slopes down from southwest to northeast. However, a stream channel on the eastern side of the of the parcel and swale in the western half of the site break the parcel into two distinct drainage basins that eventually meet offsite to the northeast. Beginning at the end of 163rd Avenue SE, the site slopes up at inclinations of about 30 to 50 percent. About 200 feet south of 163rd Avenue, the slopes flatten to about 8 to 20 percent. These flatter slopes extend to the south property line, and appear to be a large fill slope associated with the construction of the highway embankment . As stated, the eastern portion of the site is has a stream channel the flows from south to north. Topography on the eastern half of the site slopes down to stream channel at inclinations that vary from about 20 to 50 percent. **Total topographic relief across the parcel is on the order of 100 feet. the attached Site and Exploration, Figure 2a, includes the topographic survey data for the project site and identifies areas of 40 percent and steeper slopes with more than 1,000 square feet of area. Figure 2b shows the locations of the critical (steep slope and stream) areas.**

The parcel is currently vegetated with a moderate to dense mixed fir and deciduous trees. The groundcover varies from native ferns, holly, and other native shrubs to blackberries and alders where the site has been disturbed (northwest corner) and salmon berry and other wetland plants in the upper reaches of the stream channel.

In addition to the stream, some seeps were noted along an old dozer/access road in the southwest corner of the site. We did not observe evidence of active or ongoing erosion or slope instability, but according to anecdotal information from the neighbors and City personnel, we understand several parcel north of the site had shallow slope failures during construction activities of these parcels.

Site Soils

The USDA Natural Resource Conservation Service (NRCS) Web Soil Survey maps the soils across the lower portion of the site as the Alderwood and Kitsap (AkF) soils that form on slopes of 25 to 70 percent. 16D. These soils are derived from glacial till and are listed as having a severe erosion hazard when exposed. The AkF soil are also listed being in hydrologic soils group B, but the deeper, more indurate layers are listed in hydrologic soils group D. The soils in the upper portions of the site are mapped by the NRCS as the Everett gravelly sandy loam (EvB) and the Everett-Alderwood gravelly sandy loam (EwC). Both soil types are derived from glacial outwash, have slight erosion hazards when exposed, and are listed in hydrologic soils group A. A copy of the SCS map for the site vicinity is attached as Figure 3.

As stated above, no evidence of surficial erosion was observed at the site of our reconnaissance. Soils encountered in test pits and borings generally confirm the NRCS map designations, with exception that the soils encountered in the southern portion of the parcel are more consistent with glacial till (Alderwood soils) than the mapped Everett (outwash) soils.

Site Geology

The *Geologic Map of the Issaquah 7.5' Quadrangle, King County, Washington, Washington* by Derek B. Booth, Timothy J. Walsh, Kathy Goetz Troost, and Scott A. Shimel, 2006 indicates that most of the site is underlain by glacial till (Qvt), while the northern portion is likely underlain by advance outwash (Qva). The stratigraphically lower and older Olympia Beds (Qob), a nonglacial sand and gravel deposit is mapped north of the project site.

The glacial till was deposited during the most recent Vashon Stade of the Fraser Glaciation, approximately 12,000 to 15,000 years ago. The glacial till consists of a heterogeneous mixture of clay, silt, sand, and gravel that was deposited at the base of the

prehistoric continental glacial ice mass and was subsequently over-ridden. As such, the glacial till is considered overconsolidated and exhibits high strength, low compressibility characteristics and is in a very dense condition where undisturbed. The advance outwash consists of poorly sorted mixture of primarily gravel and sand that was deposited by meltwater streams emanating from the advance continental ice mass. Like the till, the advance outwash was overridden by the prehistoric ice mass and is in a very dense condition. An excerpt of the referenced geologic map is attached as Figure 4.

No evidence of deep seated erosion or other active landslide activity was observed at the time of our site visit. No areas of landslide deposit or mass wasting are noted on the referenced map within 300 feet of the subject parcel.

Subsurface Explorations

We explored surface and subsurface conditions on April 24, and May 1, 2013. Table 1 summarizes the approximate functional locations, surface elevations, and termination depths of our subsurface explorations, and Figure 2 depicts their approximate relative locations. The following section of this report describes our field exploration procedures.

TABLE 1
APPROXIMATE LOCATIONS, ELEVATIONS, AND DEPTHS OF EXPLORATIONS

Exploration Number	Functional Location	Surface Elevation (feet)	Termination Depth (feet)	Termination Elevation (feet)
B-1	Central portion of Lot 2	234	21½	212½
B-2	North central portion of Lot 18	228	16½	211½
B-3	West central portion of Lot 17	252	16½	235½
B-4	Buffer area, east of Lot 17	240	16	224
TP-1	Lower, east portion of Lot 5	258	7	251
TP-2	Lower, east portion of Lot 7	258	7	251
TP-3	Lower, east portion of Lot 9	260	7	253
TP-4	Central portion of Lot 4	250	7	243
TP-5	South side Lot 16	248	8	240
TP-6	Center of Lot 15	244	9	235
TP-7	Road turn-around	260	10	250
TP-8	West side Lot 13	270	9	261

Elevation datum: Client Provided Site Plan

The specific number, locations, and depths of our explorations were selected by GeoResources based on access limitations, encountered stratigraphy, and budget considerations. Approximate locations were determined by taping and pacing from features shown on the provided site plan. Elevations were determined by interpolating between elevation contours shown on the referenced site survey. Consequently, the data listed in Table 1 and the locations depicted on Figure 2 should be considered accurate only to the degree implied by our measuring methods.

Our borings were drilled with a small track mounted hollow-stem auger drill rig under contract to GeoResources, LLC. A geologist monitored the drilling of the borings, logged the subsurface conditions, and obtained representative soil samples. Representative soil samples obtained from the boring were placed in sealed plastic bags and taken to a laboratory for further examination and testing as deemed necessary. Upon completion, three borings were completed with groundwater observation wells. Boring B-4 did not encounter groundwater and as such was backfilled with bentonite chips.

Soil samples were obtained at 2½- to 5-foot depth intervals in accordance with Standard Penetration Test (SPT) as per the test method outline by ASTM: D-1586. The SPT

method consists of driving a standard 2-inch-diameter split-spoon sampler 18 inches into the soil with a 140-pound hammer. The number of blows required to drive the sampler through each 6-inch interval is counted, and the total number of blows struck during the final 12 inches is recorded as the Standard Penetration Resistance, or "SPT blow count." If a total of 50 blows are struck within any 6-inch interval, the driving is stopped and the blow count is recorded as 50 blows for the actual penetration distance. The resulting Standard Penetration Resistance values indicate the relative density of granular soils and the relative consistency of cohesive soils.

The attached boring logs describe the vertical sequence of soils encountered at each specific location. Where a soil type changed between sample intervals, we estimated the contact depth based on drilling conditions and cuttings. The boring logs also indicate the observed blow count, sample number, and approximate depth of each soil sample collected from the boring. Where encountered, the approximate groundwater depth is depicted on the each log.

The boring logs indicate the subsurface conditions at specific locations only, as actual subsurface conditions can vary across the site. The nature and extent of any such variations would not become evident until additional explorations are performed or until construction activities have begun. However, based on our experience in the area and extent of prior explorations in the area it is our opinion that the soils encountered in our explorations are generally representative of the soils at the site.

Subsurface Conditions

Our explorations encountered variable subsurface conditions that generally confirmed the mapped stratigraphy. In general, our explorations encountered 6 to 12 inches of a surficial topsoil/forest duff layer mantling ½ to 5 feet of loose to medium dense silty sand with varying amounts of gravel, that we interpret to be weathered glacial till. About 12 feet of silty outwash mantling weathered till was encountered in boring B-2. Three test pits, TP-2, T-3,and TP-8 encountered a brown fine sandy silt between the topsoil/duff and underlying weathered till. At depths of 1½ to 6 feet, the weathered till was underlain by dense to very dense silty gravelly sand, that we interpret to be glacial till. The amount of silt and gravel varied slightly across the site. Borings B-3, encountered sandier lenses within the till at a depth of 12 feet. This deeper, dense to very dense glacial till was encountered to the full depth explored our explorations. Table 2 summarizes the approximate thicknesses, depths, and elevations of the soil layers.

TABLE 2
APPROXIMATE THICKNESSES, DEPTHS, AND ELEVATIONS OF SOIL LAYERS ENCOUNTERED IN EXPLORATIONS

Exploration Number	Thickness of Topsoil (feet)	Thickness of Soft Sandy SILT (feet)	Thickness of Med Dense Weathered Till (feet)	Depth to Dense Glacial Till (feet)	Elevation of Dense Glacial Till (feet)
B-1	1	0	5	6	228
B-2	1	0	12*	13	215
B-3	1	0	4	5	247
B-4	½	0	1	1½	238½
TP-1	¾	0	1¼	2	256
TP-2	½	1	1½	3	255
TP-3	1	1	1	3	257
TP-4	1	0	1	2	248
TP-5	1	0	½	1½	246½
TP-6	1	0	½	1½	242½
TP-7	1	0	½	4	256
TP-8	½	1	½	3½	266½

Elevation datum: Client provided site plan
Note *: Test pit TP-12 appeared to encounter a layer of recessional outwash atop the glacial till.

Groundwater

Groundwater seepage was observed most of borings and test pits at the time of drilling or digging. Table 3, summarizes the depth, elevation, and date of groundwater encountered in our explorations.

TABLE 3
APPROXIMATE DEPTHS AND ELEVATIONS OF GROUNDWATER ENCOUNTERED IN EXPLORATIONS

Exploration Number	Depth to Groundwater (feet)	Elevation of Groundwater (feet)	Date Observed
B-1	18 17.08 17.75	216	April 24, 2013 (ATD) June 19, 2013 September 13, 2013
B-2	8 6.58 7.25	220	April 24, 2013 (ATD) June 19, 2013 September 13, 2013
B-3	12 12.02 12.58	252	April 24, 2013 (ATD) June 19, 2013 September 13, 2013
TP-1	1	257	April 24, 2013 (ATD)
TP-2	1	257	April 24, 2013 (ATD)
TP-3	2	258	April 24, 2013 (ATD)
TP-7	1½	258½	April 29, 2013 (ATD)
TP-8	1½	268½	April 29, 2013 (ATD)

Elevation datum: Client provided site plan

In most of our explorations, we interpret the encountered groundwater to be indicative of a seasonal "perched" groundwater condition. However, in boring B-1 and B-3, the

groundwater appeared to be in more of sandier lens within the less permeable glacial till. Perched groundwater develops when the vertical infiltration of water through a shallow, more permeable soil horizon is slowed by a deeper less permeable soils type. Throughout the year, groundwater levels will typically fluctuate in response to changing precipitation patterns, off-site construction activities, and site utilization.

Construction planning should include appropriate dewatering measures. The use of French drains along the upslope portions of the west side of the site, with ditching and occasional pumping, should be sufficient to manage the encountered level of water during construction. Appropriate drainage, discussed later in this report, should be included for all structures.

Environmentally Critical Areas definitions (SC25.09.020)

The City of Bellevue municipal code lists landside hazard areas, steep slope areas, coal mine hazards as the three primary geologic hazards. We understand the City is concerned with landslide and steep slope hazards on the subject site. The City of Bellevue Critical Areas Ordinance, 20.25H.120, used the following designations 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.
   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.
3. Coal Mine Hazards. Areas designated on the Coal Mine Area Maps or in the City's coal mine area regulations, LUC 20.25H.130, as potentially affected by abandoned coal mines; provided, that compliance with the coal mine area regulations shall constitute compliance with the requirements of this chapter in regard to coal mines.

B. Geologic Hazard Area Buffers.
The following critical area buffers are established.
1. General Geologic Hazard Critical Area Buffers.
   a. Landslide hazards Top-of-slope buffer of 50 feet.
   b. Steep slopes Top-of-slope buffer of 50 feet
2. Existing Development. Where a primary structure legally established on a site prior to August 1, 2006, encroaches into the critical area buffer established in subsection B.1 of this section, the critical area buffer and structure setback shall be modified to exclude the footprint of the existing structure. Expansion of an existing structure into

the critical area buffer shall be allowed only pursuant to the provisions of LUC 20.25H.065.

3. Buffer Modification. Modifications to the geologic hazard critical area buffer may be considered through a critical areas report, LUC 20.25H.230.

C. Structure Setbacks.

1. General. The requirements of this section apply along with any other dimensional requirements of the Land Use Code (see LUC 20.20.010, 20.20.130, 20.20.190 and Parts 20.25A – 20.25G). The most restrictive dimension controls. Structure setbacks are required in order to:
   a. Minimize long-term impacts of development adjacent to critical areas and critical area buffers; and
   b. Protect critical areas and critical area buffers from adverse impacts during construction.
2. Minimum Setback of Structures.
   a. Landslide hazards Toe-of-slope setback of 75 feet.
   b. Steep slopes Toe-of-slope setback of 75 feet.
3. Structure Setback Modification. Structure setbacks may be modified only through an approved critical areas report. (Ord. 5680, 6-26-06, § 3)

CONCLUSIONS

Based on our data review, site observations and evaluation and experience in the area, it is our opinion that the steep slope areas can be mitigated by the proposed site development. It is proposed that two identified steep slope areas will be modified to allow for the development of the site roads, utilities, and building lots. The remainder of the steep slopes will remain un-disturbed. Therefore, it is our recommendation, based on the observed field conditions and recommendations contained herein, that setbacks along portions of the site where the steep slopes will be regraded can be reduced or modified.

We expect that the development of the site will include the construction of engineered retaining walls that will act as basement walls for the structures. The structures will likely include several levels of basement to extend through and stabilize the previously disturbed soils at the site. The cut slopes required to install these walls will require staging and a terraced (benched) methodology, or the installation of temporary/permanent shoring walls with drainage. The construction methodology will likely be controlled by the type and extent of the final development. Typically it is more cost effective to install terraced walls rather than one tall wall. Preliminary geotechnical recommendations and design criteria are provided herein. Once you have determined your preferred building layout and site geometry, we can provide the site specific geotechnical criteria.

Environmentally Critical Areas definitions (SC25.09.020)

The City of Bellevue municipal code lists uses the above listed characteristic to define landslide hazard areas and steep slope hazard areas. In the review letter from the City, a more detailed line by line discussion of the 6 landslide hazard area indicators was requested. Below, we have listed and comments on each of the 6 indicators mentioned in SC 25.09.020.

a. <u>Areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides</u>: The site exhibits uneven topography that is the result of two drainage courses/streams and older historic logging activities. No evidence of slumps, earthflows, mudflows, or landslide were noted during our site visit or are mapped on the published geologic map for the site area. We understand that

two of the parcel in the developed neighborhood north of the site had surficial failures during or soon after construction. Based on anecdotal information, one of the failures occurred below steep slope area2 (see attached Figure 2). This site is further offsite and below the proposed development than the prescriptive buffers. The second site, consists of a parcel along the west side of 163rd Avenue SW, north of the proposed steep slope area 1 (Tract E).

b. Areas that have shown movement during the Holocene Epoch (past 13,500 years) or that are underlain by landslide deposits: As stated above, *The Geologic Map of the Issaquah 7.5' Quadrangle, King County, Washington, Washington* (Booth et al, 2006) indicates that most of the site is underlain by glacial till (Qvt), while the northern portion is likely underlain by advance outwash (Qva). No areas of landslide deposit or mass wasting are noted on the referenced map within 300 feet of the subject parcel.

The glacial till was deposited during the most recent Vashon Stade of the Fraser Glaciation and is a heterogeneous mixture of clay, silt, sand, and gravel. The till was deposited at the base of the prehistoric continental glacial ice mass and was subsequently over-ridden. The glacial till is considered overconsolidated and exhibits high strength, low compressibility characteristics and is in a very dense condition where undisturbed. The advance outwash consists of poorly sorted mixture of primarily gravel and sand that was deposited by melt-water streams emanating from the advance continental ice mass. Like the till, the advance outwash was overridden by the prehistoric ice mass and is in a very dense condition is mapped or was observed at the time of our site visit. No areas of apparent or observed landslide activity were noted during our site visits.

c. Slopes that are parallel or subparallel to planes of weakness in subsurface materials: The site is underlain by glacial till, which is a heterogeneous mixture of soil with no bedding, laminations or parallel planes of weakness. The deeper advance outwash is also typically does not have bedding or planes or planes or weakness. The stratigraphically lower and older Olympia Beds (Qob), are a non-glacial sand and gravel deposit is mapped north of the project site. The Olympia beds can have laminations, or planes of weakness, but this soil type is not mapped, nor does it outcrop, under the subject parcel.

d. Slopes exhibiting geomorphological features indicative of past failures, such as hummocky ground and back-rotated benches on slopes: The primary topographic features on the site consists of two, roughly parallel drainages. The eastern drainage is still occupied by the mapped stream and wetland, while the western drainage appears to have cut-off by the eastern drainage and now only appears to convey a shallow perched groundwater table. There also appears to be two longer, lineal features in the western half of the that appears to be the old logging roads.

e. Areas with seeps indicating a shallow ground water table on or adjacent to the slope face: As described above, there are several areas of seeps on the parcel. Some of the seeps are within the mapped streams and wetland corridor on the eastern half of the site, where no development is proposed. There are a few smaller seep area on the western half that will be developed. As discussed below in the following sections of this report, shallow French or interceptor drains will be used to mitigate the shallow perched groundwater table where several of the lots are proposed.

f. <u>Areas of potential instability because of rapid stream incision, stream bank erosion, and undercutting by wave action</u>: The mapped stream corridor begins at a culvert discharge near the south property line and the Interstate 90 right-of-way and fill embankment. The discharge point is incised below the discharging culvert. Where the box culvert crossing is proposed, the stream channel is in a shallow channel that appears to flow in a broader wetland area. North of the box culvert and extending off site to the northeast, the stream channel does become more deeply incised. The site is not subject to any undercutting by wave action.

As discussed above, the site does have several isolated seep areas. Most of the seeps occur along the mapped stream corridor that will be protected by the wetland and stream buffers. Two smaller area of seepage on the western portion of the site will be mitigated conventional drainage improvements. There is also some typical stream incision along the lower northern portions of the mapped stream corridor. This area will also be protected by the required wetland and stream buffers.

According to the site topographic survey, there are 5 steep slopes areas of slopes steeper than 40 percent with more than 10 feet of vertical of relief. These areas are also highlighted on the Figure 2.

Geologic Hazard Areas Buffers

Section 20.25H.035 of the COB Municipal Code requires buffers from various critical areas as outlined below in Table 4.

TABLE 4
APPROXIMATE THICKNESSES, DEPTHS, AND ELEVATIONS OF SOIL LAYERS ENCOUNTERED IN EXPLORATIONS

Critical Area Category or Type	Critical Area Buffer Width	Structure Setback	Modification of Buffer or Setback
Geologic Hazard Areas			
Landslide Hazards	Toe-of-slope: None	Toe-of-slope: 75 ft	LUC 20.25H.120
	Top-of-slope: 50 ft	Top-of-slope: None	LUC 20.25H.230
Steep Slope Hazards	Toe-of-slope: None	Toe-of-slope: 75 ft	LUC 20.25H.120
	Top-of-slope: 50 ft	Top-of-slope: None	LUC 20.25H.230

As discussed previously, the proposed development requires that three identified steep slope areas be modified to allow for the development of the site roads, utilities, and building lots. The steep slopes with proposed buffer modifications, and those steep slope areas not being affected, are shown on the Critical Areas Exhibit, Figure 2b.

There are two steep slope areas along the extension of 163rd Avenue, where it enters the project site, that will require modification or buffer reductions. One area is located within the area of Lot 1 and Tract B. A portion of the steep slope area in this location will remain undeveloped in Tract B, but has previously been altered to accommodate the installation of underground utilities that extend from the terminus of 163rd Avenue to the multi-family development west of the subject parcel. The other area is Tract E and Lot 18. This area will be modified to accommodate the roadway and access to Lot 18.

Two steep areas, below proposed lots 14 and 15, will have reduced buffers and/or be modified by placing an engineered fill slope. The engineered slopes and the or the use of pier/pile type foundations will minimize impacts to these two areas. The fill slope should be constructed as outlined in the following sections of this report. The steep slope area to be

modified (steep slope area 4) is underlain by dense to very dense glacial till and did not the amount of perched groundwater as other portions of the site.

There are two large steep slope areas located within/along the central stream. The southern portion of steep slope area, where the box culvert is proposed, will need to be modified. The northern steep slope extends west to the proposed 163rd Avenue extension and will also be modified. Given the subsurface conditions encountered at the site, it is our opinion that the buffers could be reduced while having minimal impacts on the steep slope hazard areas and the proposed development.

Further modifications to critical areas buffers and setbacks per 20.25H125 Performance Standards – Landslides and Steep Slopes. We have commented on the 10 (Items A through J) of this section of the City of Bellevue code. As described in this following sections of this report and as shown on the revised and updated site plans, the proposed development on or 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, to protect the structures and mitigate the hazard.

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; As currently proposed, several of the residences will include daylight basement and tuck under type construction in order to take advantage of the exiting topography and to minimized the amount of excavation. Additionally, cantilever and column supported portion of residences/decks will be used on some of the more steeply sloping lots. Recommendations daylight basement and tuck under type construction and column foundations are included in the following section of this report.

B. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation; As currently proposed, the east side of the site with the steepest slopes, stream channel, and associated wetlands will not be developed. As stated above, most of the proposed development will occur on the western portion of the parcel where the steep slope hazard areas are smaller and more isolated.

C. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties; Provided the recommendations contained herein this report are followed, the post developed condition will have a reduced risk of failure and decreased need for buffers. Recommendations included in this report that will stabilize the site include drainage improvements and retaining walls to retain existing sloping areas of the site.

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; As previously stated, we anticipate that new retaining wall as tall as 12 feet will be required along the roadside adjacent to Tract B, Lot 1 to the west, and Tract E to the east. Walls up to 11 feet are along the backside of the proposed hammerhead turn-around. Additional retaining walls are proposed along the backside of Lots 1 to 2, and adjacent Lots 14 to 15. No permanent fill slopes on slopes steeper than 5H:1V will be created without the use of retaining walls.

E. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer; As stated, the currently proposed development avoids the steeper slope areas, stream areas, and wetland areas on the eastern and north eastern portion of the property.

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; See the site plan prepared by Core Design. As discussed below, where necessary, pole-type construction and cantilevered decks will be used where slopes are excessive. We also understand that residences where daylight basement and tuck under type construction will be used, a stepped or stair foundation with partial crawlspace will be incorporated into the design of the residences.

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; The use of daylight basement and tuck under type construction will replace the need for rockery walls up or down slope of the residential foundation. However, extending the foundations walls to the side yard in lieu of small landscaping walls between residences (such as on lots 1 to 7) will result in larger temporary cuts, more overall disturbances, and taller/steep grade transitions between the front and rear yards on these parcels.

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; We have provided recommendations for pile supported deck support and pole-type (isolated column foundations) in order to minimize the need for retaining walls and fill in the steep sloping portions of the proposed development.

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; We have provided recommendations for pile supported deck support and column foundations in order to minimize the need for retaining walls and fill in the steep sloping portions of the proposed development.

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); We have reviewed the current proposed grading plan for the project. This report provides recommendations for buffer modification, mitigation, and stabilization for steep slopes. Soundview Consultants has prepared a report discussing buffers and modified buffers/encroachment into wetland and stream areas under a separate cover. These reports and plans address the current City of Bellevue requirements.

Building Setbacks from Steep Slope Areas

Since the regraded slopes will have an overall slope of 30 percent or less, they will not meet the criteria of a steep slope area, and no buffer should be imposed. However, the building should be constructed and setback per the requirements of the International Building Code (IBC) Section 1805. The typical IBC setback from the top of the slope equals one third the height of the slope, unless evaluated and reduced, and/or a "structural setback" is provided, by a licensed geotechnical engineer. Given the height and steepness of the site slopes and density of the native sand soils at the site, we recommend a building setback of 20 feet from the top of the slopes that are 40 percent or greater.

Where this setback distance cannot be met, such as on Lots 1, 14, 15, 16, 17, and 18, the foundation elements of the structures should be extended vertically to meet the recommended horizontal setback distance, a Structural Setback. Where the foundation is extended vertically to achieve the "**Structural Setback**" or through the use of "**Pole Type Construction**" (described later in this report), we recommend that the setback be measured horizontally from the lower outside edge of the foundation element to the face of the steep slope (greater than 33 percent). This "**Structural Setback**" is based on the foundation elements extending to and being imbedded in dense native soils. A detail showing the "Structural Setback" is attached as Figure 5.

Seismic Design Recommendations

Characterization of soil profile type is required to determine the site class definition. Based on the Standard Penetration Test (SPT) values and soil classifications derived from explorations completed at the project site, it is our opinion that the project site could be adequately classified as a Site Class C.

Site Preparation

The site is currently covered with a variety of vegetation, including immature trees. Prior to grading/excavation for the proposed site development, we anticipate 6 to 12 inches of organic topsoil and duff will be removed in the building areas. Although a minor amount of the on-site material may be utilized for landscaping, the native soils contain a significant amount of fine soil material with an above optimum moisture content. The majority of these soils will likely be exported from the site as they will not be suitable for use as structural fill without significant remediation.

Structural Fill

Imported fill material should consist of a well-graded mixture of sand and gravel or crushed rock that is free of organics, debris, and rubbish, and should not contain more than 8 percent fines (material passing the No. 200 mesh sieve, based on the minus ¾-inch fraction). The fines should be non-plastic, and the moisture content of the soil should be within ±3 percent of the optimum based on the modified proctor (ASTM D:1557). All structural fill should have a maximum particle size of 3 inches, unless specifically exempted by the project geotechnical engineer. Structural fill should be compacted to at least 95 percent of the maximum dry density (MDD) of the modified proctor.

Fill Placement, Use of On-Site Soils and Compaction

Where fill soil is required to achieve temporary or finished grades, the exposed soil surface after stripping of organic debris, topsoil and/or existing fill removal, should be compacted using appropriate equipment for the site. Roadway/driveway sections should be proof-rolled with a loaded dump truck or equivalent to reveal loose, deflecting or yielding conditions. These

areas should be repaired prior to fill placement. Sections of subgrade that will be used as infiltration systems should not be densely compacted.

Soil material classified as loose silty fine SAND is suitable for use as structural fill provided the moisture content is within ±3 percent of optimum for compaction and excessive roots are removed. This material contains enough fine-grained material (silt) to become difficult or impossible to compact when wet or in wet weather and should not be used in those conditions.

The lower sand material may be suitable for use as structural fill during moderate wet weather, depending on the fines content. During dry conditions, it may need to be moisture conditioned (water added) to achieve optimum moisture conditions for compaction. Cobbles (rocks greater than 3 inches) are could be contained within this stratum. When this material is used as fill, removal of the cobbles is not practical; however, they should be separated so a concentration of cobbles does not occur in local areas. Cobbles greater than 8 inches (recommended lift thickness) and all boulders should be removed and not be used in fills.

Roadway/driveway fill should be placed in uniform lifts and compacted to a dense and unyielding condition, to at least 95 percent of the Modified Proctor maximum dry density (ASTM D 1557-70. The upper 18 inches of pavement subgrade soils should be compacted to 95 percent Modified Proctor. The thickness of soil layers before compaction should not exceed 8 inches for heavy equipment compactors or 4 inches for hand-operated mechanical compactors. In landscaped areas, the backfill should be compacted to at least 90 percent of the Modified Proctor maximum dry density.

Temporary Excavations

All job site safety issues and precautions are the responsibility of the contractor providing services/work. The following cut/fill slope guidelines are provided for planning purposes only. Temporary cut slopes will likely be necessary during grading operations or utility installation.

Excavations at the site associated with confined spaces, such as utility trenches and retaining walls, must be completed in accordance with local, state, or federal requirements. Based on current Washington Industrial Safety and Health Act (WISHA, WAC 296-155-66401) regulations, we would classify the shallow, upper soils on the site as Type C soils and the dense glacial till and advance outwash would be classified as Type A soils.

According to WISHA, for temporary excavations of less than 20 feet in depth, the side slopes in Type A soils should be laid back at a slope inclination of ¾H:1V (Horizontal: Vertical) and Type C soils should be laid back at a slope inclination of 1½H:1V or flatter from the toe to top of the slope. It should be recognized that slopes of this nature do ravel and require occasional maintenance. Exposed slope faces should be covered with a durable reinforced plastic membrane, jute matting, or other erosion control mats during construction to prevent slope raveling and rutting during periods of precipitation. These guidelines assume that all surface loads are kept at a minimum distance of at least one half the depth of the cut away from the top of the slope and that significant seepage is not present on the slope face. Flatter cut slopes will be necessary where significant raveling or seepage occurs, or if construction materials will be stockpiled along the top of the slope.

Where it is not feasible to slope the site soils back at these inclinations, a retaining structure should be considered. Where retaining structures are greater than 4-feet in height (bottom of footing to top of structure) or have slopes of greater than 15 percent above them, they should be engineered per Washington Administrative Code (WAC 51-16-080 item 5 and WAC 51.51.0404.4).

This information is provided solely for the benefit of the owner and other design consultants, and should not be construed to imply that GeoResources assumes responsibility

for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

Constructed Fill Slopes

Fill should be placed and compacted in a manner that is parallel to the slope stockpile so that keying and benching can be achieved (as per Appendix J, Section J107.3 of the IBC).

Appendix J of the IBC requires that all fill placed on slopes steeper than 1H:5V be keyed and benched. The toe of the fill slope should be keyed into the existing slope. The keyway should have a minimum width and depth of 10 feet and 2 feet, respectively. Subsequent lifts of fill should be constructed on level benches. The benches should have a minimum width of 8 feet. The fill should be placed as outlined above in the "**Structural Fill**" section of this report. Typically, larger earthwork equipment and rollers cannot adequately compact the face of a fill slope. We recommend that the slope actually be overbuilt and cut back to the compacted core. Failure to adequately compact the face of the may result in shallow surficial failures during the first few wet winter months. A detail is attached as Figure 6.

Foundation Elements

Where foundation elements for the residences **and the box culvert** are situated on undisturbed medium dense or denser native soils, or on engineered fill material that extends to these native soils, conventional shallow foundations may be utilized. Where the foundation elements will be situated in areas with previously disturbed soil material and/or steep slope areas (30 percent or greater with 10 feet or more of vertical relief), the foundation elements will require special consideration and design criteria to meet UBC/City of Bellevue setback criteria. The foundation elements may be extended vertically using a variety of measures including deepened footing/stem wall, reinforced concrete piers, needle piling, auger cast piling, or other approved structural elements.

Shallow Foundation Design

Where the structures are founded on undisturbed medium dense or denser native soils (or suitable structural fill), shallow foundations consisting of spread and individual footing elements can be utilized to support the proposed structures. Foundations bearing in the undisturbed dense native glacial till, weathered till, or properly placed and compacted structural fill, as outlined in the "Structural Fill" section of this report can be designed for an allowable bearing pressure of 2,500 pounds per square foot (psf). Bearing pressures can be increased by up to one-third for seismic and wind loads.

Minimum footing widths should be 24 inches for individual column footings and 18 inches for continuous spread footings. Exterior footings should be at least 18 inches below the lowest adjacent grade. All loose or soft soil and soil containing organics should be removed from beneath footing and areas to receive structural fill.

We estimate settlements to be less than 1-inch, with differential settlements (between adjacent footings or over a 20-foot span of continuous footing) less than ½ inch, provided the footings are designed and constructed in accordance with our recommendations. These settlements are expected to occur as the structural loads are applied, due to the granular nature of the soil.

We recommend that all exposed footing subgrades be evaluated by a representative from GeoResources, LLC. to confirm soil conditions and provide recommendations where unanticipated conditions are found. Native soils that are disturbed during footing excavation should be removed prior to the placement of the concrete forms and reinforcement.

Lateral Resistance of Shallow Foundations

For portions of the structure founded on footings, lateral loads may be resisted by a

combination of base friction and passive pressure against the footings and buried portions of the wall. In our opinion, passive earth pressures developed from the very dense, native soils could be based on an allowable equivalent fluid density of 350 pounds per cubic foot (pcf) or 200 pcf for soil above and below the groundwater table, respectively. This passive resistance value is based on the assumption that the footings extend at least 18 inches below the lowest adjacent grade and that the ground surface is horizontal for a minimum distance of 1½ times the embedment depth. The above passive earth pressure includes an FS of 1.5 to limit lateral deflections. We recommend a coefficient of friction of 0.35 be used between cast-in-place concrete and undisturbed, native, silty, gravelly sand for calculating the resistance to sliding at the base of the footings. This friction factor also includes an FS of 1.5.

Floor Slabs

Dense, native soils or compacted structural fill will provide a suitable subgrade for floor slabs constructed on grade. We recommend that a vertical modulus of subgrade reaction equal to 250 pounds per cubic inch (pci) be used in the design of the floor slab-on-grade on undisturbed medium dense sand with minor gravel, or on adequately compacted structural fill.

In order to provide firm bedding for floor slabs, we recommend areas be prepared as described in construction recommendations **"Earthwork"** section of this report. The exposed soils should be uniformly compacted to at least 95 percent of the Modified Proctor (ASTM D 1557) maximum dry density and to a dense and unyielding condition. All fill under slab-on-grade floors, including backfill for footing excavations, overexcavated areas, utilities, etc., should consist of compacted structural fill. Structural fill requirements are discussed in a later section of this report.

We recommend that the all building areas be constructed with long-term drainage systems, including a capillary break and vapor retarder. For a capillary break, we recommend a minimum 4-inch-thick layer of washed pea gravel (⅜ inch to No. 8 sieve size) or clean, 5/8-inch minus crushed rock (less than 2 percent passing the No. 200 sieve) be utilized with a vapor retarder consisting of plastic sheeting or drainage barrier material placed beneath floor slabs, as shown in Figure 7. If pea gravel is used, a 2-inch layer of clean crushed rock can be placed over it to provide a firmer working surface for the reinforcement. The vapor barrier should be placed on top of the capillary break material.

Prior to placing pea gravel and/or crushed rock for a working surface or capillary break, the exposed subgrade surface should be evaluated by a representative of our firm and compacted as needed to achieve a dense, unyielding condition. If used, the crushed rock should be compacted with at least three complete coverages of a vibrating plate compactor.

Subgrade Retaining Walls

Given the amount of relief across several of the lots, including Lots 1,2, and 3, we anticipate that several of the residence will include daylight basements. The lateral pressures acting on the permanent subgrade or basement retaining walls will depend upon the nature and density of the soil behind the wall. It is also dependent upon the presence or absence of hydrostatic pressure. If the walls supporting structural fill are backfilled with granular well-drained soil, the design active pressure may be taken as 35 pcf (equivalent fluid density) where there is no backslope above or below the wall. The design for active pressure assumes the walls can yield 0.001 times the wall height. Stiffer walls or walls restrained from movement by diaphragms or floors, should be designed to resist at-rest pressures of 50 pcf. Additional surcharges would apply for slope above the wall or structural elements. For the conditions of a 3H:1V backslope above the wall, we recommend a lateral fluid pressure of 50 psf for a wall designed with active pressures.

Positive drainage, which controls the development of hydrostatic pressure, can be accomplished by placing a zone of coarse sand and gravel behind the walls. The granular

drainage material should contain less than 5 percent fines. The drainage zone should extend horizontally at least 18 inches from the back of the wall. The drainage zone should also extend from the base of the wall to within 1 foot of the top of the wall. The drainage zone should be compacted to approximately 90 percent of the MDD within 18 inches of the wall. Over-compaction should be avoided as this can lead to excessive lateral pressures.

A perforated or slotted PVC pipe with a minimum diameter of 6 inches should be placed in the drainage zone along the base of the wall to direct accumulated water to an appropriate discharge location. We recommend that a nonwoven geotextile filter fabric be placed between the drainage material and the remaining wall backfill to reduce silt migration into the drainage zone. The infiltration of silt into the drainage zone can, with time, reduce the permeability of the granular material. The filter fabric should be placed such that it fully separates the drainage material and the backfill, and should be extended over the top of the drainage zone.

Lateral loads may be resisted by friction on the base of footings and as passive pressure on the sides of footings and the buried portion of the wall as provided in the **"Lateral Resistance of Shallow Foundations**" section of this report.

Pole-Type Construction

To minimize disturbance to steep slope and other critical areas, performance standards in the buffer reduction may require the use of pole-type construction for isolated column foundations. Typically, these isolated exterior foundations can be supported by either small diameter drilled piers or by driven pipe piles. The following sections of this report provided recommendations for both types of foundations.

Small Diameter Driller Piers

The piers should consist of minimum 12-inch diameter concrete piers that are structurally reinforced with steel rebar. The piers should have a minimum embedment of 8 feet into the deeper, dense glacially consolidated soils.

Where the 12-inch diameter piers bear on dense glacial till soil, a bearing value of 8,000 pounds per pier may be utilized. This is based on a minimum penetration equal to 8 feet. Piers should not be located closer than 4-foot centers to each other. Any loose or wet soil should be removed prior to placement of concrete.

We estimate that settlements of footings designed and constructed as recommended will be less than 1 inch, for the anticipated load conditions, with differential settlements between comparably loaded footings of 1/2 inch or less. Most of the settlements should occur essentially as loads are being applied. However, disturbance of the foundation subgrade during construction could result in larger settlements than predicted.

Where concrete pier or other similar foundation supports are utilized, the footing elements should also be designed and constructed as structural elements or grade beams. All fill material placed adjacent to the footings and support structures should be placed as structural fill compacted to at least 95 percent of the appropriate MDD in accordance with ASTM D-1557.

Small Diameter Pin-Piling

Needle piling consist of small diameter Schedule-80 steel pipe that are driven into the underlying soils to refusal. The steel pipe diameters range from 2 to 6-inches. Individual pipe segments typically range from about 5 to 10 feet long and are successively joined with external threaded couplings, internal slip couplings, or butt welds as pile driving progresses.

For the proposed addition, we recommend that 2-inch needle piling be utilized since access will likely be limited, preventing the use of larger, machine-mounted hammers. The 2-inch needle piles should be driven into the subgrade by means of a 140 lbs pneumatic or hydraulic hammer. Regardless of diameter or installation method, we recommend that each needle pile be driven to a point of refusal defined as less than 1 inch of penetration during 1 minute of sustained driving.

We anticipate that the needle piles will meet refusal in the underlying dense advance outwash or at least 2 feet below the nearest adjacent rockery, whichever is deepest. However, because refusal depths are difficult to predict and because soil conditions could vary significantly across the site, the contractor should be prepared for variable pile lengths. Also, it may be necessary to modify pile layouts if rocks or other obstructions are encountered during pile-driving, especially when driven near the existing rock wall.

When refusal has been achieved, the pin piles can be cut to a predetermined height or elevation. To provide a good bond between the piles and the pile cap, reinforcing bars with 90-degree bends can be welded to the top of the pile or, alternatively, the top of the pile can be splayed apart. A structural engineer should be responsible for designing the reinforced steel and foundation elements.

In our opinion, a properly installed 2-inch-diameter needle piling driven to refusal (as defined above) will provide the following allowable axial capacities. These capacities assume minimum pile spacing (center to center) of six diameters. Furthermore, the stated uplift capacity would be applicable only to needle piles that are installed with tension-resisting couplings.

Design Parameter	Allowable Value 2-inch-diameter
Static Compressive Capacity	4,000 pounds
Transient Compressive Capacity	5,300 pounds
Transient Uplift Capacity	2,000 pounds

Alternatively, if access for a small bobcat size machine is feasible, it may be more economic to utilize fewer, but larger diameter piling. A properly installed 4-inch-diameter or 6-inch-diameter needle pile driven to refusal (as defined above) will provide the following allowable axial capacities. These capacities assume a minimum pile spacing (center to center) of six diameters. Furthermore, the stated uplift capacities would be applicable only to needle piles that are installed with tension-resisting couplings.

Design Parameter	Allowable Value	
	4-inch-diameter	6-inch-diameter
Static Compressive Capacity	20,000 pounds	30,000 pounds
Transient Compressive Capacity	26,000 pounds	40,000 pounds
Transient Uplift Capacity	13,000 pounds	20,000 pounds

Site Drainage

We recommend installing a subdrain system along the outside of the perimeter footings of the residences to prevent the buildup of hydrostatic pressures. The subdrain should consist of a minimum 4-inch diameter plastic pipe that is either slotted or perforated.

The pipe should be bedded in either 3/8" – to No. 8 size washed pea gravel or 5/8-inch minus clean crushed gravel. If desired the trench could be extended down vertically. Typical wall and subdrainage and backfilling recommendations are presented in Figure 7.

Precipitation water from roof downspouts should be collected into tightlines and routed away from the building using tightline pipes. Downspout water should not be introduced into the foundation backfill. Surface water should be collected in catch basins and tightlined with the downspout water to an approved discharge point. Final grading should be performed such that surface water drains away from the structure.

To intercept shallow perched groundwater, improve overall slope stability, and to facility mass grading, we recommend that an interceptor or cutoff drain be installed during the initial site preparation. The cut off drain should extend from about the east side of Lot 9 to the southwest corner of the project site, and north along the back, upper side of Lots 6, 5, 4, and 3. The drain will intercept perched groundwater that was noted in our test pit and borings. We recommend that the drain extend at least 2-foot into the deeper, dense to very dense glacial till. Based on the observed subsurface conditions, we anticipate that the drain will need to be at least 5 to 8 feet in depth after grading is finished. We have included a typical interceptor drain detail as Figure 8.

Retaining Walls

Retaining walls are planned for supporting fills between the road and lots, including the use of reinforced earth fill walls and rockeries. The following sections provide comments and recommendations concerning these wall types. If the cut wall height and associated temporary cut slopes becomes prohibitive, it may be necessary to use a soldier pile and lagging retaining wall. We can provide recommendations for a soldier pile if needed.

Reinforced Walls

Reinforced soil walls consist of structural fill lifts interlayered with reinforcing grids or strips and supported at the face by a reinforcing material or segmental (modular) concrete facade. Suitable options include the proprietary systems produced by Allan Block, Hilfiker, Sierra Scape, Keystone, Pisa, Stonewall, and VSL, all of which are available with decorative segmental concrete facades. If appearance is not a criterion, the Hilfiker or Sierra Scape grid-face system, which utilizes welded-wire mesh for the horizontal and facing reinforcement materials, will be suitable. A rockery can be constructed in front of grid-face walls to achieve a more attractive facade.

The entire area beneath the new reinforced soil zone should be stripped of all vegetation and organic soils, as per the Site Preparation section of this report. All subgrade soils should then be compacted to a firm, unyielding condition. We also recommend that the face of the existing roadway embankment be benched prior to new fill placement.

Reinforced soil walls with proprietary facades (either segmental concrete or welded-wire mesh) are typically designed by the wall supplier or a specialty consultant, using design values provided by the geotechnical engineer. These design values include soil density, internal friction angle, cohesion, and allowable bearing capacities, as well as seismic acceleration. Table 5 summarizes our recommended design values for the various soils involved in the wall construction, based on our explorations and subsequent interpretations. We also recommend using the appropriate seismic acceleration for design purposes of the specific wall type.

Based on subsurface conditions encountered in our test pits, the proposed retaining wall will likely be founded on medium dense to dense weathered or glacial till. . If at the time of excavation, relict topsoil or soft soils are encountered, it may be necessary to overexcavate the unsuitable soils and create a bearing pad of quarry spalls or other free draining material.

TABLE 5 RECOMMENDED DESIGN VALUES FOR REINFORCED SOIL WALLS				
Soil Type	**Density (pcf)**	**Internal Friction Angle (degrees)**	**Cohesion (psf)**	**Allowable Bearing Capacity (psf)**
Reinforced Soil (imported granular fill)	130	32	0	N/A
Retained Soil (glacial till)	135	36	0	N/A
Subgrade Soil (glacial till)	135	36	0	2,500
Bearing Pad Soil (quarry spalls)	125	38	0	N/A

Ideally, all fill soils located within the reinforced backfill and retained backfill zones would consist of clean, well-graded sand and gravel, such as "Gravel Borrow" or "Ballast" per WSDOT Standard Specifications 9-03.14(1) and 9-03.9(1), respectively. However, the excavated embankment fill soils and/or native soils could be reused as backfill if they are free of organic matter and are near optimum moisture content at the time of placement. Existing organic matter, sod, or topsoil stripped from the wall subgrade would not be suitable for this purpose under any circumstances.

All soils located within the reinforced backfill and retained backfill zones should be placed and compacted in accordance with our recommendations given in the Structural Fill section of this report. Specifically, we recommend that all fill be compacted to a uniform density of at least 90 percent (based on ASTM:D-1557) and that the upper 2 feet of fill located below future asphaltic pavements be compacted to at least 95 percent.

Rockeries

Rockeries should be in front of dense, native soils. Rockeries should be constructed using sound, unweathered rock from an established source that has demonstrated that it produces suitable rock. The rock shall be free of fractures, clay seams and evidence of weathering.

The first course of rocks must be placed on firm, unyielding soil. There must be full contact between the rock and soil which may require shaping of the ground surface or slamming or dropping the rocks into place so that the soil foundation conforms to the rock face bearing on it. As an alternative, it is satisfactory to use lean concrete in which to seat the first course of rocks or to use 3/4-inch minus crushed rock into which the foundation rocks are seated. The bottom of the first course of rock should be a minimum of 1-foot below the lowest adjacent grade.

The rockery face shall slope toward the bank being protected at not steeper than 1H:6V, but not flatter than 1H:3V. The rocks should be placed so that there are no continuous joint planes in the vertical or lateral direction. Each rock must bear solidly on two or more rocks below it and so there is no sign of instability such as "rocking" or "tipping" of individual boulders. The rocks should fit so no open spaces or voids larger than 6 inches exist. Rocks should be placed so that there is some bearing between flat rock faces, rather than on points. Horizontal or nearly horizontal joints should slope downward into the material protected (away from the rockery face).

A drainage envelope of quarry spalls should be used behind the rockery rocks to block spaces and, where necessary, to wedge between rocks and to lock them together. This should also serve to prevent washing of backfill material through the rockery.

Soil Nail

We understand cut walls up to 12 feet in height may be required near lots 1 and Tracts B and E. A tieback wall constructed top down, is typically the most economic, provided the soils are suitable.

We are providing geotechnical design criteria for a soil nail wall in accordance with the Federal Highway Administration (FHWA) Geotechnical Engineering Circular #4, Ground Anchors and Anchored Systems. Based on the geology observed and subsurface conditions encountered in our borings we recommend the following values be used in the soil nail wall design:

Moist Soil Unit Weight: 135 pcf
Effective Soil Friction Angle: 36 degrees
Effective Soil Cohesion: 0 psf
Ultimate Load Transfer Rate (6-inch diameter): 6 kips per lineal foot
Construction Surcharge Loading: 500 psf
Allowable Bearing Capacity: 3,500 psf

These values assume the soils encountered in the borings are representative of the soils encountered during drilling. A minimum 6-inch diameter soil nail size was also assumed. We were not provided with construction sequencing or potential vehicle loads. If loads greater than 500 psf are anticipated above the wall during construction, they should be included in the design.

Soil Nail Installation

Soil nails are typically installed using top down construction methods. Soil nail spacing is typically between 4 and 6 feet on center with the top row of nails installed between 2 and 4 feet below the top of the wall. The nails are typically inclined at a down angle of 15 degrees but can be designed for other angles if necessary.

We anticipate the dense and gravelly/cobbly nature of the soils observed at the site may require casing to be advanced during drilling and then extracted as the grout is placed. We recommend positive grout head be maintained at all time during extraction of the casing to prevent collapse prior to grout set. Grout volumes should be closely monitored during installation.

A minimum of 1 verification test per soil type encountered should be performed to verify the contractor's installation methods, nail load transfer rate and the design assumptions. The verification test should be performed per the structural plans and specifications and in accordance with FHWA guidelines and should achieve at least 200 percent of the design load. A minimum of 5 percent of the production nails should be proof tested up to 150 percent of the design load in accordance with the FHWA guidelines. If nails are found to be deficient, additional testing may be required.

We recommend we review the shoring plans and layout to confirm our recommendations have been appropriately included and that during construction a representative of the owner experienced in the design and construction of soil nail walls be present to verify contractor means and methods.

Wet Weather Earthwork

Wet weather generally begins about mid-October and continues through about May, although rainy periods may occur at any time of year in the Pacific Northwest. Most of the soil material at the site contains sufficient silts/fines to produce an unstable mixture when wet. Such soils are susceptible to changes in water content, and they tend to become unstable and difficult or impossible to compact when their moisture content significantly exceeds the optimum. If earthwork at the site continues into the wet season, or if wet conditions are encountered, we recommend the following:

- The ground surface in and surrounding the construction area should be sloped as much as possible to promote runoff of precipitation away from work areas and to prevent ponding of water.
- Earthwork should be accomplished in small sections to minimize exposure to wet conditions. That is, each section should be small enough so that the removal of unsuitable soils and placement and compaction of clean structural fill can be accomplished on the same day. The size of construction equipment may have to be limited to prevent soil disturbance. It may be necessary to excavate soils with a backhoe, or equivalent, located so that equipment does not traffic over the excavated area. Thus, subgrade disturbance caused by equipment traffic will be minimized.
- Fill material should consist of clean, well-graded, pit-run sand and gravel soils, of which not more than 5 percent fines by dry weight passes the No. 200 mesh sieve, based on wet-sieving the fraction passing the ¾-inch mesh sieve. The gravel content should range from between 20 to 60 percent retained on a No. 4 mesh sieve. The fines should be non-plastic.
- No soil should be left uncompacted and exposed to moisture. A smooth-drum vibratory roller, or equivalent, should roll the surface to seal out as much water as possible.
- In-place soils or fill soils that become wet and unstable and/or too wet to suitably compact should be removed and replaced with clean, granular soil (see third bullet).
- Excavation and placement of structural fill material should be observed on a full-time basis by a geotechnical engineer (or representative) experienced in earthwork to determine that all work is being accomplished in accordance with the project specifications and our recommendations.
- Grading and earthwork should not be accomplished during periods of heavy, continuous rainfall.

We suggest that these recommendations for wet weather earthwork be included in the contract specifications.

LIMITATIONS

We have prepared this report for the Goldenwood Bellevue LLC and other members of the design team for use in evaluating a portion of this project. Subsurface conditions described herein are based on our observations of the soils encountered in our subsurface explorations and those nearby.

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they presently exist. We assume that the exploratory borings made for this project are representative of the subsurface conditions throughout the site; i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the explorations. If conditions different from those described in this report are observed or appear to be present during construction, we should be advised at once so that we can review these conditions and reconsider our recommendations, where necessary. If there is a substantial lapse of time between submission of our report and the start of work at the site, or if conditions have changed because of natural forces or construction operations at or near the site, it is recommended that this report be reviewed to determine the applicability of the conclusions and recommendations.

This report may be made available to regulatory agencies or others, but this report and conclusions should not be construed as a warranty of subsurface conditions. Subsurface conditions can vary over short distances and can change with time.

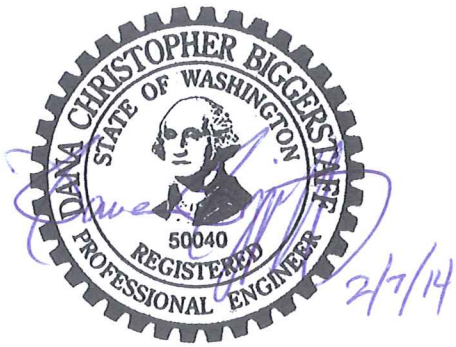
The scope of our services did not include environmental assessment or evaluation regarding the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air at the subject site other than those activities described in this report.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in this area at the time this report was prepared. No warranty, express or implied, should be understood.

◆ ◆ ◆

We have appreciated working for you on this project. Please do not hesitate to call at your earliest convenience if you have any questions or comments.

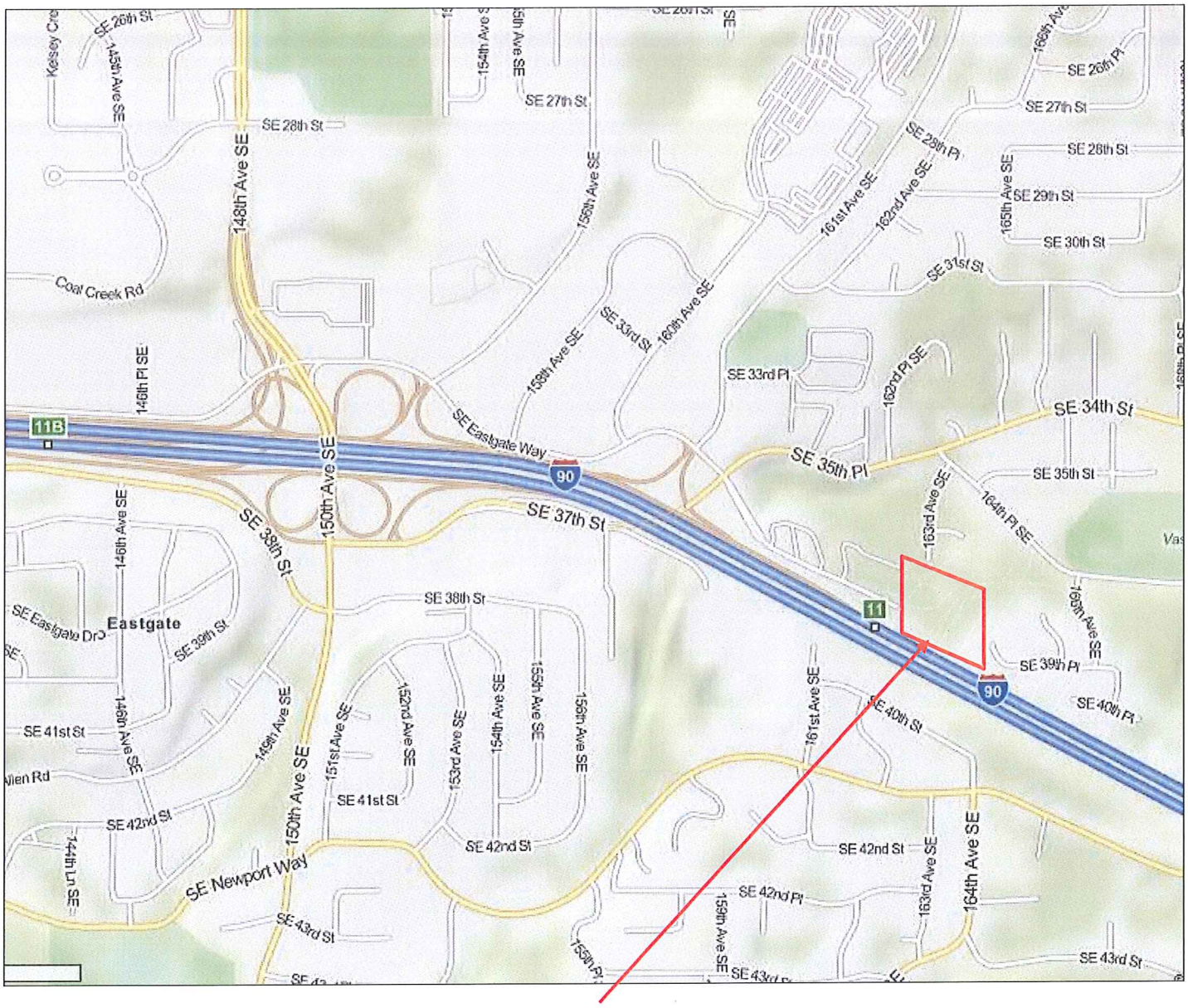
Respectfully submitted,
GeoResources, LLC



Keith S. Schembs, LEG
Principal

Dana C. Biggerstaff, PE
Senior Geotechnical Engineer

KSS:DCB:kss
Doc ID: GoldenwoodBellevueLLC.Goldenwood.RG
Attachments:
- Figure 1: Vicinity Map
- Figure 2a: Site Exploration Plan
- Figure 2b: Critical Areas Exhibit
- Figure 3: NRCS Soils Map
- Figure 4: USGS Geologic Map
- Figure 5: Structural Setback
- Figure 6: Fill Slope Construction (IBC Appendix J)
- Figure 7: Drainage Details
- Figure 8: Cut–off Drain Detail
- Appendix A:
  - Figure A-1:Unified Soil Classification System
  - Figure A-2a: Test Pits TP-1 – TP-3
  - Figure A-2b: Test Pits TP-4 – TP-6
  - Figure A-2c: Test Pits TP-7 – TP-8
  - Boring Logs B-1 through B-4



Approximate Site Location

N
W E
S

Not to Scale

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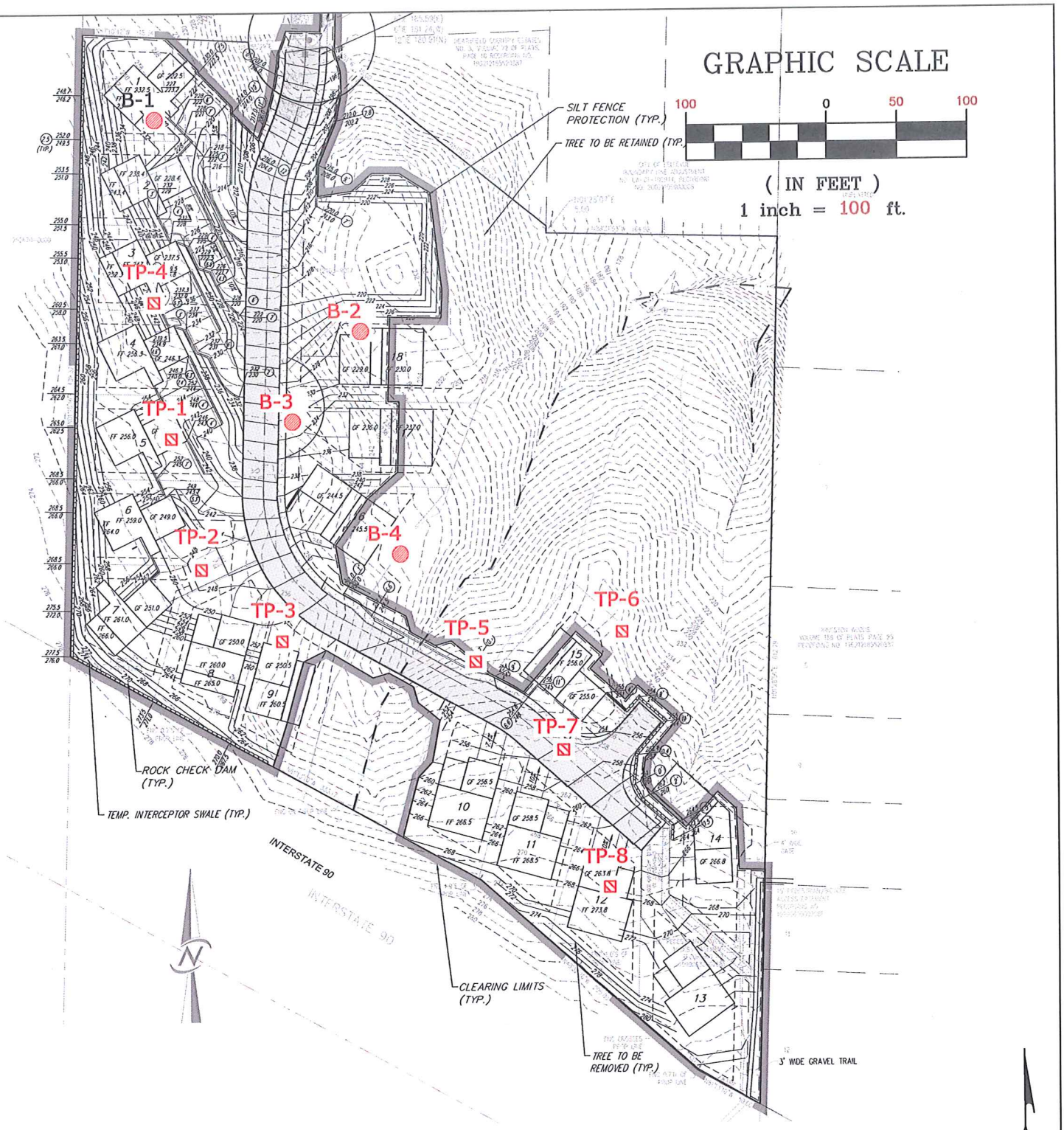
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

Site Vicinity Map
Goldenwood Plat
163rd Avenue SE
Bellevue, WA

DocID: GoldenwoodBellevueLLC.F	July 2013	Figure 1



PROPOSED TEST PIT NUMBER AND (TP-x) and BORE NUMBER (B-x) AND APPROXIMATE LOCATION

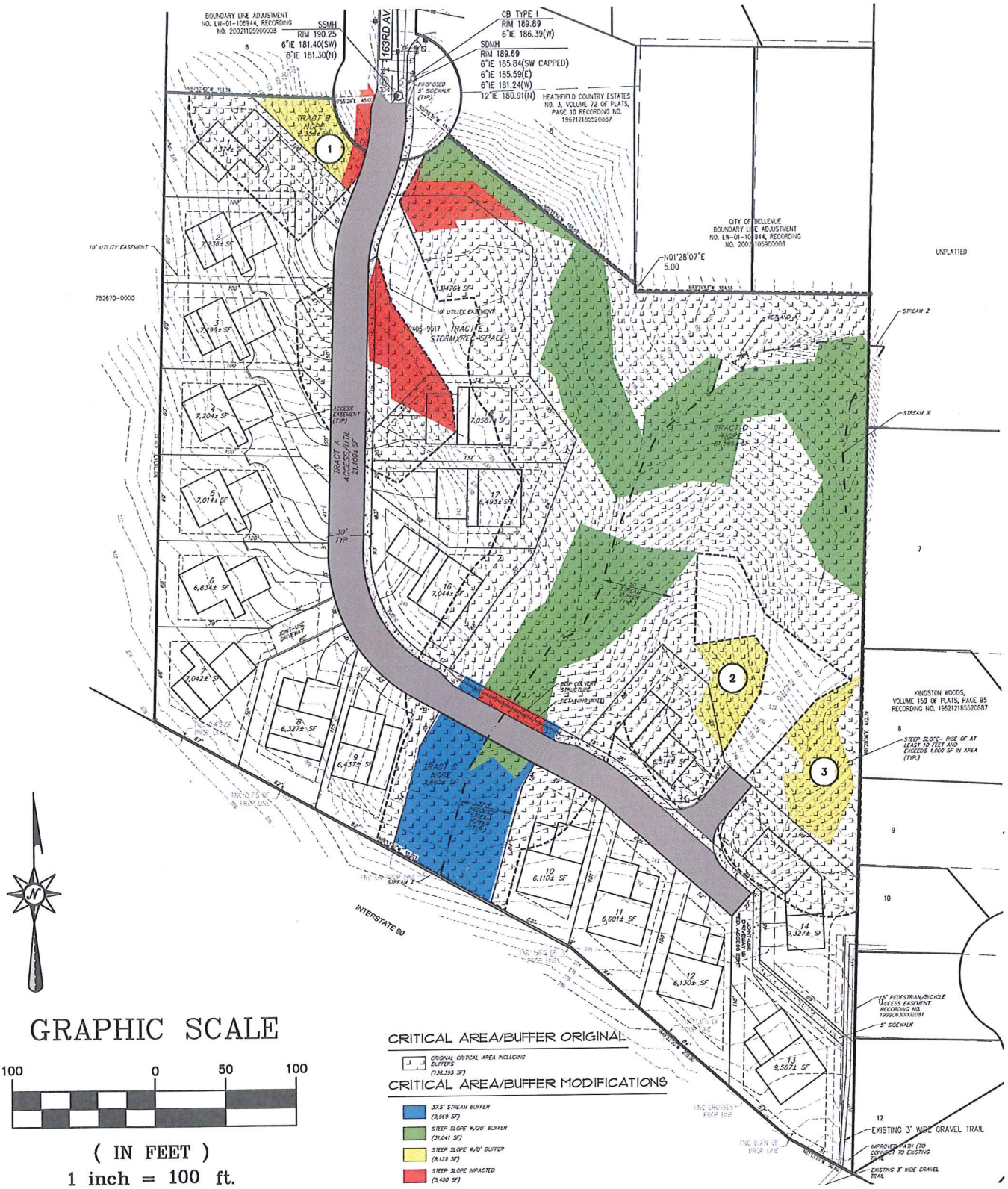
SITE SURVEY AND PLAN PROVIDED BY CORE DESIGN

GeoResources, LLC

5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Ph: (253) 896-1011 Fax: (253) 896-2633

Site and Exploration Plan
Proposed Goldenwood Plat
163rd Avenue SE
Bellevue, Washington

Job ID: GoldenwoodBellevueLLC.F	January, 2014	Figure 2a



SITE SURVEY AND PLAN PROVIDED BY CORE DESIGN

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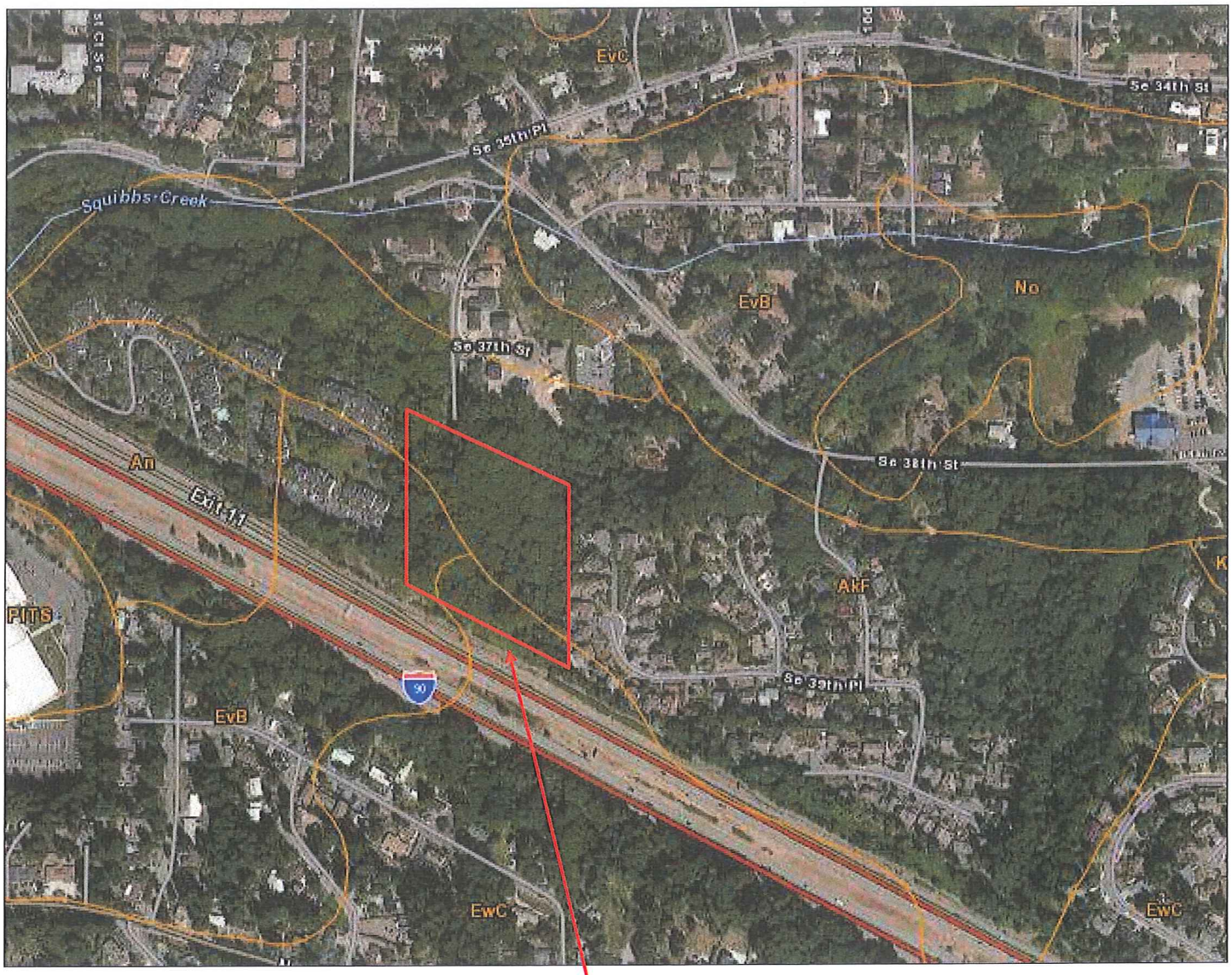
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Ph: (253) 896-1011 Fax: (253) 896-2633

Critical Area Exhibit

Proposed Goldenwood Plat

163rd Avenue SE
Bellevue, Washington

Job ID:		
GoldenwoodBellevueLLC.F	January, 2014	Figure 2b



Approximate Site Location

(map created from the USDA Natural Resource Conservation Service Web Soil Survey)

Soil Type	Soil Name	Parent Material	Slopes	Erosion Hazard	Hydrologic Soils Group
AkF	Alderwood and Kitsap Soils	Basal Till	25 - 70	Severe	B / D
EvB	Everett gravelly sandy loam	Glacial Outwash	0 - 5	Slight	A
EwC	Everett-Alderwood gravelly sandy loam	Glacial Outwash	6 - 15	Slight	A

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5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

NRCS SCS Soils Map
Goldenwood Plat
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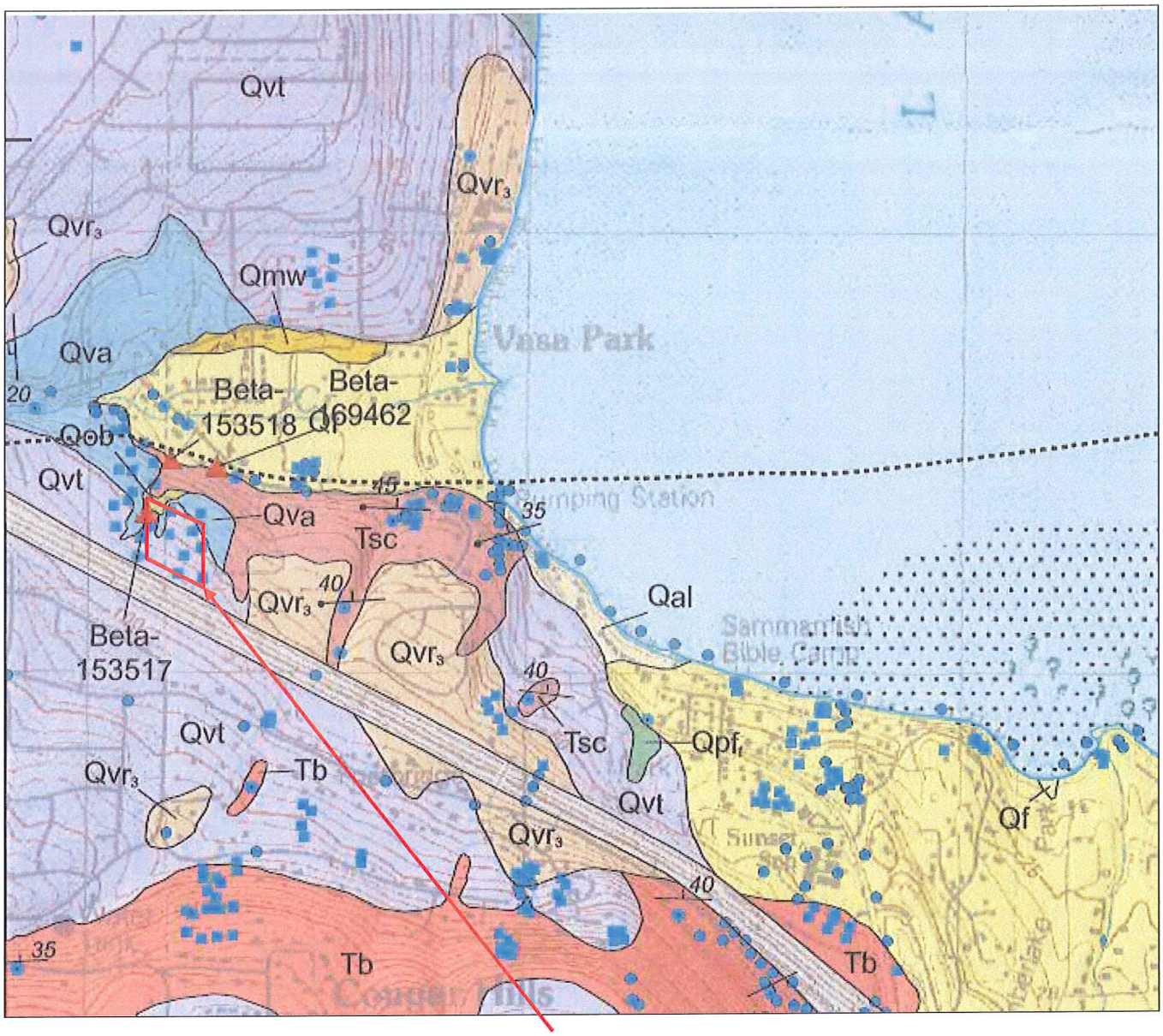
Bellevue, WA

DocID: GoldenwoodBellevueLLC.F	July 2013	Figure 3



Approximate Site Location

An excerpt from the *Geologic Map of the Issaquah 7.5' Quadrangle, King County, Washington, Washington*

By

Derek B. Booth, Timothy J. Walsh, Kathy Goetz Troost, and Scott A. Shimel, 2006

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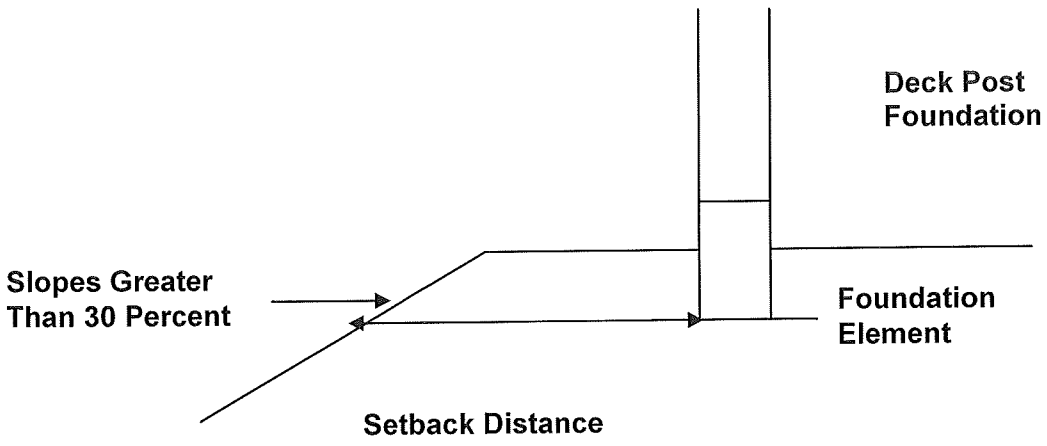
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

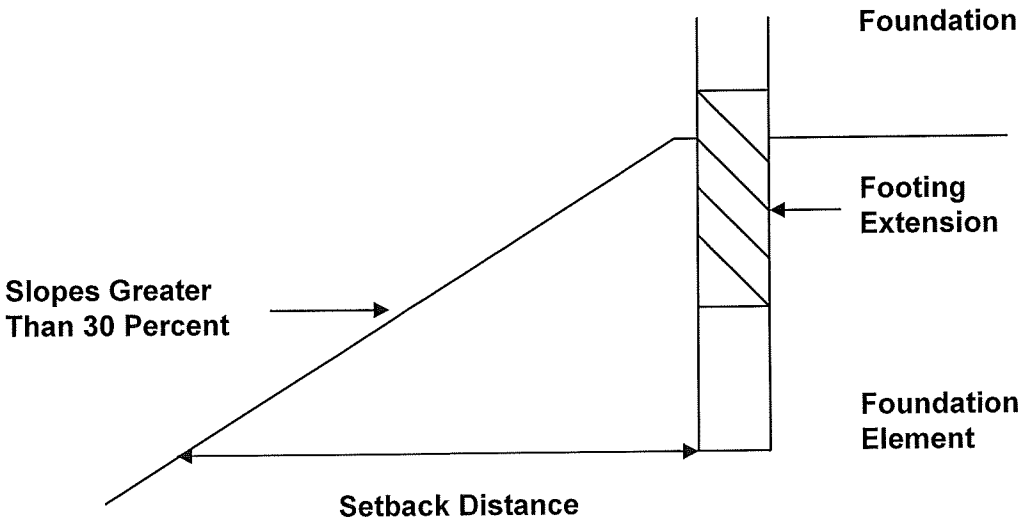
USGS Geologic Map
Goldenwood Plat
163rd Avenue SE
Bellevue, WA

DocID: GoldenwoodBellevueLLC.F	July 2013	Figure 4

Conventional Footing



Footing Extension



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Structural Setback
Goldenwood Plat
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Bellevue, WA

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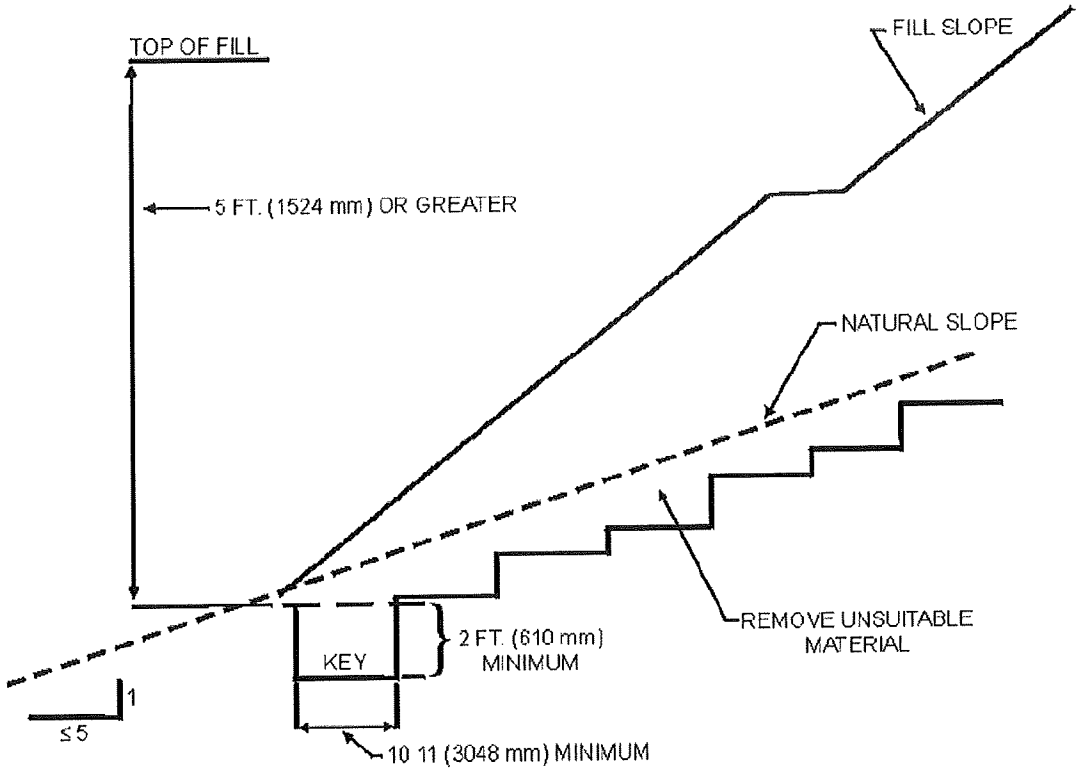

For SI: 1 foot = 304.8 mm

FIGURE J107.3
BENCHING DETAILS

GeoResources, LLC
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
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Fill Slope Construction
Goldenwood Plat
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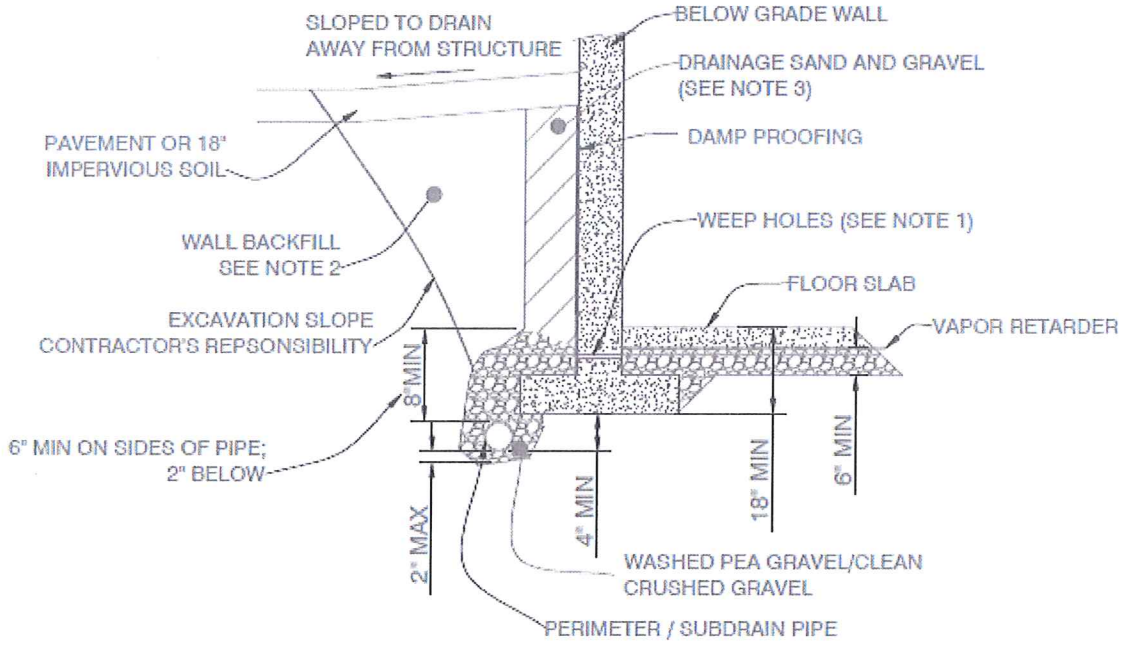
Bellevue, WA

DocID: GoldenwoodBellevueLLC.F	July 2013	Figure 6



NOTES

1. Washed pea gravel/crushed rock beneath floor slab could be hydraulically connected to perimeter/subdrain pipe. Use of 1" diameter weep holes as shown is one applicable method. Crushed gravel should consist of 3/4" minus. Washed pea gravel should consist of 3/8" to No. 8 standard sieve.

2. Wall backfill should meet WSDOT Gravel Backfill for walls Specification 9-03-12(2).

3. Drainage sand and gravel backfill within 18" of wall should be compacted with hand-operated equipment. Heavy equipment should not be used for backfill, as such equipment operated near the wall could increase lateral earth pressures and possibly damage the wall. The table below presents the drainage sand and gravel gradation.

4. All wall backfill should be placed in layers not e xceeding 4" loose thickness for light equipment and 8" for heavy equipment and should be densely compacted. Beneath paved or sidewalk areas, compact to at least 95% Modified Proctor maximum density (ASTM: 01557-70 Method C). In landscaping areas, compact to 90% minimum.

5. Drainage sand and gravel may be repl aced with a geocomposite core sheet drain placed against th e wall and connected to the subdrain pipe. The geocomposite core sheet should have a minimum transmissivity of 3 .0 gallons/minute/foot when tested under a gradient of 1.0 according to ASTM 04716.

6 The subdrain should consist of 4" diameter (minimum), slotted or perforated plastic pipe meeting the requirements of AASHTO M 304; 1/8-inch maximum slot width; 3/16- to 3/8-inch perforated pipe holes in the lower half of pipe, with lower third segment unperforated for water flow; tight joints; sloped at a minimum of 6"/100' to drain; cleanouts to be provided at regular intervals.

7. Surround subdrain pipe with 8 inches (minimum) of washed pea gravel (2" below pipe) or 5/8" minus clean crushed gravel. Washed pea gravel to be graded from 3/8-inch to No.8 standard sieve.

8. See text for floor slab subgrade preparation.

Materials

Drainage Sand and Gravel

Sieve Size	% Passing by Weight
3/4"	100
No 4	28-56
No 8	20-50
No 50	3-12
No 100	0-2

3/4" Minus Crushed Gravel

Sieve Size	% Passing by Weight
3/4"	100
1/2"	75 - 100
1/4"	0 - 25
No 100	0 - 2
(by wet sieving)	(non-plastic)

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Fife, Washington 98424
Phone: 253-896-1011
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Drainage Detail
Goldenwood Plat
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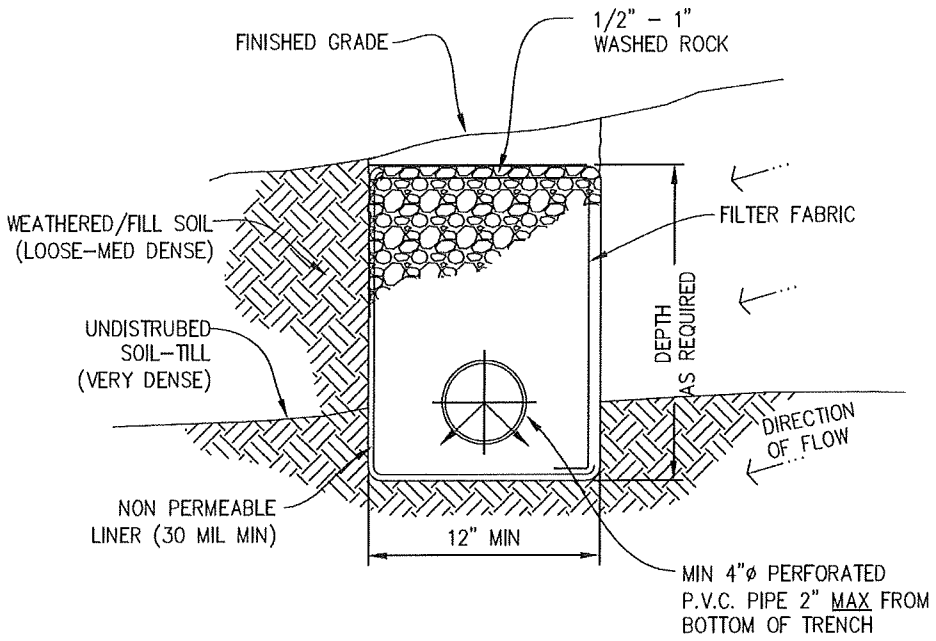
Bellevue, WA

DocID: GoldenwoodBellevueLLC.F	July 2013	Figure 7



CUTOFF DRAIN

SCALE : NTS

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5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

Cut Off Drain Detail
Goldenwood Plat
163rd Avenue SE
Bellevue, WA

DocID: GoldenwoodBellevueLLC.F	July 2013	Figure 8

Appendix A

Subsurface Explorations Logs

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS More than 50% Retained on No. 200 Sieve	GRAVEL More than 50% Of Coarse Fraction Retained on No. 4 Sieve	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND More than 50% Of Coarse Fraction Passes No. 4 Sieve	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% Passes No. 200 Sieve	SILT AND CLAY Liquid Limit Less than 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY Liquid Limit 50 or more	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-90.
2. Soil classification using laboratory tests is based on ASTM D2487-90.
3. Description of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and or test data.

SOIL MOISTURE MODIFIERS:

Dry- Absence of moisture, dry to the touch

Moist- Damp, but no visible water

Wet- Visible free water or saturated, usually soil is obtained from below water table

GeoResources, LLC
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

Soil Classification System
Goldenwood Plat
163rd Avenue SE
Bellevue, WA

DocID: GoldenwoodBellevueLLC.F	July 2013	Figure A-1

Test Pit TP-1

Location: East, lower portion of Lot 4

Depth (feet)	Soil Type	Soil Description
0 - ¾	-	Topsoil
¾ - 2	GW	Gray mottled orange, silty fine to medium SAND, with some gravel to gravelly, minor rootlets (Med dense, moist to wet) (Weathered Till)
2 - 7	GM	Gray silty gravelly SAND, with some cobbles (Dense to very dense, moist)(Glacial Till)

Terminated at 7 feet below ground surface.
No caving observed.
Groundwater seepage observed at 1 to 2 feet.

Test Pit TP-2

Location: East, lower portion of Lot 6

Depth (feet)	Soil Type	Soil Description
0 - ½	-	Topsoil
½ - 1½	SM	Brown fine sandy SILT, with some gravel, roots (loose, wet)
1½ - 3	GW	Gray mottled orange, silty fine to medium SAND, with some gravel to gravelly, minor rootlets (Med dense, moist to wet) (Weathered Till))
3 - 7	GM	Gray silty gravelly SAND, with some cobbles (Dense to very dense, moist)(Glacial Till)

Terminated at 7 feet below ground surface.
No caving observed.
Groundwater seepage observed from 1 to 2½ feet depth.

Test Pit TP-3

Location: Northeast, lower portion of Lot 7

Depth (feet)	Soil Type	Soil Description
0 - 1		Topsoil
1 - 2	SM	Brown fine sandy SILT, with some gravel, roots (loose, wet)
2 - 3	GM	Gray mottled orange, silty fine to medium SAND, with some gravel to gravelly, minor rootlets (Med dense, moist to wet) (Weathered Till)
3 - 7	GM	Gray silty gravelly SAND, with some cobbles (Dense to very dense, moist)(Glacial Till)

Terminated at 7 feet below ground surface.
No caving observed.
Groundwater seepage observed from 2 to 3 feet.

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Fax: 253-896-2633

Test Pit Logs
Goldenwood Plat
163rd Avenue SE
Bellevue, WA

Test Pit TP-4

Location: Upper, western portion of Lot 1

Depth (feet)	Soil Type	Soil Description
0 - 1	-	Topsoil
1 - 2	GM	Gray mottled orange, silty fine to medium SAND, with some gravel to gravelly, minor rootlets (Med dense, moist to wet) (Weathered Till)
2 - 7	GM	Gray silty gravelly SAND, with some cobbles (Dense to very dense, moist)(Glacial Till)

Terminated at 7 feet below ground surface.
Minor caving observed in the upper 6 feet.
No groundwater seepage.

Test Pit TP-5

Location: SW Corner of Lot 16

Depth (feet)	Soil Type	Soil Description
0 - 1	-	Forest Duff
1 - 1½	GM	Gray mottled orange, silty fine to medium SAND, with some gravel to gravelly, minor rootlets (Med dense, moist to wet) (Weathered Till)
1½ - 9	GM	Gray silty gravelly SAND, with some cobbles (Dense to very dense, moist)(Glacial Till)

Terminated at 9 feet below ground surface.
No caving observed.
No groundwater seepage or mottling observed.

Test Pit TP-6

Location: NE corner of site, ~ 50 ft west of Mason Street right of way

Depth (feet)	Soil Type	Soil Description
0 - 1	-	Forest Duff
1 - 1½	GM	Gray mottled orange, silty fine to medium SAND, with some gravel to gravelly, minor rootlets (Med dense, moist to wet) (Weathered Till)
1½ - 9	GM	Gray gravelly SAND, with some silty to silty, cobbles (Dense to very dense, moist)(Glacial Till)

Terminated at 9 feet below ground surface.
No caving observed.
No groundwater seepage observed.

GeoResources, LLC
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

Test Pit Logs
Goldenwood Plat
163rd Avenue SE
Bellevue, WA

Test Pit TP-7

Location: South center of site, between TP-1 and TP-2

Depth (feet)	Soil Type	Soil Description
0 - 1	-	Forest Duff
1 - 1½	GM	Gray mottled orange, silty fine to medium SAND, with some gravel to gravelly, minor rootlets (Med dense, moist to wet) (Weathered Till)
1½ - 4	GM	Gray silty gravelly SAND (Dense to very dense, moist)(Glacial Till)
4 - 9	GM	Gray gravelly SAND, with some silty to silty, cobbles (Dense to very dense, moist)(Glacial Till)

Terminated at 9 feet below ground surface.
No caving observed.
Perched groundwater seepage at 1½ and 5½ feet

Test Pit TP-8

Location: East center of site, west Mason Street right of way

Depth (feet)	Soil Type	Soil Description
0 - ½	-	Forest Duff
½ - 1½		Topsoil
1½ - 3½	GM	Gray mottled orange, silty fine to medium SAND, with some gravel to gravelly, minor rootlets (Med dense, moist to wet) (Weathered Till)
3½ - 8	GM	Gray silty gravelly SAND (Dense to very dense, moist)(Glacial Till)

Terminated at 8 feet below ground surface.
No caving observed.
Perched groundwater seepage at 1½ feet

Logged by: KSS/DCM **Excavated on: 4/24/2013 and 4/29/2013**

GeoResources, LLC
5007 Pacific Highway East, Suite 16
Fife, Washington 98424
Phone: 253-896-1011
Fax: 253-896-2633

Test Pit Logs
Goldenwood Plat
163rd Avenue SE
Bellevue, WA

Project No: LundgrenHm.VasaCreek

Project: Proposed Vasa Creek Plat

Client: Lundgren Homes

Site Location: 136th Ave SE, Bellevue, WA

Boring Location: Top of Slope, lot 1

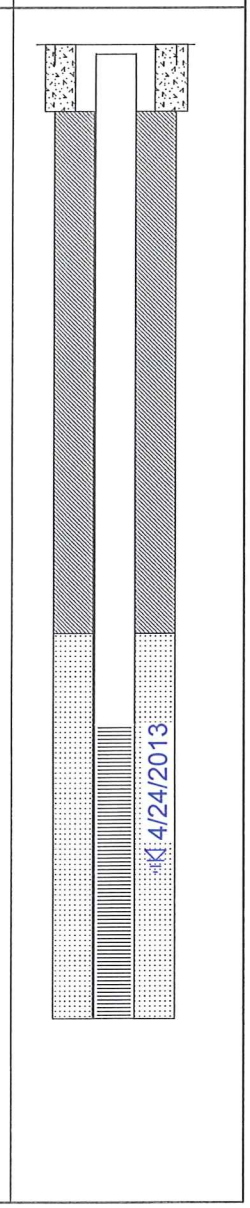
Borehole Number: B-1

Project Manager: KSS

Logged: KSS

GeoResources, LLC
5007 Pacific Hwy. E, Ste 16
Fife, Washington 98424

SUBSURFACE PROFILE				SAMPLE					
Depth (ft / m)	Depth/Elev.	Symbol	Description	Type	Blows/ft	Recovery (ft)	Standard Penetration Test (blows/foot) 0 10 20 30 40 50	Water Level	Well Construction
0 / 0			Ground Surface						
	0		Topsoil/Fill Material						
			SM Brown silty sand with some gravel (medium dense, moist)		17				
5	5		as above gravelly		22				
	6		***SM*** Tan mottled orange silty fine sand with gravel (dense, moist) (Glacial Till)						
	8		as above becomes orange/brown		32				
10					42				
15 / 5	15		Gray silty gravelly SAND (very dense, moist) (Glacial Till)		79				
	17		as above (very dense)						
20					52				
25	22		End of Borehole						



Drilled By: Boretec, Inc.
Drill Date: 4/24/2013
Drill Method: Hollow Stem Auger
Sampling Method: 2" o.d. split spoon per SPT per ASTM D1586

Unique Well Tag:

Datum:

Hole Size: 6" o.d.

Sheet: 1 of 1

Project No: LundgrenHm.VasaCreek

Project: Proposed Vasa Creek Plat

Client: Lundgren Homes

Site Location: 136th Ave SE, Bellevue, WA

Boring Location: Lower portion Lot 16

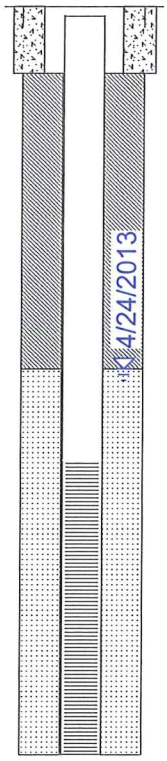
Borehole Number: B-2

Project Manager: KSS

Logged: KSS

GeoResources, LLC
5007 Pacific Hwy. E, Ste 16
Fife, Washington 98424

SUBSURFACE PROFILE				SAMPLE					
Depth (ft / m)	Depth/Elev.	Symbol	Description	Type	Blows/ft	Recovery (ft)	Standard Penetration Test (blows/foot) 0 10 20 30 40 50	Water Level	Well Construction
0 / 0			Ground Surface						
	0		Topsoil/Fill Material						
			SM Orange/brown silty sand with some gravel (loose, moist)		4				
5					9				
	8		***SM*** Tan silty fine sand with some gravel (loose, wet)		8				
10					9				
	13		(dense, moist)						
15 / 5	15		Gray silty gravelly SAND (dense, moist) (Glacial Till)		36				
	17		End of Borehole						
20									
25									



Drilled By: Boretec, Inc.
Drill Date: 4/24/2013
Drill Method: Hollow Stem Auger
Sampling Method: 2" o.d. split spoon per SPT per ASTM D1586

Unique Well Tag:

Datum:

Hole Size: 6" o.d.

Sheet: 1 of 1

Project No: LundgrenHm.VasaCreek

Project: Proposed Vasa Creek Plat

Client: Lundgren Homes

Site Location: 136th Ave SE, Bellevue, WA

Boring Location: Top of slope, Lot 15

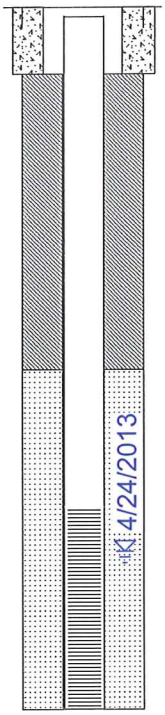
Borehole Number: B-3

Project Manager: KSS

Logged: KSS

GeoResources, LLC
5007 Pacific Hwy. E, Ste 16
Fife, Washington 98424

SUBSURFACE PROFILE				SAMPLE					
Depth (ft / m)	Depth/Elev.	Symbol	Description	Type	Blows/ft	Recovery (ft)	Standard Penetration Test (blows/foot) 0 10 20 30 40 50	Water Level	Well Construction
0 / 0			Ground Surface						
	0		Forest Duff/Topsoil						
			SM Tan light brown silty fine sand with some gravel (medium dense, moist) (Weathered Till)		24				
5	5		***SM*** Gray silty sand with some gravel (very dense, moist)		95				
					50				
10					66				
	12		***SP*** SAND (wet)						
			Gray silty gravelly SAND (very dense, moist) (Glacial Till)						
15					50				
	16		End of Borehole						
5									
20									
25									



Drilled By: Boretec, Inc.
Drill Date: 4/24/2013
Drill Method: Hollow Stem Auger
Sampling Method: 2" o.d. split spoon per SPT per ASTM D1586

Unique Well Tag:

Datum:

Hole Size: 6" o.d.

Sheet: 1 of 1

Project No: LundgrenHm.VasaCreek

Project: Proposed Vasa Creek Plat

Client: Lundgren Homes

Site Location: 136th AveSE Bellevue, WA

Boring Location: East of Lot 15, above stream buffer

Borehole Number: B-4

Project Manager: KSS

Logged: KSS

GeoResources, LLC
5007 Pacific Hwy. E, #16
Fife, Washington 98424
(253) 896-1011

SUBSURFACE PROFILE				SAMPLE					
Depth (ft / m)	Depth/Elev.	Symbol	Description	Type	Blows/ft	Recovery (%)	Standard Penetration Test (blows/foot) 0 10 20 30 40 50	Water Level	Remarks
0 / 0			Ground Surface						
	0		Forest Duff/Topsoil						
1									
2	2		**SM** Orange silty gravelly SAND (medium dense, moist) (Weathered Till)						
3 / 1					50				29,50/6"
4			**SM** Gray silty gravelly SAND (very dense, moist)						
5					50				50/6"
6 / 2									
7									
8									
9									
10 / 3					50				50/6"
11									
12									
13 / 4									
14									
15					50				50/4"
16 / 5	16		End of Borehole						No observed water
17									
18									
19									
20 / 6									
21									
22									
23 / 7									
24									
25									

Drilled By: Boretec, Inc.

Datum: -

Drill Method: Hollow Stem Auger

Hole Size: 6" o.d.

Drill Date: 4/24/2013

Sampling Method: 2"o.d. split spoon per SPT per ASTM D1586

CRITICAL AREAS STUDY

AMALANI LLC / GOLDENWOOD

JANUARY 2014

Soundview Consultants LLC

CRITICAL AREAS STUDY

AMALANI LLC / GOLDENWOOD

JANUARY 31, 2014

PROJECT LOCATION

3736 163RD AVE. SE
BELLEVUE, WA 98008
(KING COUNTY)

PREPARED FOR

AMALANI LLC
105 SOUTH MAIN STREET, SUITE 230
SEATTLE, WASHINGTON 98104

PREPARED BY

SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WASHINGTON 98335
(253) 514-8952

Soundview Consultants LLC

Executive Summary

Soundview Consultants LLC has been contracted by Amalani LLC to perform a wetland delineation and habitat assessment on one parcel located at 3736 163rd Avenue Southeast Bellevue, Washington which is proposed for a 18 unit subdivision. The subject property is situated in the Southeast ¼ of Section 11, Township 24 North, Range 5 East W.M. within King County (King County Tax Parcel Number 1124059017).

The subject property was investigated for the presence of potentially jurisdictional wetlands, potentially regulated fish and wildlife habitat, and/or priority species in the spring and summer of 2013. The site investigation identified one wetland, two streams, and one unregulated seep within the property boundaries. Both streams extend off-site to the northeast towards 164th Place Southeast. The wetland and streams are likely regulated by the Washington State Department of Ecology (Ecology), the City of Bellevue and the United States Army Corps of Engineers (USACE). The streams are also likely regulated by the Washington State Department of Fish and Wildlife (WDFW).

The wetland identified is a Palustrine Emergent /Scrub-Shrub seasonally saturated wetland (PEM/SSB). It is approximately fifty three (53) square feet sloped and it is associated with a small embayment of the primary stream. The wetland is dominated by English ivy and devils club. The streams identified on-site are non-fish bearing and likely experience only seasonal flow from seeps and surface-water from Interstate 90, which is adjacent to the property. The two streams converge off-site and eventually drain into a road side ditch along 164th Place Southeast before entering a catch basin and stormwater system. Buffer areas for these hydrologic features are undeveloped but have been impacted by previous logging practices and non-native invasive plant species. The identified wetland and streams on-site do not likely contain sensitive plant, fish, or wildlife species.

Approximately twelve (12) percent of the site is encumbered by regulated hydrologic features and associated buffers. In addition, the site contains several areas with steep slopes which will likely have associated buffers. Any potential future project designs should include careful site planning in order to avoid impacts to sensitive areas. Future proposed project actions will be mitigated for as necessary.

Wetland/Stream Name	Size (on-site)	Category / Type*	Regulated Under Bellevue Land Use Code Title 20.25H	Regulated Under RCW 90.48	Regulated Under Clean Water Act
Wetland A	53 sf	IV	No	Yes	Yes
Stream X	541 lf	Ns (N)	Yes	Yes	Yes
Seep Y	80 lf	None	No	No	No
Stream Z	91 lf	Np (N)	Yes	Yes	Yes

* Current Ecology & DNR wetland rating & stream typing methods and definitions. Bellevue Land Use Code ratings shown in parenthesis.

Wetland Delineation Map

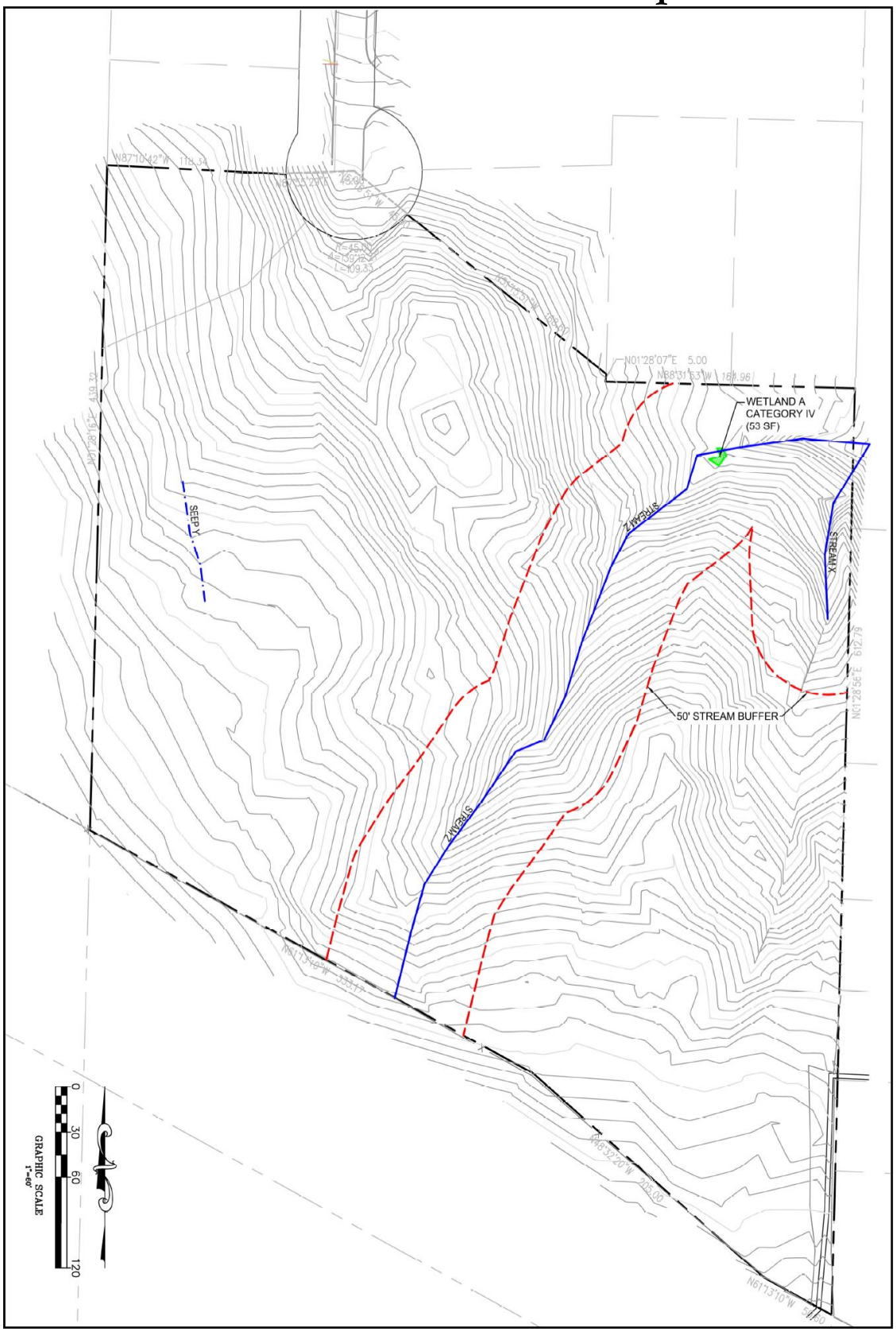


Table of Contents

Chapter 1. Introduction 1
Chapter 2. Project Location 2
2.1 Location 2
2.2 Project Description 3
Chapter 3. Methods 4
Chapter 4. Existing Conditions 6
4.1 Landscape Setting 6
4.2 Wetlands 7
4.3 Streams/Drainages 11
Chapter 5. Conclusion and Recommendations 14
5.1 Descriptions of Wetland, Streams, and Stream Crossing 14
5.2 Jurisdictional Assessment 16
Chapter 6. Mitigation and Vegetation Management Plan 18
6.1 Mitigation Sequencing 18
6.2 Description of Impacts 19
6.3 Mitigation Strategy 20
6.5 Planting Specifications 20
6.6 Maintenance & Monitoring 23
6.7 Goals, Objectives and Performance Standards 24
6.8 Contingency Plans 24
Chapter 7. References 26
Appendix A — Methods and Tools 1

Figures

Figure 1. Vicinity Map 2
Figure 2. Aerial Photograph of the Subject Property. 6

Tables

Table 1. Wetlands on the Subject Property. 7
Table 2. Wetland A Summary 8
Table 3. Precipitation Summary[1] 9
Table 4. Functions and Values of Existing Wetlands. 10
Table 5. Stream Information Summary – Stream X. 12
Table 6. Stream Information Summary – Stream Z. 13

Appendices

Appendix A — Methods and Tools
Appendix B — Background Information
Appendix C — Site Inventory
Appendix D — Wetland Delineation Data Sheets
Appendix E — Wetland Rating Forms
Appendix F — Qualifications

Chapter 1. Introduction

Soundview Consultants LLC has been contracted by Amalani LLC to perform a wetland delineation and habitat assessment on one 5.8 acre site located at 3736 163rd Avenue Southeast Bellevue, Washington. The site is proposed for a single family residential sub-division. The project is situated on one parcel in the Southeast ¼ of Section 11, Township 24 North, Range 5 East W.M. within King County (King County Tax Parcel Number 1124059017).

Access to the site is provided via 163rd Avenue Southeast to the north. Full development of the site is limited by a small federally regulated wetland, low functioning streams and associated buffers. A stream crossing will be necessary to provide appropriate access to upland areas within the site. However, through careful site assessment and planning efforts, major stream impacts will be avoided by limiting the extent and location of the crossing to avoid the most sensitive areas and constructing the footings upland of Ordinary High Water (OHW). Non-compensatory mitigation for stream buffer impacts will be provided through buffer averaging, restoration actions, and protective measures. Such actions would likely result in a meaningful benefit the overall function of the Cedar-Sammamish watershed in comparison to existing site conditions which show signs of degradation through non-native invasive plant species.

The purpose of this critical areas study is to document the presence of jurisdictional wetlands and regulated fish and wildlife habitat on or near the subject property, and to assess potential impacts to these critical areas from potential future site development and provide recommendations to minimize impacts. This report provides conclusions, recommendations, and specifications regarding:

- Site description, and area of assessment;
- Background research and identification of potentially regulated critical areas and habitats within the vicinity of the project;
- Identification, delineation, and assessment of regulated wetlands and water bodies;
- Identification and assessment of regulated fish and wildlife habitat and/or priority species located on or near the subject property;
- Standard buffer recommendations, building setbacks, and development limitations;
- Existing conditions site map detailing identified critical areas and standard buffers;
- Documentation of recommended wetland and stream avoidance, minimization, and mitigation measures; and
- Supplemental information necessary for Federal, State, and local regulatory review.

Chapter 2. Project Location

2.1 Location

The proposed project is located at 3736 163rd Avenue Southeast Bellevue, Washington. The project is situated on one parcel in the Southeast ¼ of Section 11, Township 24 North, Range 5 East W.M. within King County (King County Tax Parcel Number 1124059017).

To access the site from Interstate 5 northbound, take exit 154B and merge onto Interstate 405 northbound towards Renton/Bellevue; proceed 10.7 miles and take exit 11 and merge onto Interstate 90 eastbound toward Spokane; proceed 1.3 miles then take exit 11A for 150th Avenue Southeast. Keep right for Southeast 37th Street; proceed 0.3 mile onto Southeast 37th Street; proceed for 0.6 mile and continue onto Southeast 35th Place; proceed 0.3 miles and turn right onto 164th Place Southeast; proceed 154 feet and turn right onto 163rd Avenue Southeast. The subject property is located on the left, or east side of 163rd Avenue Southeast.

Figure 1. Vicinity Map of Site Location.

2.2 Project Description

The project proposes to develop most of an approximately 5.82-acre site with a residential plat; the buildable area on-site totals 2.75-acreas. The purpose of the project is to provide single-family residences within the City of Bellevue's Urban Growth Boundary. The proposed project includes eighteen (18) residential units with a road that dead ends on the plat, driveways, parking areas, a stream crossing, stormwater detention tract, and associated utilities and infrastructure. Of the 5.82-acre site, there is an estimated 3.07 acres in critical habitat and buffer areas and an estimate of 2.75-acres in buildable areas. The amount of impervious area on the project site will be less than the amount of area left undeveloped.

The streams, wetlands, and associated buffers located on the subject property have not been developed. The existing vegetation consists of coniferous and deciduous trees consisting of western red cedar, Douglas fir, big-leaf maple and aspen over vine maple, salmonberry, red huckleberry, Indian plum, twinberry, salal, and Oregon grape. Groundcover within these areas consists of sword fern, English ivy, and trailing blackberry. To improve critical area and buffer functions, the project proposes to remove and control non-native invasive vegetation using herbicidal treatment (BLUC 20.25H.055) and minor excavation of non-native vegetation rhizomal mats within designated buffer areas. Large trees within the buffer areas will not be disturbed but will be maintained to ensure species are not overtaken by English ivy or Himalayan blackberry in the future.

Stream Z bisects the project property into eastern and western portions, making it necessary to develop a stream crossing to allow property access and meet project goals. Aside from the actions listed above, there is very little development that will occur inside the stream and wetland buffer area. The area around the culvert near the Interstate 90 right-of-way will have minimal buffer protection. The buffer downstream of the culvert will be protected and enhanced, and the project is designed to avoid critical fish and wildlife habitat areas to the greatest extent possible.

Chapter 3. Methods

The methods used to successfully comply with Federal, State, and local assessment requirements are detailed below. Please see Appendix A for further details of methods used in this report.

Wetlands, drainages, and other potentially regulated fish and wildlife habitat within the subject property boundaries were delineated and assessed by a qualified wetlands specialist during the spring and summer of 2013. All potentially regulated areas were inspected on multiple occasions with special emphasis given to the boundaries of the wetlands and hydrology of the streams. All wetland and OHW determinations were made using observable vegetation, hydrology, and soils in conjunction with data from the National Wetland Inventory, King County Geographic Information Services, maps of the U.S. Fish and Wildlife Service, the Soil Survey of King County (Snyder, Gale, and Pringle, 1973), and various aerial photographs. See Appendix B for maps detailing background data such as soils, topography, and resource inventories.

Wetland boundaries were determined using the routine approach described in the Washington State Wetlands Identification and Delineation Manual (Ecology, 1997) and U.S. Army Corps of Engineers' Wetlands Delineation Manual (USACE, 1987) and modified according to the guidelines established in the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (USACE, 2008). The OHW was determined using Ecology's method as detailed in Determining the Ordinary High Water Mark on Streams in Washington State (Olson, 2008) and definitions provided in RCW 77.55.011 (11) and WAC 220.110.020 (69).

The wetland boundary, streams and all other potentially regulated features were inspected, delineated and surveyed over several dates between April 11, 2013 and June 23, 2013. To mark the boundary between wetlands and uplands, orange surveyor's flagging was alpha-numerically labeled and tied to vegetation or wood lath along the wetland boundary. To mark the points where data was collected, pink surveyor's flagging was alpha-numerically labeled and tied at each sampling location. To mark the centerline of potential hydrologic channels, blue surveyor's flagging was alpha-numerically labeled and tied to vegetation. Due to the consistently narrow width of both streams, the OHW was determined to be a width offset from the centerline of each channel. The locations and features of the wetland, and streams are described in Chapter 4, and shown on plan sheets in Appendix C.

The wetland was classified using both the hydrogeomorphic (Brinson, 1993) and Cowardin (Cowardin, 1979) classification systems, and assessed using the Wetland Functions Characterization Tool for Linear Projects (WSDOT, 2000). Following classification and assessment, the wetland was rated and categorized using both the Washington State Wetlands Rating System for Western Washington – Revised (Hruby, 2004) and the definitions established in the Bellevue Land Use Code (LUC) Title 20.25H which follows the Washington State Wetlands Rating System (Hruby, 2004) but has a size threshold which the wetland does not meet. Streams and surface water features were classified using both the Washington Department of Natural Resources Water Typing System as outlined in described in the Washington Administrative Code (WAC) Section 222-16 and the guidelines established in the Bellevue LUC Title 20.25H.075.

The fish and wildlife habitat assessment was conducted by a qualified biologist during the same site visits. Publicly available background data was queried for documented wildlife observations and/or

the presence of potentially regulated fish and wildlife habitat on or near the site. In addition, high-resolution aerial photography of the surrounding area was carefully examined. Visual observations using stationary and walking survey methods were utilized for both aquatic and upland habitats. Any special habitat features or signs of wildlife activity were noted, and these areas were thoroughly re-inspected during morning, midday, and evening hours.

Impact avoidance areas were examined during the initial site assessment by the project biologist. Limiting factors were identified for use in subsequent site planning efforts, and in preliminary mitigation planning. Site hydrology was then examined more closely in subsequent site inspections by the project geologist and biologist to verify regulatory features.

Chapter 4. Existing Conditions

4.1 Landscape Setting

The subject property is primarily undeveloped vacant land. Surrounding areas contain residential use areas to the north, east, and west. To the west are multi-family units, to the east is a subdivision, and to the north are single-family residences and the Eastside Christian Community Church. The south side of the parcel abuts the right-of-way to Interstate 90.

The site is elevated above the 163th Avenue residences located to the north and is zoned for single-family residence under Bellevue Land Use Code (BLUC). The topography of the site consists of a draw sloping from the south central portion to the northeast portion of the parcel forming upland ridges on the west side and eastern corner. The lower areas of the draws contain Wetland A and Streams X and Z. Water from the streams converge off-site and flow into a road side ditch along 164th Place Southeast, then into a catch basin located at the corner of 164th Place Southeast and 166th Avenue Southeast, which likely drains into Lake Sammamish. The catch basin functions as a downstream fish barrier; in addition, on-site steep slopes and subsurface flows also present fish passage barriers.

Figure 2. Aerial Photograph of the Subject Property.

The upland areas consist of second and third-growth mixed coniferous and deciduous forest. The upland vegetation in the forested areas of the subject property contains western red cedar, Douglas fir, big-leaf maple and aspen over vine maple, salmonberry, red huckleberry, Indian plum, twinberry, salal, and Oregon grape. Groundcover within these areas consists of sword fern, English ivy, trailing blackberry, and youth-on-age.

4.2 Wetlands

4.2.1 Overview

The site investigation identified one locally non-regulated wetland on the subject property (Appendix C). The wetland identified contains indicators of wetland hydrology, hydric soils, and a predominance of hydrophytic vegetation; however, the wetland is found to be below the size threshold (2,500 square feet) necessary for regulation under BLUC 20.25H.095. Table 1 summarizes the wetland identified on the subject property.

Wetland A is 53 square feet (0.001 acre) in size, and is located in the northeast portion of the subject property adjacent to a relic logging road. Hydrology for Wetland A is provided by seeps and direct perception. The dominant vegetation in this wetland is devils club, salmonberry, and lady fern over English ivy, youth-on-age, and about two percent reed canarygrass. The wetland is classified as a Palustrine Saturated Emergent/Shrub Scrub wetland, and is located adjacent to a stream. Under BLUC 20.25H.095, Wetland A is below the 2,500 square foot threshold for even a Category IV wetland, meaning it does not have an associated buffer; however, it is located in the stream buffer of Stream Z and therefore is nonetheless protected by approximately 25 feet of buffer on all sides. Table 2 provides a detailed summary of Wetland A.

Appendix B includes a USFWS National Wetland Inventory map (B1), King County GIS Data (B2), USGS Topographic Map (King County iMAP) (B3), NRCS Soil Survey map (B4), and Washington Department of Fish and Wildlife (WDFW) Salmonid Distribution Map (B5). Appendices D through G document the delineation and assessment of the wetland including wetland delineation data sheets (Appendix D), and wetland rating forms (Appendix E).

Table 1. Wetlands on the Subject Property.

Wetland	Predominant Wetland Classification / Rating				Wetland Size (acres)	Buffer Width (feet)[E]
	Cowardin[A]	HGM[B]	Ecology[C]	City of Bellevue[D]		
A	PEM/SSB	Slope	IV	NA	0.001	NA

Notes:

A. Cowardin et al. (1979) or National Wetland Inventory (NWI) Class based on vegetation: PEM = Palustrine Emergent; PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested; Modifiers (-C, -E, -H, -x, et cetera) = Water Regime or Special Situations

B. Brinson, M. M. (1993).

C. Ecology rating according to Washington State Wetland Rating System for Western Washington – Revised Hruby (2004).

D. BLUC 20.25H.095 definition (verified with Ecology 2004 rating forms).

E. BLUC 20.25H.095 standards.

Table 2. Wetland A Summary

WETLAND A – INFORMATION SUMMARY			
Location:	Southeast of Stream Z near northeastern corner		
		Local Jurisdiction	City of Bellevue
		WRIA	8
		Ecology Rating (Hruby, 2004)	IV
		Bellevue Land Use Code (20.25H.095)	NA
		City of Bellevue Buffer Width	NA
		Wetland Size	0.001 acre
		Cowardin Classification	PEM/SSB
		HGM Classification	Slope
		Wetland Data Sheet(s)	DP-3W
		Upland Data Sheet (s)	DP-4
		Boundary Flag color	Orange
Dominant Vegetation	The dominant vegetation in this wetland is English Ivy, devils club, salmonberry, youth-on-age, and lady fern.		
Soils	Alderwood and Kitsap soils, very steep.		
Hydrology	Hydrologic support for the wetland is primarily provided through spring seeps and surface runoff from upland areas.		
Rationale for Delineation	Wetland A is located at the base of a steep slope. The wetland boundary was delineated using a clear change in topography, a change between upland and hydrophytic vegetation, a slight change in soils and the presence of seep hydrology.		
Rationale for Local Rating	Wetland A is rated a Category IV using the Washington State Wetlands Rating System revised due to no hydrologic functions and very low water quality functions. Since the wetland is smaller than 2,500 square feet in size, it is below the regulatory threshold and category system under BLUC 20.25H.095.		
Wetland Functions Summary			
Water Quality	Wetland A contains a 2 to 5 percent slope and less than twenty-five (25) percent dense uncut vegetation. The opportunity to retain sediments and pollutants from stormwater runoff associated with the nearby road and development exists; however, this potential is limited due to the small size of Wetland A, degraded conditions, slope, and lack of dense vegetation.		
Hydrologic	Wetland A is a very small slope wetland located immediately south of Stream Z on the northeastern portion of the parcel. The wetland almost entirely lacks storage capacity and is only lightly vegetated; therefore hydrologic function is very limited.		
Habitat	Habitat functions provided by the wetland may include limited small avian and mammal foraging; however, minimal habitat functions are provided due to the small size, and lack of vegetation and habitat complexity.		
Buffer Condition	The area surrounding Wetland A was logged several decades ago and is primarily characterized by a mixture of deciduous and evergreen tree species over an understory of native and non-native invasive vegetation. In addition, areas east of the wetland are compromised by a relic logging road which is elevated with fill approximately fifteen feet above the wetland. Surrounding land areas provide limited screening of the wetland from outside disturbances and likely provide some water quality enhancement.		

4.2.2 Soils

The Natural Resource Conservation Service's (NRCS) Soil Survey of King County, Washington identifies three soil series' present on the subject property (Snyder, Gale, and Pringle, 1973). The main soil series identified within the subject property is Alderwood Kitsap soils with very steep slopes. Everett gravelly sandy loam with 0 to 5 percent slopes and Everett-Alderwood gravelly sandy loams with 6 to 15 percent slopes were also identified on-site but are confined to southern and southwestern portions of the site (Appendix B4). According to the survey, Alderwood-Kitsap is a moderately well drained soil formed in glacial till (Snyder, 1973) and is considered a hydric soil (NRCS, 2001). The Everett series is somewhat excessively drained soils that contain very gravelly sand at 18 to 36 inches in depth. Everett-Alderwood soils are rolling and are dominantly 6 to 10 percent and contain a consolidated substratum at a depth of 7 to 20 feet (Snyder, 1973). The NRCS Soil Survey Map is located in Appendix B4.

4.2.3 Vegetation

Vegetation within the wetland includes devils club, salmonberry and sword fern over youth-on-age and English ivy. Hydrophytic vegetation communities within the wetland contain greater than fifty (50) percent facultative wetland, and/or facultative dominant species and it scored a prevalence index of 3.0.

4.2.4 Hydrology

Hydrologic support for the wetland is primarily provided through seeps and surface runoff from upland areas. Direct precipitation and flooding from an adjacent stream may provide hydrology during the wet season. Indicators of wetland hydrology observed within the wetlands included surface water; however, free water was not observed in test pits. Soils in the wetland exhibited a thick dark surface over a nearly depleted layer; however, were not identified as a hydric soil.

4.2.5 Precipitation

Precipitation data was obtained from the National Oceanic and Atmospheric Administration (NOAA) weather station at SeaTac Airport and City of Bellevue Underground Weather station in order to obtain percent of normal precipitation during and preceding site assessments. A summary of data collected is provided in Table 3.

Table 3. Precipitation Summary[1]

Date	Day of	Day Before	1 Week Prior	2 Weeks Prior	Month To Date[2]	Water Year[3]	% of Normal[4]
4/11	0.06	0.37	3.50	3.59	3.56	32.54	unknown
4/24	0.00	0.00	1.15	2.57	5.70	34.68	unknown
5/02	0.00	0.00	0.19	1.34	0.00	36.21	0/115
5/06	0.00	0.00	0.15	0.19	0.00	36.21	0/115
5/08	0.00	0.00	0.00	0.19	0.00	36.21	0/115
6/23	0.31	0.00	0.14	0.15	0.50	39.09	775/92

1. Data obtained from NOAA weather station at SeaTac Airport (http://www.weather.gov/climate/index.php?wfo=sew) and underground weather (http://www.wunderground.com/weather-forecast/US/WA/Bellevue.html).
2. Precipitation for the month is the same as for the Year-to-Date.
3. Water Year is precipitation from October 1, 2012.
4. Percent of normal is shown as for the day/for the year.

The precipitation data (Table 3) shows that precipitation quantities varied between site visits but at least some precipitation had fallen within two weeks prior to each site visit. In addition, rainfall conditions were above normal for the year, when the delineation was conducted.

4.2.6 Wetland Functions

Wetland A contains a two (2) to five (5) percent slope and less than twenty-five (25) percent dense uncut vegetation. The wetland has the opportunity to retain sediments and pollutants from stormwater runoff associated with the nearby road and development; however, the potential is limited due to the small size, slope and lack of dense vegetation in Wetland A. The wetland almost entirely lacks storage capacity and is only lightly vegetated; therefore, hydrologic function is very limited. Habitat functions provided by the wetland may include limited small avian and mammal foraging. Minimal habitat functions are provided due to the small size, lack of vegetation, and habitat complexity.

Table 4. Functions and Values of Existing Wetlands.

Function / Value[A]	Wetland
	A
Water Quality Functions	
Sediment Removal	-
Nutrient and Toxicant Removal	-
Hydrologic Functions	
Flood Flow Alteration	-
Erosion Control & Shoreline Stabilization	-
Habitat Functions	
Production & Export of Organic Matter	-
General Habitat Suitability	x
Habitat for Aquatic Invertebrates	x
Habitat for Amphibians	x
Habitat for Wetland-Associated Mammals	x
Habitat for Wetland-Associated Birds	x
General Fish Habitat	-
Native Plant Richness	-
Special Characteristics	
Educational or Scientific Value	-
Uniqueness and Heritage	-

[A]: A 'dash' means that the function is not present; "x" means that the function is present, but is of lower quality; and "+" means the function is present and is of higher quality.

4.2.7 Wetland Buffer

Under BLUC 20.25H.095, Wetland A is an unregulated wetland as it is less than 2,500 square feet; therefore, it does not require a buffer under BLUC. However, because the wetland is located inside the Stream Z buffer it is protected by approximately fifty (50) feet of buffer on all sides. While the stream buffer is mostly undeveloped and contains some native plant species, it has been impacted by historic forest practices, proximity of a relic logging road, and is dominated by the non-native invasive plant species, English ivy (see below discussion).

4.3 Streams/Drainages

The site investigation identified two unnamed streams (identified herein as Stream X and Stream Z) located within the northeastern portion of the subject property (Appendix C) and one unregulated seep (Seep Y). Both on-site streams were identified as Type O non-fish bearing waterbodies (BLUC 20.25H.075.B.4) as they are not inventoried as shorelines of the state (Type S), they do not contain fish or fish habitat (Type F), nor are they physically connected to a type S or Type F stream by an above ground channel (Type N). Even though Soundview Consultants LLC identified Streams X and Z as Type-O non-fish-bearing Waterbodies, they will be treated as Type-N streams in accordance with recommendations provided by the City of Bellevue. The standard buffer for Type N streams includes a fifty (50) foot buffer with a fifteen (15) foot structure setback. The project proposed buffer averaging which is further described in Section 5.1.3 of this report.

4.3.1 Stream X

Stream X begins near the northeastern portion of the subject property where a seep emerges from the substrate. Stream X carries persistent flow for approximately ninety (90) feet before the feature travels off-site and converges with Stream Z. Within the subject property, the narrow OHW of this stream covers approximately one hundred (100) square feet (Appendix C). The stream begins approximately ninety (90) feet inside the eastern boundary of the subject property in the northeast corner. Upland areas south of Stream X contain signs of a potential wash that was dry during the assessment. Soundview Consultants LLC conducted six (6) total site visits to assess potential hydrology. No hydrology was identified aside from several minor areas of saturated soils (likely arising from seeps) in this southernmost area.

On-site, Stream X is a narrow channel approximately one to two feet wide and approximately three to five inches deep; flow is likely seasonal. No fish habitat was identified within Stream X due to broken surface flows where water occasionally flows subsurface as well as other fish barriers including steep slopes. Under BLUC 20.25H.075, Stream X will be treated as a Type N stream subject to a fifty (50) foot buffer and setback of fifteen (15) feet. Table 5 (below) provides a detailed summary of Stream X.

Table 5. Stream Information Summary – Stream X.

STREAM X INFORMATION SUMMARY		
	Stream Name	Stream X
	WRIA	8
	WA Stream Catalog #	NA
	Local Jurisdiction	City of Bellevue
	DNR Stream Type	Type Ns
	Local Stream Rating	Type N
	Buffer Width	50 feet
	Documented Fish Use	None
Location of Stream	The stream originates from a seep in the northeastern corner of the property, east of both the wetland and Stream Z, and flows east.	
Connectivity (where stream flows from/to)	The stream flows off-site to the east where it connects with Stream Z which eventually flows in to a roadside ditch and catch basin located on 164th Place SE. The catch basin likely flows into Lake Sammamish, which is fish bearing.	
Riparian/Buffer Condition	The stream buffer is undeveloped but has been impacted by historic forest practices (i.e. logging) and contains both native and some non-native vegetation.	

4.3.2 Stream Z

Stream Z begins off-site at the upper southern portion of a draw where an Interstate 90 culverted storm-drain outfalls just south of the parcel boundary. Stream Z continues across the site at a northeastern angle before exiting the site in the northeast corner of the parcel where it converges with Stream X. The converged streams then flow into a road side ditch along 164th Place Southeast, then into a catch basin located at the corner of 164th Place Southeast and 166th Avenue Southeast, which likely drains into Lake Sammamish.

Throughout the on-site reach, several seeps contribute hydrology which gradually causes an increase in flow moving northeast down the draw. Within the subject property, the narrow OHW of this stream likely covers approximately 1,500 square feet (Appendix C). Stream Z intermittently flows within a shallow channel approximately three (3) feet wide by six (6) to eight (8) inches deep. No fish habitat was identified within Stream Z due to low flows, steep slopes and other fish barriers, including broken surface flows where water occasionally flows subsurface, a chain-link fence at the

southern parcel boundary, a catch basin downstream, and debris (a piece of a car was removed from the stream during geotechnical analysis). Under BLUC 20.25H.075, Stream Z is a Type O but will be treated as a Type N stream per the City of Bellevue's recommendation and subject to 50-foot buffer. Table 6 (below) provides a detailed summary of this stream.

Table 6. Stream Information Summary – Stream Z.

STREAM Z INFORMATION SUMMARY		
	Stream Name	Stream Z
	WRIA	8
	WA Stream Catalog #	NA
	Local Jurisdiction	City of Bellevue
	DNR Stream Type	Type Np
	Local Stream Rating	Type N
	Buffer Width	50 feet
	Documented Fish Use	none
Location of Stream	Stream Z begins at the upper southern portion of the draw and travels the length of the parcel, continuing off-site in the northeastern corner.	
Connectivity (where stream flows from/to)	Stream Z originates from a culvert coming off of Interstate 90. The stream travels the length of the parcel and continues off-site in the northeastern corner and meets with Stream X. The streams flow in to a roadside ditch and catch basin located on 164th Place SE. The catch basin likely flows into Lake Sammamish, which is fish bearing.	
Riparian/Buffer Condition	The stream buffer is mostly undeveloped and contains some native plant species. However, it has been impacted by historic forest practices, contains a relic logging road and is dominated by English ivy.	

4.3.3 Stream Buffers

Streams X and Z are being treated as Type N streams as requested by the City of Bellevue (BLUC 20.25H.075.B3); according to buffer requirements for streams under BLUC 20.25H.035 Type N waters require a fifty (50) foot buffer on both developed and undeveloped sites. In addition, Type N waters require a fifteen (15) foot structure setback on undeveloped sites and do not require a buffer setback on developed sites.

Both on-site stream buffers are mostly undeveloped and contain some native plant species. However, buffers have been impacted by historic forest practices, contains a relic logging road and significant portions are dominated by English Ivy. Allowed development activities within critical areas and associated buffers under BLUC are assessed below in Chapter 5.

Chapter 5. Conclusion and Recommendations

The proposed project is located in the City of Bellevue, approximately 0.4 mile west of Lake Sammamish. The results of the 2013 site investigations identified one wetland, two streams, and one seep. Both streams span onto off-site areas. The on-site wetland is a small slope wetland that is undeveloped and predominately undisturbed aside from past logging practices. The on-site wetland only comprises approximately fifty-three (53) square feet (0.01 acre) and wetlands, streams, and corresponding buffers encumber approximately twelve (12) percent of the site. The wetland is adjacent to Stream Z and may have a surface connection to the stream during heavy rains. All on-site hydrologic features likely drain to a roadside ditch and catch basin located on 164th Place Southeast which likely enters Lake Sammamish (waters of the state). Therefore, all hydrologic features, aside from Seep Y, likely have a Federal jurisdictional under the Clean Water Act.

5.1 Descriptions of Wetland, Streams, and Stream Crossing

BLUC has adopted the Ecology's wetland rating system published August 2004 (BLUC 20.25H.095) but has an additional size threshold for locally regulated wetland features. The on-site wetland is a Category IV wetland by Ecology's wetland rating system but is under the 2,500 square foot size threshold for City of Bellevue wetlands (BLUC 20.25H.095.B.4) and therefore is not regulated nor does it require a buffer.

Due to the twelve (12) percent site encumbrance by wetlands, streams and associated buffers, and as a result of Stream Z bisecting the property, development will require a stream crossing and buffer averaging which will be designed via mechanisms described at BLUC 20.25H.075.C.2. Strategic project planning will likely allow the preservation and protection of the wetland and stream features aside from a stream crossing point which has been designed to avoid impacts below OHW and protect downstream hydrology. All critical areas impacts proposed under the site development plan will be mitigated.

5.1.1 Stream Descriptions

Two non fish-bearing streams (X and Z) were identified on-site. In addition, a seep (herein identified as Y) was identified on the western portion of the parcel but does not contain the characteristics of a regulated drainage or wetland. Stream X is located in the northeastern corner of the subject property. Stream Z bisects the project site, which leaves the eastern half inaccessible in its current state. Stream Z is likely seasonal or perennial; Stream X originates from a seep and is likely seasonal. The streams are rated Type N, in accordance with the City of Bellevue's precedence to be consistent with previous developments, and requires a fifty (50) foot buffer under BLUC 20.25H.035.

Several areas upland of Stream X contains signs of a wash, dry during the assessment but containing previous stormwater erosional blowout features. Over the course of six site visits potential hydrology was observed and monitored and it was determined that the erosional potential storm event feature is not a hydrologic feature. The only hydrology observed were several small isolated, unvegetated, saturated areas from potential seeps.

5.1.2 Stream Crossing Description

Stream Z bisects the project site into eastern and western portions and will necessitate a box culvert stream crossing to provide access to the eastern-most portion of the parcel and meet project goals. The BLUC describes allowable development within critical areas and the associated buffers under BLUC 20.25H.055.B. A private road and crossing of Stream Z is permitted based on specific criteria provided for in BLUC 20.25H.055.C2. As there is no technically feasible alternative to a stream crossing for this project that would have less impact on the critical area and associated buffer the stream crossing has been located and designed to minimize these impacts. The stream crossing has been designed as one consolidated corridor and with the minimum width necessary as it will result in fewer impacts to the critical area. Access to the entire property is limited by the adjacency of Interstate 90 to the south and existing residences to the east, and as a result, the proposed residences located on the eastern side of the property are only accessible by crossing Stream Z. Buffer areas temporarily impacted by road construction will be fully replanted with native shrub species. The only permanent impacts to the stream buffer will be a slight reduction by no more than 25% in buffer width within the stream crossing area which will be compensated for through an increase in buffer area in the northeastern portion of the project parcel. No fish habitat was identified within Stream Z due to low flows, steep slopes and other fish barriers, including broken surface flows where water occasionally flows subsurface, a chain-link fence at the southern parcel boundary, a catch basin downstream, and debris.

All work shall be consistent with the City of Bellevue codes and standards and best management practices (BMPs) outlined in the City of Bellevue's "Environmental Best Management Practices Manual". No parking or other support functions are necessary to accommodate this stream crossing. Although the original project called for a piped culvert for the stream crossing structure, this has been changed to help achieve the City of Bellevue's Project goal of a net benefit to critical areas and will consist of a box culvert to allow for minimal adverse impact on overall aquatic area flow peaks. The box culvert will be designed in accordance with the Washington State Department of Fish and Wildlife "Design of Road Culverts for Fish Passage". The span of the box culvert will be thirty (30) feet wide to encompass both the road and sidewalks. The box culvert will be twelve (12) feet nine (9) inches tall and thirty-eight (38) feet one (1) inch in length.

5.1.3 Wetland Buffer Impact Description

As necessary to develop the site, buffer modifications are allowed through buffer averaging under BLUC 20.25H.075.C.2. In order to comply with this section the overall buffer area will be maintained. The proposed project will result in an overall improvement in on-site ecological structure and function as buffer areas in the most sensitive portions of the site, between the two streams and adjacent to the wetland will be increased through buffer averaging to offset buffer reductions in the southern portion of the property and non-native invasive plant species will be contained to 10 percent or less within the designated buffer areas by removing English Ivy, planting native plant species, retaining a contiguous buffer area wherever possible, expanding the buffer in northeastern section where function is already high and there exists a wetland, maintaining the required buffer width wherever possible and increasing buffer area elsewhere. Plant removal will be constrained to invasive species which are not suitable for native species of local importance. As buffer modification is restricted to plant removal and plant replacement there will be no impact to slope stability and the likelihood of erosion or landslide hazard will not increase.

5.1.4 Addressing other BLUC That May Influence Project Approval

BLUC 20.25H.255 A: The City of Bellevue Land Use Code has been thoroughly analyzed to ensure the proposed modifications have adhered to strict performance standards and to ensure protection of critical area functions and values. Adequate resources have been allocated to ensure required mitigation and monitoring efforts can be completed. The proposed modifications and performance standards are beneficial to the functions and values of the critical area and associated buffers as non-native invasive plant species will be removed and replaced with more beneficial native plant species. Further, the buffer area will be expanded in the northeastern section of the subject property where habitat function is high and there currently exists a small wetland. The resulting development of single-family residences is compatible with other uses in the land-use district as the subject property is surrounding primarily by single-family residences.

BLUC 20.25H.255 B: This proposal includes plans for the restoration of degraded critical area and associated buffer functions by removing non-native invasive plant species and planting native shrub species on-site within the buffer area. This will improve habitat for native species that use the buffer area by expanding plant diversity and returning the ecosystem to a more historically natural/accurate state. The opportunity to retain sediments and pollutants from stormwater runoff associated with the nearby road and development exists within Wetland A; however, this potential is limited due to its small size, degraded conditions, slope, and lack of dense vegetation. A stormwater detention tract will be installed in the northwest corner of the subject property to ensure a net gain in stormwater quality function.

BLUC 20.30P.140: This proposal has utilized to the maximum extent possible the best available construction, design, and development techniques to ensure the least amount of impact on the critical area and associated buffer area within the subject property. The project proposes to construct box culvert footings upland of ordinary high water to avoid impacts within the stream. Temporary erosion and sediment control (TESC) measures consisting of a construction entrance, silt fencing, seeding of disturbed soils, and brush barriers will be installed using BMPs outlined in the City of Bellevue's "Environmental Best Management Practices Manual" and TESC Plan prepared by the Project Engineer and approved by the responsible Biologist prior to clearing and grading activities and construction of the stream crossing. Once TESC measures are in place, the site will be graded, and the compensatory mitigation actions will proceed. Equipment used for mitigation actions will be typical for small excavation and grading activities and will be kept in good working order free of leaks. All equipment staging and materials stockpiles will be kept out of wetlands, streams, and buffers to the maximum extent possible and the area will be kept free of spills and/or hazardous materials. All concrete wash water will be contained on-site. The performance standards outlined in the City of Bellevue Land Use Code 20.25H have been thoroughly analyzed and utilized to the maximum extent possible. The proposed project will be served by public facilities which include streets, fire protection, and utilities.

5.2 Jurisdictional Assessment

The two streams associated with the subject property are likely natural as demonstrated by topographic maps, landscape position, and recently collected site data. However, Stream Z likely has anthropogenic hydrologic supplementation through the Interstate 90 stormwater culvert which discharges into the draw just upstream (south) of the site. Both Stream X and Z, as mapped in Appendix C, contain either persistent or seasonal flow, are relatively permanent, and likely flow to

waters of the state (Lake Sammamish). As such, these features may be considered tributaries to traditional navigable waters.

The on-site wetland (Wetland A) does not directly abut traditional navigable waters but is adjacent to a potential non-navigable tributary (Stream Z) of such waters. Since no in-water work is proposed a USACE jurisdictional determination is not necessary. This report does not attempt to provide data for significant nexus testing at this time. Significant nexus tests are known to substantially delay project processing schedules.

A stream crossing is proposed, however the box culvert footings will be upland of OHW; therefore, Federal authorization, and State certification, is not necessary under Sections 401 and 404 of the CWA. In addition, the stream crossing box culvert will likely need to follow WDFW's 2013 Water Crossing Design Guidelines (Barnard et al, 2013).

Chapter 6. Mitigation and Vegetation Management Plan

This document presents the Final Mitigation Plan details and specifications for the Amalani LLC Goldenwood project. The proposed stream and buffer impacts and mitigation actions attempt to closely adhere to local regulations outlined in BLUC 20.25H.085 and 20.25H.090 and the Bellevue Urban Wildlife Habitat Literature Review (The Watershed Company, 2009). While buffer averaging under BLUC does not specifically require buffer enhancement and restoration, these ecological improvements have been determined valuable through the use of the Bellevue Urban Wildlife Habitat Functional Assessment Model (FAM) and necessary to provide a net increase in ecological function. A table presenting how FAM was applied to the project can be found in the Critical Areas Report/cover letter.

Potential compensatory stream buffer mitigation actions were examined in the context of mitigation sequencing and watershed-level processes as required locally under standards set forth in BLUC 20.25H.085. In general, stream and critical buffer area mitigation should be located within the same watershed as the impact site, and should be located where it is most likely to successfully replace lost functions and services that best benefit the impacted watershed. The final mitigation plan addresses issues as they relate to the proposed project including potential changes in surface water quality, water retention, and ground water recharge rates. Previous sections of this report will be referenced in the mitigation plan regarding background information.

6.1 Mitigation Sequencing

Although impacts to the stream buffer are not entirely avoidable, careful planning has ensured impacts will be minimized and compensated for. Approximately twelve (12) percent of the site is encumbered by regulated hydrologic features and associated buffers. In addition, the site contains several areas with steep slopes which have associated buffers and critical areas. The project was designed to avoid and minimize negative impacts and to provide mitigation for any unavoidable negative impacts.

Unavoidable negative impacts to potential critical areas include buffer impacts in the southern portion of the site resulting from residential construction and a stream crossing. These impacts will be minimized to the maximum extent possible. Through careful planning efforts, the proposed road alignment avoids major stream impacts by limiting the extent of the stream crossing, to avoid the most sensitive critical areas, and by constructing the associated bridge outside the ordinary high water of Stream Z. All construction activities are avoiding direct wetland and stream critical areas impacts through careful project designing and confining development to portions of the site that avoid critical areas.

The compensatory mitigation is intended to compensate for the loss of stream buffer functions and value by providing additional functions according to the needs of the watershed and providing an overall improvement to stream and potential wetland buffer areas. Buffer enhancement through non-native vegetation removal along with native planting from a reputable source will allow for improved hydrology and quality of water leaving the project site. Replacing invasive vegetation with native vegetation will enhance the habitat functions provided by the site. A diverse herbaceous layer

will be established to provide browse, cover, and nesting for small mammals, which in turn provide prey for raptors and other small mammals.

6.2 Description of Impacts

In order to access the eastern area of the site, construction of the proposed public road extension from 163rd Avenue Southeast along with associated infrastructure will require the construction of a stream crossing. An approximate 30-foot wide box culvert will be constructed over Stream Z in the southern end of the site.

Unnecessary impacts to Stream Z and associated buffer area have been avoided by careful design and location of the stream crossing. The proposed crossing was designed in a manner that will allow for unimpeded flow and fish passage as stipulated by Washington Department of Fish and Wildlife under the crossing thus helping to protect Stream Z. In addition, some buffer areas of Stream Z will be narrowed and temporarily altered by necessary grading and restoration actions. Some buffer areas nearest the southern boundary of Stream Z will be modified by proposed compensatory mitigation actions and buffer averaging. The project will result in the offset of approximately 3,325 square feet (0.076 acre) of buffer area from the southern portion of the site to the northern portion. Most buffer impacts are temporal, and buffers will be restored without a net loss of habitat or function.

The proposed project will also involve upland work including: installation of temporary erosion and sediment control measures, grade and fill activities, installation of utilities, construction of public roads, construction of single-family residential homes, and installation of stormwater collection and treatment systems designed in accordance with the City of Bellevue's approved stormwater design standards.

6.2.1 Description of Stream Crossing

As mentioned above, the stream crossing is necessary in order to construct a public road to access the eastern area of the subject property where placement of the residential homes has been proposed. The road placement and necessary grading was designed to minimize stream and buffer impacts within the design standards of the City of Bellevue. The primary access road will enter the site off 163rd Avenue Southeast along the northwestern edge of the property. Upon entry, the road will cut along the western portion of the property and make a wide turn to the east near the southern edge of the property. It will terminate in a forked cul-de-sac near the southeastern corner of the site. As the subject property is currently bordered to the south by Interstate 90, to the east by existing residences, and Stream Z completely bisects the subject property there is no feasible alternative that would avoid creating a stream crossing.

6.2.2 Additional Buffer Impacts

In order to provide the stream crossing some buffer averaging and minor grading is proposed within the buffer of Stream Z. These buffer impacts and width modifications will be contained within the outer portions of the stream buffer, and all activities not related to the stream crossing or mitigation actions will occur outside a minimum 15 foot setback from the stream buffer boundary. Upon project completion, there will be a net gain in stream buffer area and functions.

6.3 Mitigation Strategy

The objective of the proposed stream buffer mitigation actions is to restore and enhance diminished water quality and hydrologic function resulting from buffering averaging and provides an overall net benefit in critical area functions by removing non-native invasive plant species and replanting native vegetation where necessary. This proposal has utilized, to the maximum extent possible, the best available construction, design, and development techniques to ensure the least amount of impact on the critical area and associated buffer area within the subject property. Temporary erosion and sediment control (TESC) measures consisting of a construction entrance, silt fencing, seeding of disturbed soils, and brush barriers will be installed using BMPs outlined in the City of Bellevue's "Environmental Best Management Practices Manual." Stream buffer enhancement actions will include removing non-native invasive plant species, English ivy, that is dominant in the existing buffer area and replace removed plant cover with native shrubs and plants. Replacing invasive species with native vegetation will enhance the habitat functions provided by the site. A diverse herbaceous layer will be established to provide browse, cover, and nesting for small mammals, which in turn provide prey for raptors and other small mammals.

6.4 Mitigation Implementation

The following stream buffer mitigation actions will be completed concurrent with development activities included in the proposed project. All wetland, stream, and buffer areas adjacent to the planned development areas will be protected by installation of split-rail fencing and critical areas signage to discourage intrusion and improper use of these areas, and permanent protections for these critical areas will be ensured through establishment of a Native Growth Protection Area (NGPA) as defined in BLUC 20.25H.030B if necessary. The NGPA will be kept free from all development and disturbances except were allowed or required for habitat improvement projects. The NGPA will also be flagged in the field and protective fencing will be installed prior to site development activities. Details of each type of mitigation action are described below.

6.5 Planting Specifications

Due to the need for construction activities over and adjacent to Stream Z, use of existing micro-topography, targeted planting actions, and substantial coordination with the responsible Wetland Scientist, and Geologist may be necessary to properly implement the proposed mitigation actions. The project manager and grading contractor shall meet with the Wetland Scientist at the site before construction activities commence in order to ensure mitigation objectives will be met and critical elements are properly addressed, and implementation of the proposed buffer impacts and mitigation actions will be conducted under the oversight of the responsible Biologist and Project Engineer for the duration of the project.

The following specifications are established as a set of minimum standards for proper implementation of the mitigation actions. Additional actions, modifications, and/or substitutions may be necessary at the time of construction and may be approved by the responsible Biologist and Project Engineer.

6.5.1 Erosion Control and Pollution Prevention

Temporary erosion and sediment control (TESC) measures consisting of a construction entrance, silt fencing, seeding of disturbed soils, and brush barriers will be installed using BMP's outlined in the project's Stormwater Pollution Prevention Plan (SWPPP) and TESC Plan prepared by the Project Engineer and approved by the responsible Biologist prior to clearing and grading activities and construction of the stream crossing. Once TESC measures are in place, hydric soils will be salvaged, the site will be graded, and the compensatory mitigation actions will proceed.

Equipment used for mitigation actions will be typical for small excavation and grading activities and will be kept in good working order free of leaks. All equipment staging and materials stockpiles will be kept out of wetlands, streams, and buffers and the area will be kept free of spills and/or hazardous materials. All lot leveling material and road surfacing will be sourced from upland areas on-site or from approved suppliers, and will be free of pollutants and hazardous materials, and all concrete wash water will be contained on-site.

6.5.2 Plant Scheduling, Species, Density, and Location

Plant installation should occur as close to conclusion of impact activities as possible to limit erosion and limit the temporal loss of function provided by the stream buffer. All planting should occur between September 1 and May 1 to ensure plants do not dry out after installation, or temporary irrigation measures may be necessary.

6.5.3 Plant Materials and Installation

6.5.3a Plant Materials

All plant materials to be used on the site will be nursery grown stock from a reputable, local source. Only native species are to be used; no hybrids or cultivars will be allowed. Plant material provided will be typical of their species or variety; if not cuttings they will exhibit normal, densely-developed branches and vigorous, fibrous root systems. Plants will be sound, healthy, vigorous plants free from defects, and all forms of disease and infestation.

Container stock shall have been grown in its delivery container for not less than six months but not more than two years. Plants shall not exhibit rootbound conditions. Under no circumstances shall container stock be handled by their trunks, stems, or tops.

An approved native seed mix will be used to seed the disturbed areas after planting trees and shrubs. The buffer seed mix will include 15% blue wildrye (*Elymus galucus*); 15% Idaho fescue (*Festuca idahoensis*); 15% red fescue (*Festuca rubra*); 15% California brome (*Bromus carinatus*); 15% large leaf lupine (*Lupinus polyphyllus*); 15% meadow barley (*Hordeum brachyantherum*). The seed mixture used for hand or hydroseeding shall contain fresh, clean, and new crop seed mixed by an approved method. In areas where invasive vegetation is removed the project proposes planting salmonberry, vine maple, sword fern, Oregon grape, kinnikinnick, and Indian plumb to increase plant diversity and prevent reestablishment of non-native invasive plant species.

All plant material shall be inspected by the Wetland Scientist upon delivery. Plant material not conforming to the specifications above will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site.

Fertilizer will be in the form of Agroform plant tabs or an approved like form. Mulch will consist of sterile wheat straw or clean recycled wood chips approximately 1/2 inch to 1 inch in size and 1/2 inch thick. If free of invasive plant species, the mulch material may be sourced from woody materials salvaged from the land clearing activities.

6.5.3b Product Handling, Delivery, and Storage

All seed and fertilizer should be delivered in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. This material should be stored in a manner to prevent wetting and deterioration. All precautions customary in good trade practice shall be taken in preparing plants for moving. Workmanship that fails to meet industry standards will be rejected. Plants will be packed, transported, and handled with care to ensure protection against injury and from drying out. If plants cannot be planted immediately upon delivery they should be protected with soil, wet peat moss, or in a manner acceptable to the project biologist. Plants, fertilizer, and mulch not installed immediately upon delivery shall be secured on the site to prevent theft or tampering. No plant shall be bound with rope or wire in a manner that could damage or break the branches. Plants transported on open vehicles should be secured with a protective covering to prevent windburn.

6.5.3c Preparation and Installation of Plant Materials

The planting contractor shall verify the location of all elements of the mitigation plan with the Biologist prior to installation. The responsible Biologist reserves the right to adjust the locations of landscape elements during the installation period as appropriate to the mitigation actions outlined above. If obstructions are encountered that are not shown on the drawings, planting operations will cease until alternate plant locations have been selected by and/or approved by the Biologist.

Circular plant pits with vertical sides will be excavated for all container stock. The pits should be at least 12 inches in diameter, and the depth of the pit should accommodate the entire root system. The bottom of each pit will be scarified to a depth of 4 inches.

Broken roots should be pruned with a sharp instrument and rootballs should be thoroughly soaked prior to installation. Set plant material upright in the planting pit to proper grade and alignment. Water plants thoroughly midway through backfilling and add Agroform tablets. Water pits again upon completion of backfilling. No filling should occur around trunks or stems. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water, and install a 4 to 6 inch layer of mulch around the base of each container plant.

6.5.4 Temporary Irrigation Specifications

While the native species selected for mitigation are hardy and typically thrive in northwest conditions, and the proposed mitigation actions are planned in areas with sufficient hydroperiods for the species selected, some individual plants might perish due to dry conditions during the summer months. Therefore, irrigation or regular watering will be provided as necessary for the duration of the first 2 growing seasons while the native plantings become established.

6.5.5 Invasive Plant Control and Removal

Invasive species to be removed include Himalayan blackberry, English ivy, and any other listed noxious weeds. To ensure these species do not expand following the mitigation actions, invasive plants within the buffer averaging area will be pretreated with a root-killing herbicide approved for use in aquatic sites (i.e. Rodeo) approximately 30 days prior to being cleared and grubbed from the entire stream and associated buffer. The pre-treatment with herbicide should occur prior to all planned mitigation actions, and spot treatment of any surviving other invasive vegetation should be performed again each fall prior to leaf senescence for a minimum of 3 years.

A maintenance program requiring annual removal of invasive species within all wetland and buffer areas by a homeowner's association following project completion, and written into the subdivision's Codes, Covenants, and Restrictions, is also recommended. This program will start during the early summer of Year 3 of the monitoring program.

6.6 Maintenance & Monitoring

The applicant is committed to compliance with the proposed mitigation plan and overall success of the project. As such the applicant will continue to maintain the project, keeping the site free from of non-native invasive vegetation, trash, and yard waste. The monitoring program has been designed to comply with monitoring regulations stipulated under BLUC 20.25H.220.D.

While the buffer creation/reestablishment and enhancement actions rely primarily on mechanical manipulations, the establishment of herbaceous groundcover within the wetland, restoration actions within the buffer, and invasive species control in both the stream and the buffer will require some continued monitoring and maintenance. Since the mitigation actions are limited to restoration and enhancement of the buffer area, the mitigation site will be monitored for a period of 3 years (as specified under BLUC 20.25H.220.D) with formal inspections by a qualified Biologist. Monitoring events will be scheduled at the time of construction, 30 days after planting, and late in the first through final year's growing seasons in Years 1, 2, and 3. Monitoring will consist of percent cover measurements at permanent monitoring stations, walk-through surveys to identify invasive species presence and dead or dying restoration plantings, photographs taken at fixed photo points, wildlife observations, and general qualitative habitat and wetland function observations. No pruning is proposed; however, annual monitoring efforts may result in recommendations including those described below in Section 6.7 Contingency Plans.

To determine percent cover, observed vegetation will be identified and recorded by species and an estimate of areal cover of dominant species within each sampling plot. Circular sample plots, approximately 30 feet in diameter (706 square feet), are centered at each monitoring station. The sample plots encompass the specified buffer areas and terminate at the observed buffer area boundary. Trees and shrubs within each 30-foot diameter monitoring plot are then recorded to species and areal cover. Herbaceous vegetation is sampled from a 10-foot diameter (78.5 square feet) within each monitoring plot, established at the same location as the center of each tree and shrub sample plot. Herbaceous vegetation within each monitoring plot is then recorded to species and includes an estimate of percent areal cover. A list of observed tree, shrub, and herbaceous species including percent areal cover of each species and wetland status is included within the monitoring report.

6.7 Goals, Objectives and Performance Standards

The goals and objectives for the proposed buffer mitigation actions are based on improving buffer functions to compensating for project impacts. These actions are capable of improving water quality and hydrologic functions, and providing a moderate to high level of habitat function for stream buffer-associated wildlife. The goals and objectives of the proposed mitigation actions are as follows:

Goal – Improve habitat functions associated with Stream Z buffer by reducing presence of non-native invasive species and increasing presence of habitat features and diversity within the averaged Stream Z buffer.

Objective 1 – Increase plant biodiversity in areas where English Ivy is dominant.

Performance Standard 1 – A minimum of 5 native tree and shrub species will be present within the mitigation area in all monitoring years.

Performance Standard 2 – The enhanced buffer area onsite will contain a minimum of 50 percent areal coverage by Year 2 and 60 percent areal coverage by Year 3 in all strata.

Objective 2 – Effectively control and/or eliminate invasive species from the wetland buffer enhancement areas.

Performance Standard 3 – Non-native invasive plants will not make up more than 15 percent total areal cover in any growing season following Year 1.

6.8 Contingency Plans

If monitoring results during the first 3 years indicate that performance standards are not being met, it may be necessary to implement all or part of the contingency plan. Careful attention to maintenance is essential in ensuring that problems do not arise. Should any portion of the site fail to meet the success criteria, a contingency plan will be developed and implemented with City of Kenmore approval. Such plans are adaptive and should be prepared on a case-by-case basis to reflect the failed mitigation characteristics. Contingency plans can include additional plant installation, and plant substitutions including type, size, and location.

Contingency/maintenance activities may include, but are not limited to:

1. Replacing plants lost to vandalism, drought, or disease, as necessary.
2. Replacing any plant species with a 20 percent or greater mortality rate after 2 growing seasons with the same species or native species of similar form and function.
3. Irrigating the mitigation areas only as necessary during dry weather if plants appear to be too dry, with a minimal quantity of water.
4. Reseeding and/or repair of stream buffer areas as necessary if erosion or sedimentation occurs.
5. Removing all trash or undesirable debris from the wetland and buffer areas as necessary.

6. Additional treatment of mechanical removal of non-native invasive plant species.
7. Additional signage indicating trespassing or habitat disturbance if an adhoc trail begins to develop.

Chapter 7. References

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Appendix A — Methods and Tools

Table A-1. Methods and tools used to prepare the report.

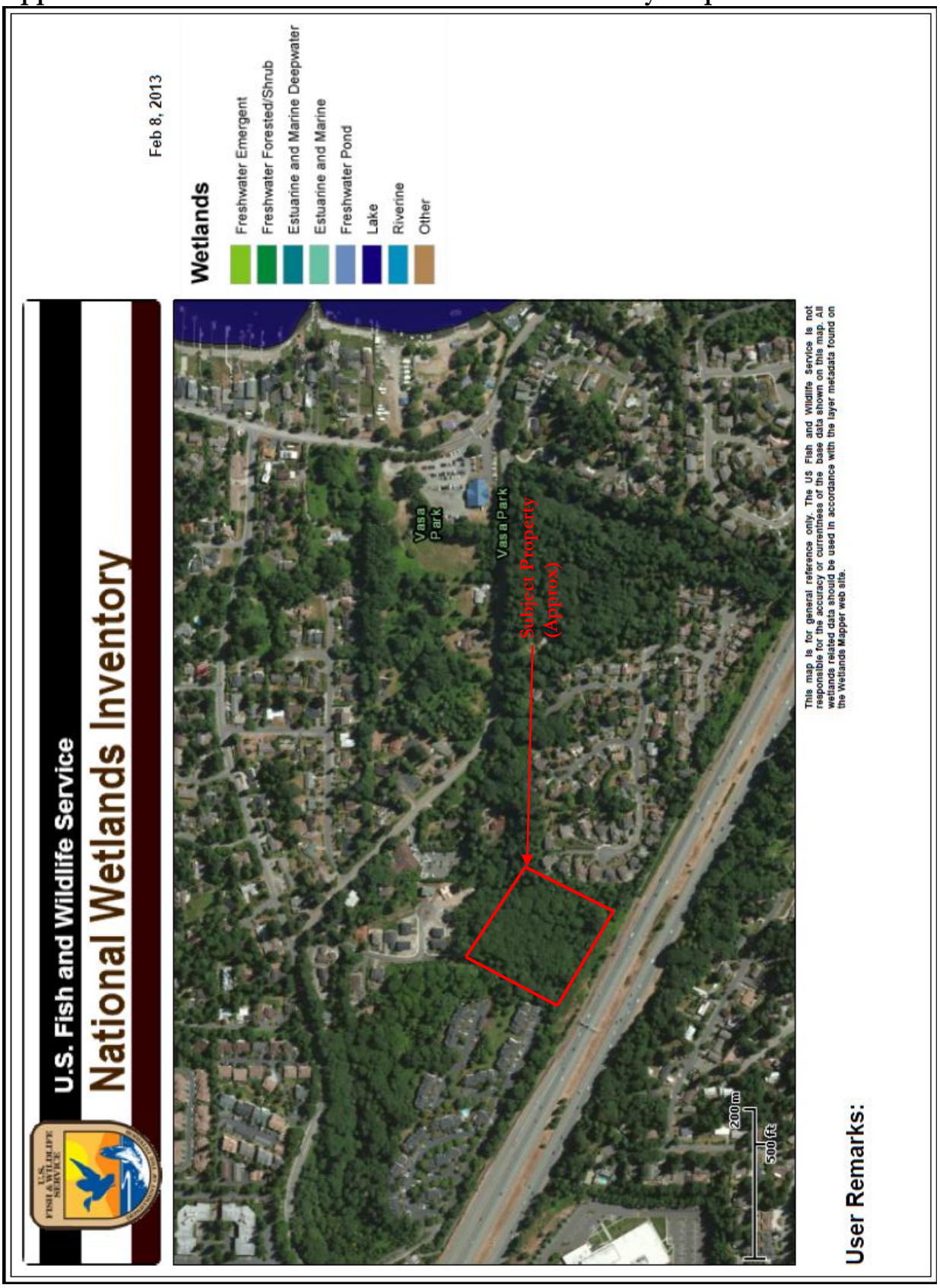
Parameter	Method or Tool	Website	Reference
Wetland Delineation	Washington State Wetland Delineation Manual	http://www.ecy.wa.gov/biblio/9694.html	**Ecology**. 1997. Washington state wetland identification and delineation manual. Publication #96-94. Washington Department of Ecology, Olympia, WA.
	USACE 1987 Wetland Delineation Manual	http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf	**Environmental Laboratory.** 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
	Western Mountains, Valleys, and Coast Region Interim Regional Supplement	http://www.usace.army.mil/cw/cecwo/reg/inte_aridwest_sup.pdf	**U.S. Army Corps of Engineers.** 2008. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-13. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
Wetland Classification	USFWS / Cowardin Classification System	http://www.fws.gov/nwi/Pubs_Reports/Class_Manual/class_titlepg.htm	**Cowardin**, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. Government Printing Office, Washington, D.C.
	Hydrogeomorphic Classification (HGM) System	http://el.erdc.usace.army.mil/wetlands/pdfs/wrpde4.pdf	**Brinson**, M. M. (1993). "A hydrogeomorphic classification for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
Wetland Rating	Washington State Wetland Rating System	http://www.ecy.wa.gov/biblio/0406025.html	**Hruby**. 2004. Washington State wetland rating system for western Washington –Revised. Publication # 04-06-025.
	Bellevue Land Use Code	http://www.codepublishing.com/wa/bellevue/	Uses State Rating System under Bellevue Land Use Code Title 20.25H.095.
Stream Delineation	Federal Ordinary High Water Mark Definition	http://www.usace.army.mil/inet/functions/cw/cecwo/reg/33cfr328.htm	Congressional Federal Register 33 Part 328 Definition of Waters of the United States.
	Draft State Ordinary High Water Mark Protocol	http://www.ecy.wa.gov/pubs/0806001.pdf	**Olson, P.** and E. Stockdale. 2008. Determining the Ordinary High Water Mark on Streams in Washington State. Washington State Department of Ecology, Shorelands & Environmental Assistance Program, Lacey, WA. Ecology Publication # 08-06-001.
Stream Classification	Department of Natural Resources (DNR) Water Typing System	**Forest Practices Water Typing:** http://www.stage.dnr.wa.gov/forestpractices/watertyping/ **WAC 222-16-030:** http://apps.leg.wa.gov/WAC/default.aspx?cite=222-16-030 **Water Type Mapping:** http://www3.wadnr.gov/dnrapp5/website/fpars/viewer.htm	Washington Administrative Code (WAC) 222-16-030. DNR Water typing system.
	Bellevue Land Use Code	http://www.codepublishing.com/wa/bellevue/	Bellevue Land Use Code Title 20.25H.075
Wetland Indicator Status	Northwest (Region 9) (Reed, 1988) and Northwest (Region 9) Supplement (Reed et al., 1993)	http://www.fws.gov/nwi/bha/list88.html	**Reed**, P.B. Jr. 1988. National list of plant species that occur in wetlands: Washington. Biological Report NERC-88/18.47 for National Wetlands Inventory, Washington, D.C. **Reed**, P.B. Jr. 1993. Northwest supplement (Region 9) species with a change in indicator status or added to the Northwest 1988 list, wetland plants of the state of Washington 1988. U.S. Department of Interior Fish and Wildlife Service WELUT - 88 (26.9), Washington, D.C.

Plant Names	USDA Plant Database	http://plants.usda.gov/	Website (see Appendix A)
Soils Data	NRCS Soil Survey	http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx	Website GIS data based upon: **Snyder, D.E., P.S. Gale, and R.F. Pringle.** 1973. Soil Survey of King County Area, Washington. United States Department of Agriculture, Soil Conservation Service in cooperation with Washington State Department of Natural Resources, and Washington State University, Agriculture Research Center. Washington, D.C.
Hydric Soils Data	King County Hydric Soils List	http://soils.usda.gov/use/hydric/	**Natural Resources Conservation Service.** 2011. Hydric Soils List: King County, Washington. U.S. Department of Agriculture. Washington D.C.
Threatened and Endangered Species	Washington Natural Heritage Program	http://www.dnr.wa.gov/nhp/ and http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf	**Washington Natural Heritage Program** (Data published 10/15/08). Endangered, threatened, and sensitive plants of Washington. Washington State Department of Natural Resources, Washington Natural Heritage Program, Olympia, WA
	Washington Priority Habitats and Species	http://wdfw.wa.gov/hab/phspage.htm	**Priority Habitats and Species (PHS) Program** (Data requested 11/24/09). Map of priority habitats and species in project vicinity. Washington Department of Fish and Wildlife (WDFW).
	NOAA fisheries species list and maps	http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Index.cfm and http://www.nmfs.noaa.gov/pr/species/	Website
	USFWS species lists by County	http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=53033	Website
Species of Local Importance	WDFW GIS Data	http://wdfw.wa.gov/mapping/salmonscape/	Website
Report Preparation	Bellevue Land Use Code	http://www.mrsc.org/codes.aspx	Bellevue Land Use Code Title 20.25H – Critical Areas Overlay District

Appendix B — Background Information

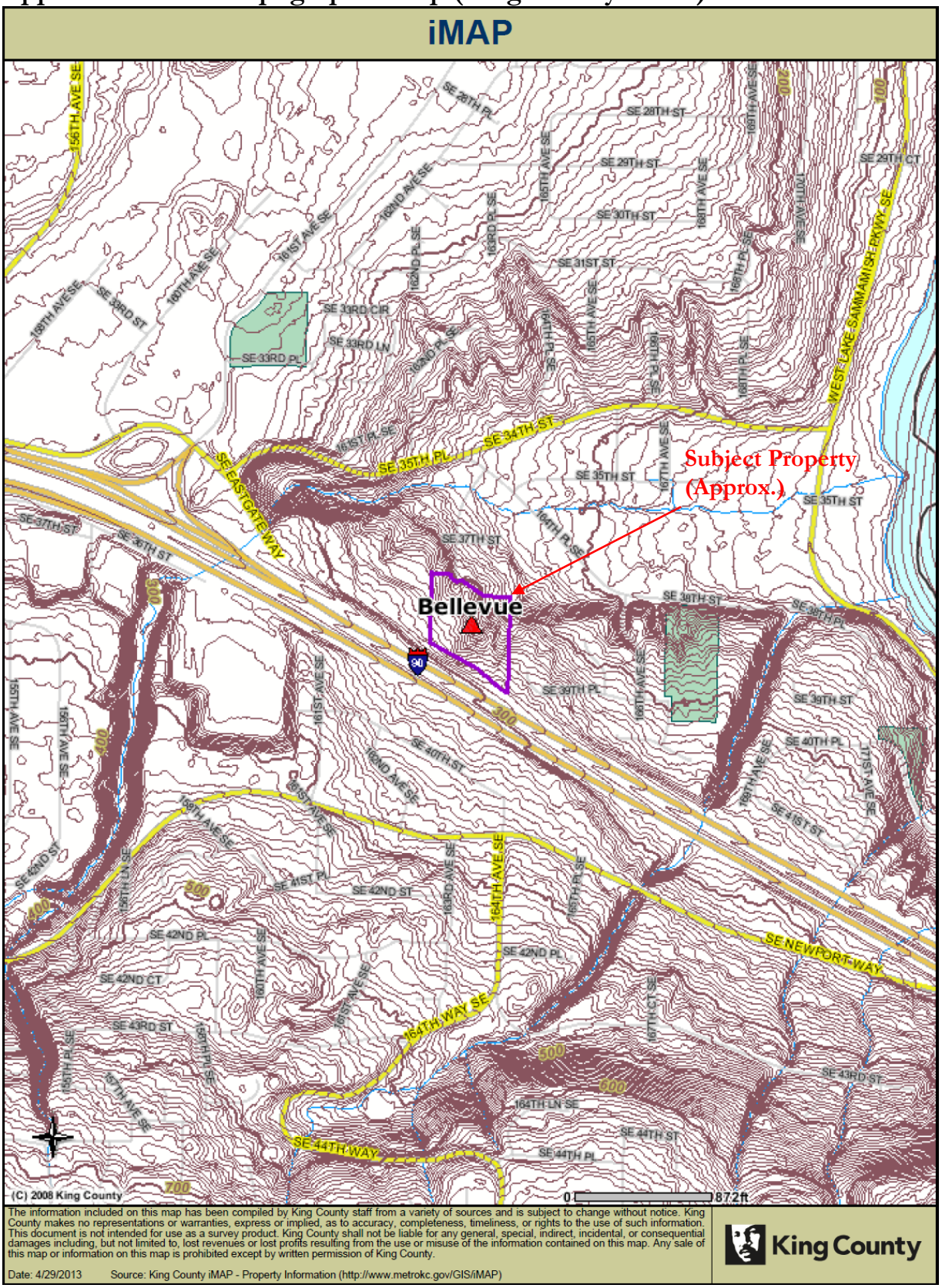
This Appendix includes a USFWS National Wetland Inventory map (B1), King County GIS Data (B2), Topographic Map (King County iMAP) (B3), NRCS Soil Survey map (B4), and WDFW Salmonid Distribution Map (B5).

Appendix B1. USFWS National Wetland Inventory Map

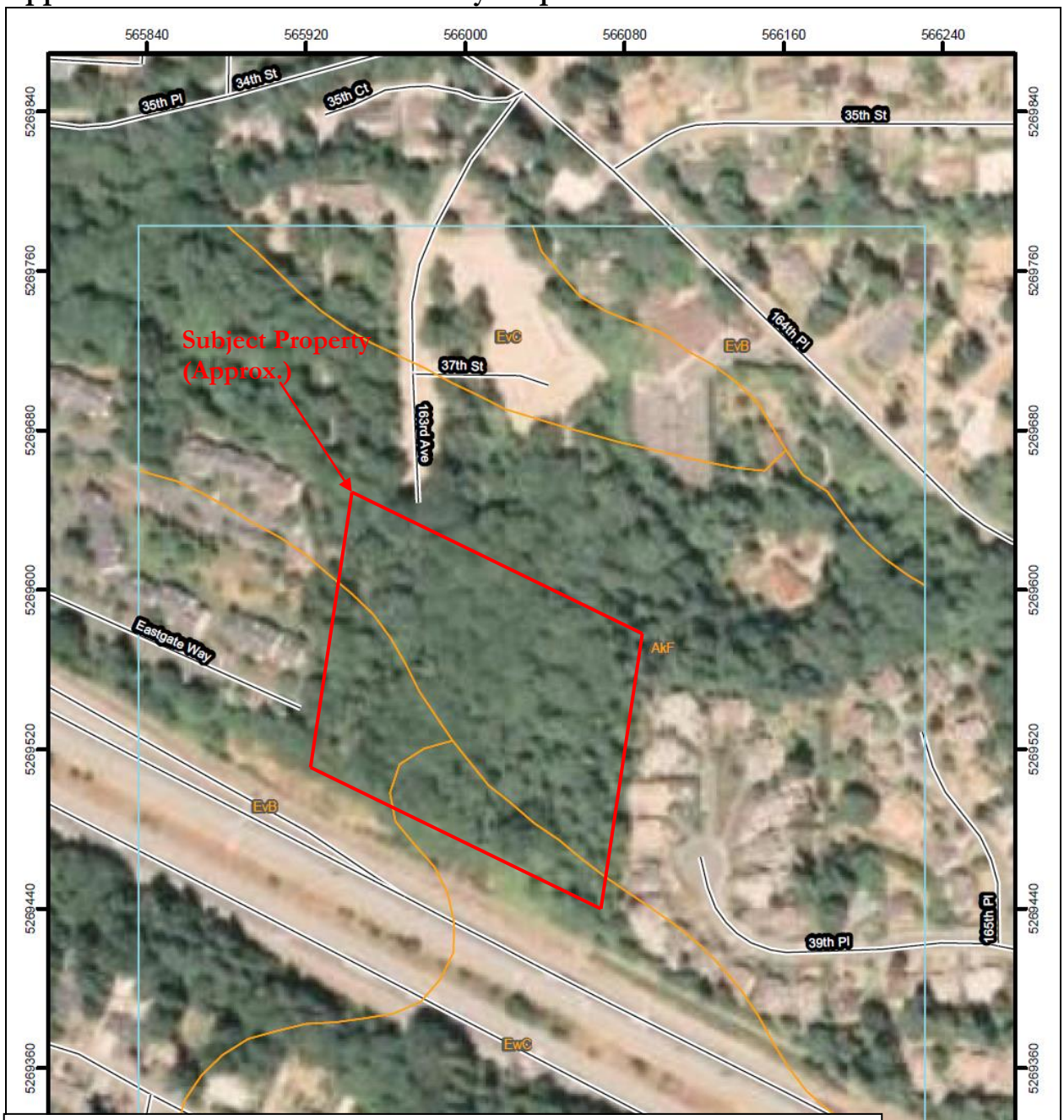


Appendix B2. King County GIS data

Appendix B3. Topographic Map (King County iMAP)

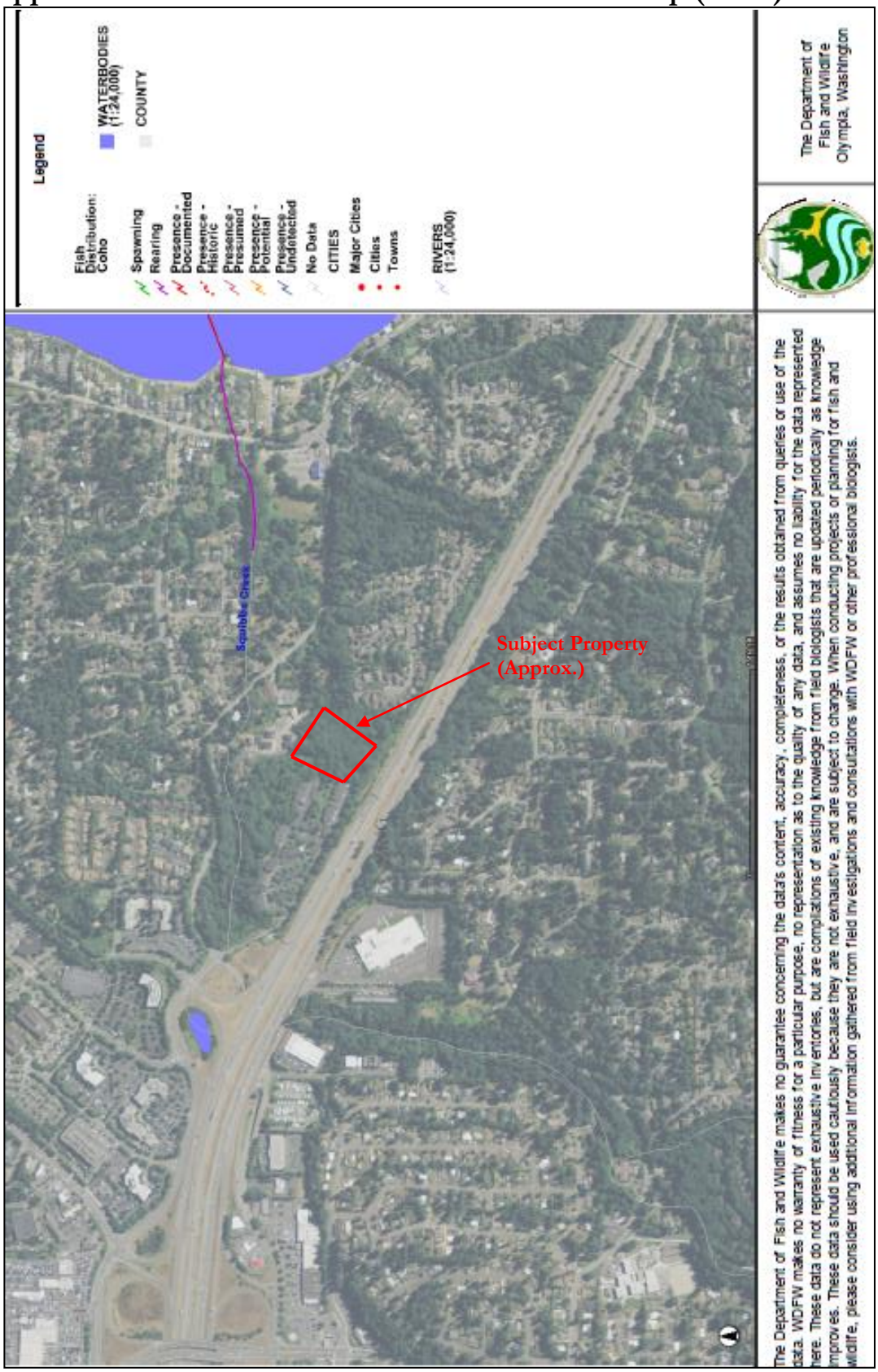


Appendix B4. NRCS Soil Survey Map



King County Area, Washington (WA633)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
AkF	Alderwood and Kitsap soils, very steep	20.0	42.7%
EvB	Everett gravelly sandy loam, 0 to 5 percent slopes	13.4	28.6%
EvC	Everett gravelly sandy loam, 5 to 15 percent slopes	3.9	8.3%
EwC	Everett-Alderwood gravelly sandy loams, 6 to 15 percent slopes	9.6	20.5%
Totals for Area of Interest		**46.8**	**100.0%**

Appendix B5. WDFW Salmonid Distribution Map (Coho)



Appendix C — Proposed Site Plans

This Appendix includes the site inventory sheet showing physical feature locations of the site (delineated wetlands, topography, streams, et cetera), site plans including proposed structures and stream crossing, and planting plant.

Appendix D — Wetland Delineation Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	Amalani - Bellevue	City/County:	Bellevue/King	Sampling Date:	5/02/2013
Applicant/Owner:	Barry Margolese	State:	WA	Sampling Point:	DP1
Investigator(s):	Railin Peterson and Racheal Villa	Section, Township, Range:	S11, 24N, 5E		

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 10% est.

Subregion (LRR): A Lat: 47° 34'34.55" N Long: 122° 07' 20.48" W Datum: WGS584

Soil Map Unit Name: NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, Or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, Or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks: **Seep within lowest spot. Does not meet all three wetland criteria.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size:)			
5. **Rubus spectabilis**	5	Y	FAC
6. **Rubus armeniacus**	10	Y	FACU
7.			
8.			
9.			
	15	= Total Cover	
Herb Stratum (Plot Size:)			
10. **Carex deweyana**	2	N	FAC
11. **Tolmiea menziesii**	5	N	FAC
12. **Rumex crispus**	2	N	FAC
13. **Glyceria elata**	2	N	FACW
14. **Rubus ursinus**	2	N	FACU
15. **Athyrium filix-femina**	5	N	FAC
16. **Polystichum munitum var. munitum**	10	Y	FACU
17.			
18.			
19.			
	28	= Total Cover	
Woody Vine Stratum (Plot Size:)			
20. **Hedera helix**	12	Y	NL
21.			
	12	= Total Cover	
% Bare Ground in Herb Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**5**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**40**	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species	**2**	x2 =	**4**
FAC species	**19**	x3 =	**57**
FACU species	**22**	x4 =	**88**
UPL species		x5 =	
Column Totals:	**43** (A)		**149** (B)

Prevalence Index = B/A = **3.5**

Hydrophytic Vegetation Indicators:

N	Dominance Test is >50%
N	Prevalence Index is ≤3.0[1]
	Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
	Wetland Non-Vascular Plants[1]
	Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☐ No ☒**

Remarks: **Big leaf maple dominant cover but outside seep, 85% cover**

Project Site: Amalani - Bellevue

SOIL

Sampling Point: DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 3/2	90	10 YR 4/4	10	-	-	GSL	Gravelly sandy loam
6-10	10 YR 3/2	60	10 YR 4/4	40	-	-	GSL	Gravelly sandy loam, band of mixed color
10-16	10 YR 3/2	90	10 YR 4/4	10	-	-	GSL	Very gravelly sand loam

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	surface flow
Water Table Present?	Yes	☒	No	☐	Depth (inches):	unknown
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	surface

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water flowing through top layers and sides of pit

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	Amalani - Bellevue	City/County:	Bellevue/King	Sampling Date:	5/02/2013
Applicant/Owner:	Barry Margolese	State:	WA	Sampling Point:	DP2
Investigator(s):	Railin Peterson and Racheal Villa	Section, Township, Range:	S11, 24N, 5E		

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 15% est

Subregion (LRR): A Lat: 122° 07' 20.48" W Long: 122° 07' 20.48" W Datum: WGS584

Soil Map Unit Name: NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, Or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, Or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☐	No	☒				
Hydric Soil Present?	Yes	☐	No	☒	**Is the Sampling Area within a Wetland?**	**Yes**	☐	**No** ☒
Wetland Hydrology Present?	Yes	☒	No	☐				

Remarks: **East of the bottom of the seep. Does not meet all three wetland criteria.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Populus tremuloides**	40	Y	FAC
2. **Acer macrophylum**	35	Y	FACU
3.			
4.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot Size:)			
5.			
6. **Rubus spectabilis**	80	Y	FAC
7. **Rubus armeniacus**	10	N	FACU
8.			
9.			
	90	= Total Cover	
Herb Stratum (Plot Size:)			
10. **Carex deweyana**	2	N	FAC
11. **Polystichum munitum var. munitum**	30	Y	FACU
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	32	= Total Cover	
Woody Vine Stratum (Plot Size:)			
1. **Hedera helix**	15	Y	NL
2.			
	15	= Total Cover	
% Bare Ground in Herb Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**5**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**40**	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species	**122**	x3 =	**360**
FACU species	**75**	x4 =	**300**
UPL species		x5 =	
Column Totals:	**197** (A)		**660** (B)

Prevalence Index = B/A = **3.4**

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%

N Prevalence Index is $\leq 3.0^1$

Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants[1]

Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks:

Project Site: Amalani - Bellevue

SOIL

Sampling Point: DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 3/2	100	-	-	-	-	SGL	Sandy gravelly loam
6-10	10 YR 3/2	80	10 YR 4/6	20	-	-	SGL	80% pea gravels, 20% pea gravels and cobble
10-16	10 YR 4/2	100	-	-	-	-	SGL	Sandy gravelly loam

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):	-
Water Table Present?	Yes	☒	No	☐	Depth (inches):	9 inches
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	5 inches

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	Amalani - Bellevue	City/County:	Bellevue/King	Sampling Date:	5/02/2013
Applicant/Owner:	Barry Margolese		State: WA	Sampling Point:	DP3W
Investigator(s):	Railin Peterson and Racheal Villa		Section, Township, Range: S11, 24N, 5E		

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Slope (%): 5% est

Subregion (LRR): A Lat: 47° 34'35.18" N Long: 122° 07'16.81" W Datum: WGS584

Soil Map Unit Name: NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, Or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, Or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	☒	No	☐				
Hydric Soil Present?	Yes	☐	No	☒	**Is the Sampling Area within a Wetland?**	**Yes**	☒	**No** ☐
Wetland Hydrology Present?	Yes	☒	No	☐				

Remarks: **In seep to east of stream and south of logging road.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot Size:)			
5. **Rubus spectabilis**	10	Y	FAC
6. **Opiopanax horridus**	10	Y	FAC
7.			
8.			
9.			
	20	= Total Cover	
Herb Stratum (Plot Size:)			
10.			
11. **Tolmiea menziesii**	15	Y	FAC
12. **Phalaris arundinacea**	2	N	FACW
13. **Athyrium filix-femina**	15	Y	FAC
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	32	= Total Cover	
Woody Vine Stratum (Plot Size:)			
1. **Hedera helix**	85	Y	NL
2.			
	85	= Total Cover	
% Bare Ground in Herb Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**4**	(A)
Total Number of Dominant Species Across All Strata:	**5**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**80**	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species	**2**	x2 =	**4**
FAC species	**50**	x3 =	**150**
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	**52** (A)		**154** (B)

Prevalence Index = B/A = **3.0**

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

Y Prevalence Index is ≤3.0[1]

Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants[1]

Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

Project Site: Amalani - Bellevue

SOIL

Sampling Point: DP3W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	7.5 YR 2.5/1	100	-	-	-	-	GSL	Gravelly silty loam
9-12	2.5 YR 3/2	100	-	-	-	-	GSL	Gravely silty loam
12-17	7.5 YR 2.5/1	100	-	-	-	-	GSL	Gravely silty loam

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks: Borderline soils. Almost A11.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	☒	No	☐	Depth (inches):	0.5 inch depth
Water Table Present?	Yes	☐	No	☒	Depth (inches):	17 inches
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	12 inches

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland vegetation and seep hydrology present but lacks hydric soils.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	Amalani - Bellevue	City/County:	Bellevue/King	Sampling Date:	5/02/2013
Applicant/Owner:	Barry Margolese	State:	WA	Sampling Point:	DP4U
Investigator(s):	Railin Peterson and Racheal Villa	Section, Township, Range:	S11, 24N, 5E		

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 40% est

Subregion (LRR): A Lat: 47° 34'35.18" N Long: 122° 07'16.81" W Datum: WGS584

Soil Map Unit Name: NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, Or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, Or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒		
Hydric Soil Present?	Yes ☐	No ☒	**Is the Sampling Area within a Wetland?**	**Yes ☐ No ☒**
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. **Acer macrophylum**	70	Y	FACU
2. **Pseudotsuga menziesii**	30	Y	FACU
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot Size:)			
5.			
6.			
7.			
8.			
9.			
		= Total Cover	
Herb Stratum (Plot Size:)			
10. **Polystichum munitum var. munitum**	75	Y	FACU
11. **Athyrium filix-femina**	1	N	FAC
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
	76	= Total Cover	
Woody Vine Stratum (Plot Size:)			
1. **Hedera helix**	85	Y	NL
2.			
	85	= Total Cover	
% Bare Ground in Herb Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	**0**	(A)
Total Number of Dominant Species Across All Strata:	**4**	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	**0**	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species	**1**	x3 =	**1**
FACU species	**175**	x4 =	**700**
UPL species		x5 =	
Column Totals:	**176** (A)		**701** (B)

Prevalence Index = B/A = **4.0**

Hydrophytic Vegetation Indicators:

N Dominance Test is >50%

N Prevalence Index is ≤3.0[1]

Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

Wetland Non-Vascular Plants[1]

Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☐ No ☒**

Remarks:

Project Site: Amalani - Bellevue

SOIL

Sampling Point: DP4U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (Moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	2.5 Y 3/2	100	-	-	-	-	GSL	Gravelly silty loam

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (Inches):

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):	-
Water Table Present?	Yes	☐	No	☒	Depth (inches):	-
Saturation Present? (includes capillary fringe)	Yes	☐	No	☒	Depth (inches):	-

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix E —Wetland Rating Forms

Wetland name or number: Wetland A

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): Wetland A Date of site visit: 05/02/2013

Rated by: Railin Peterson, Racheal Villa Trained by Ecology? Yes X No____ Date of training: 04/11/2013

SEC: 11 TWNSHP: 24 RNGE: 5 Is S/T/R in Appendix D? Yes_____ No X

Map of wetland unit: Figure_____ Estimated size 0.0012 acres

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: I_____ II_____ III_____ IV X_____

Category I =	Score > 70	Score for Water Quality Functions	2
Category II =	Score 51 - 69	Score for Hydrologic Functions	0
Category III =	Score 30 – 50	Score for Habitat Functions	10
Category IV =	Score < 30	TOTAL Score for Functions	12

Category based on SPECIAL CHARACTERISTCS of Wetland I_____ II_____ Does not apply_____

Final Category (choose the "highest" category from above") IV

Summary of basic information about the wetland unit.

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		**Depressional**	
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	X
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above		Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	**YES**	**NO**
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		X
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		X
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands in to those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number: Wetland A

Classification of Vegetated Wetlands for Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
   NO – go to 2 **YES** – the wetland class is **Tidal Fringe**
   If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?
   YES – Freshwater Tidal Fringe **NO – Saltwater Tidal Fringe (Estuarine)**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is a Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were call estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. _____).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
   NO – go to 3 **YES** – The wetland class is **Flats**
   If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland meet both of the following criteria?
   _____ The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) where at least 20 acres (8ha) in size;
   _____ At least 30% of the open water area is deeper than 6.6 (2 m)?
   NO – go to 4 **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland meet all of the following criteria?
   X_____ The wetland is on a slope *(slope can be very gradual)*.
   X_____ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
   X_____ The water leaves the wetland **without being impounded**?
   NOTE: *Surface water does not pond in these types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).*
   NO – go to 5 **YES** – The wetland class is **Slope**

5. Does the entire wetland meet all of the following criteria?
   _____ The unit is in a valley or stream channel where it gets inundated by overbank flooding from that stream or river.
   _____ The overbank flooding occurs at least once every two years.
   NOTE: *The riverine unit can contain depressions that are filled with water when the river is not flooding..*
   NO – go to 6 **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. This means that any outlet, if present is higher than the interior of the wetland.
   NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.
   No – go to 8 YES – The wetland class is Depressional

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number: Wetland A

D	Depressional and Flat Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	(only 1 score per box)
D 1	**Does the wetland have the potential to improve water quality?**	*(see p.38)*
	D 1.1 Characteristics of surface water flows out of the wetland: • Unit is a depression with no surface water leaving it (no outlet) ..... points = 3 • Unit has an intermittently flowing, OR highly constricted, permanently flowing outlet ..... points = 2 • Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) ..... points = 1 • Unit is a "flat" depression (Q.7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch..... points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* **Provide photo or drawing**	**Figure ___**
	D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic (*use NRCS definitions*) **YES** points = 4 **NO** points = 0	
	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class): • Wetland has persistent, ungrazed vegetation > = 95% of area ..... points = 5 • Wetland has persistent, ungrazed vegetation > = 1/2 of area ..... points = 3 • Wetland has persistent, ungrazed vegetation > = 1/10 of area ..... points = 1 • Wetland has persistent, ungrazed vegetation < 1/10 of area ..... points = 0 **Map of Cowardin vegetation classes**	**Figure ___**
	D 1.4 Characteristics of seasonal ponding or inundation: *This is the area of the wetland that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 years.* • Area seasonally ponded is > 1/2 total area of wetland ..... points = 4 • Area seasonally ponded is > 1/4 total area of wetland ..... points = 2 • Area seasonally ponded is < 1/4 total area of wetland ..... points = 0 **Map of Hydroperiods**	**Figure ___**
	Total for D 1 *Add the points in the boxes above*	
D 2	**Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ____ Grazing in the wetland or within 150 ft ____ Untreated stormwater discharges to wetland ____ Tilled fields or orchards within 150 ft. of wetland ____ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ____ Residential, urban areas, golf courses are within 150 ft. of wetland ____ Wetland is fed by groundwater high in phosphorus or nitrogen ____ Other _____ **YES** multiplier is 2 **NO** multiplier is 1	*(see p. 44)* Multiplier _____
◆	**TOTAL – Water Quality Functions** Multiply the score from D1 by D2; then ***add score to table on p. 1***	
	HYDROLOGIC FUNCTIONS – Indicators that wetland unit functions to reduce flooding and stream degradation.	
D 3	**Does the wetland have the potential to reduce flooding and erosion?**	*(see p.46)*
	D 3.1 Characteristics of surface water flows out of the wetland unit • Unit is a depression with no surface water leaving it (no outlet) ..... points = 4 • Unit has an intermittently flowing, OR highly constricted permanently flowing outlet ..... points = 2 • Unit is a "flat" depression (Q.7 on key) or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch..... points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* • Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)* ..... points = 0	
	D 3.2 Depth of storage during wet periods. *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* • Marks of ponding are 3 ft. or more above the surface or bottom of the outlet ..... points = 7 • The wetland is a "headwater" wetland..... points = 5 • Marks of ponding between 2 ft. to < 3 ft. from surface or bottom of outlet..... points = 5 • Marks are at least 0.5 ft. to < 2 ft. from surface or bottom of outlet ..... points = 3 • Wetland is flat (yes to Q.2 or Q.7 on key)but has small depressions on the surface that trap water. points = 1 • Marks of ponding less than 0.5 ft ..... points = 0	
	D 3.3 Contribution of wetland unit to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* • The area of the basin is less than 10 times the area of unit..... points = 5 • The area of the basin is 10 to 100 times the area of the unit..... points = 3 • The area of the basin is more than 100 times the area of the unit ..... points = 0 • Entire unit is in the FLATS class ..... points = 5	
	Total for D 3 *Add the points in the boxes above*	

Wetland name or number: Wetland A

D 4	**Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* ____ Wetland is in a headwater of a river or stream that has flooding problems. ____ Wetland drains to a river or stream that has flooding problems ____ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ____ Other _____ **YES** multiplier is 2 **NO** multiplier is 1	*(see p. 49)* Multiplier _____
◆	**<u>TOTAL</u> – Hydrologic Functions** Multiply the score from D3 by D4; then ***add score to table on p. 1***	

Comments:

Wetland name or number: Wetland A

R	Riverine and Freshwater Tidal Fringe Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	(only 1 score per box)
R 1	**Does the wetland have the potential to improve water quality?** *(see p.52)*	
	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: • Depressions cover > 3/4 area of wetland ..... points = 8 • Depressions cover > 1/2 area of wetland ..... points = 4 **(If depressions > 1/2 of area of unit draw polygons on aerial photo or map)** • Depressions present but cover < 1/2 area of wetland. ..... points = 2 • No depressions present ..... points = 0	**Figure ___**
	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): • Trees or shrubs > 2/3 area of the unit ..... points = 8 • Trees or shrubs > 1/3 area of the wetland ..... points = 6 • Ungrazed, herbaceous plants > 2/3 area of unit ..... points = 6 • Ungrazed herbaceous plants > 1/3 area of unit ..... points = 3 • Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit ..... points = 0 **Aerial photo or map showing polygons of different vegetation types**	**Figure ___**
	Add the points in the boxes above	
R 2	**Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ____ Grazing in the wetland or within 150 ft ____ Untreated stormwater discharges to wetland ____ Tilled fields or orchards within 150 ft. of wetland ____ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ____ Residential, urban areas, golf courses are within 150 ft. of wetland ____ The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality. ____ Other _____ **YES** multiplier is 2 **NO** multiplier is 1	*(see p. 53)* Multiplier _____
◆	**TOTAL – Water Quality Functions** Multiply the score from R1 by R2; then ***add score to table on p. 1***	
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
R 3	**Does the wetland have the potential to reduce flooding and erosion?**	*(see p.54)*
	R 3.1 Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit) / (average width of stream between banks).* • If the ratio is more than 20 ..... points = 9 • If the ratio is between 10 – 20 ..... points = 6 • If the ratio is 5- <10 ..... points = 4 • If the ratio is 1- <5 ..... points = 2 • If the ratio is < 1 ..... points = 1 **Aerial photo or map showing average widths**	**Figure ___**
	R 3.2 Characteristics of vegetation that slow down water velocities during floods: *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description. (polygons need to have >90% cover at person height NOT Cowardin classes):* • Forest or shrub for > 1/3 area OR herbaceous plants > 2/3 area ..... points = 7 • Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area ..... points = 4 • Vegetation does not meet above criteria ..... points = 0 **Aerial photo or map showing polygons of different vegetation types**	**Figure ___**
	Add the points in the boxes above	
R 4	**Does the wetland have the opportunity to reduce flooding and erosion?** Answer YES if the wetland is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* ____ There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. ____ There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding ____ Other _____ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is 2 **NO** multiplier is 1	*(see p.57)* Multiplier _____
◆	**TOTAL – Hydrologic Functions** Multiply the score from R3 by R4; then ***add score to table on p. 1***	

Comments:

Wetland name or number: Wetland A

L	Lake-fringe Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that the wetland unit functions to improve water quality.	(only 1 score per box)
L 1	**Does the wetland unit have the potential to improve water quality?** *(see p.59)*	
	L 1.1 Average width of vegetation along the lakeshore (use polygons of Cowardin classes): • Vegetation is more than 33 ft. (10m) wide ..... points = 6 • Vegetation is more than 16 ft.(5m) wide and < 33 ft..... points = 3 • Vegetation is more than 6 ft. (2m) wide and < 16 ft ..... points = 1 • Vegetation is less than 6 ft. wide..... points = 0 **Map of Cowardin classes with widths marked**	**Figure ___**
	L 1.2 Characteristics of the vegetation in the wetland: *Choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.* • Cover of herbaceous plants is > 90% of the vegetated area..... points = 6 • Cover of herbaceous plants is > 2/3 of the vegetated area..... points = 4 • Cover of herbaceous plants is > 1/3 of the vegetated area..... points = 3 • Other vegetation that is not aquatic bed or herbaceous covers > 2/3 of the unit ..... points = 3 • Other vegetation that is not aquatic bed in > 1/3 vegetated area ..... points = 1 • Aquatic bed cover and open water > 2/3 of the unit..... points = 0 **Map with polygons of different vegetation types**	**Figure ___**
	Add the points in the boxes above	
L 2	**Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in the lake water, or polluted surface water flowing through the unit to the lake. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ____ Wetland is along the shores of a lake or reservoir that does not meet water quality standards ____ Grazing in the wetland or within 150 ft ____ Polluted water discharges to wetland along upland edge ____ Tilled fields or orchards within 150 ft. of wetland ____ Residential or urban areas are within 150 ft. of wetland ____ Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of lake shore) ____ Power boats with gasoline or diesel engines use the lake ____ Other _____ **YES** multiplier is 2 **NO** multiplier is 1	*(see p.61)* Multiplier _____
◆	**TOTAL – Water Quality Functions** Multiply the score from L1 by L2; then ***add score to table on p. 1***	
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce shoreline erosion.	
L 3	**Does the wetland have the potential to reduce shoreline erosion?**	*(see p.62)*
	L 3 Average width and characteristics of vegetation along the lakeshore *(do not include aquatic bed): (choose the highest scoring description that matches conditions in the wetland)* • 3/4 of distance is shrubs or forest at least 33 ft. (10m) wide ..... points = 6 • 3/4 of distance is shrubs or forest at least 6 ft. (2m) wide. ..... points = 4 • 1/4 of distance is shrubs or forest at least 33 ft. (10m) wide. ..... points = 4 • Vegetation is at least 6 ft. (2m) wide (any type except aquatic bed)..... points = 2 • Vegetation is less than 6 ft. (2m) wide (any type except aquatic bed) ..... points = 0 **Aerial photo or map with Cowardin vegetation classes**	**Figure ___**
	Record the points in the boxes above	
L 4	**Does the wetland have the opportunity to reduce erosion?** Are there features along the shore that will be impacted if the shoreline erodes? *Note which of the following conditions apply.* ____ There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion. ____ There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests, other wetlands) that can be damaged by shoreline erosion. ____ Other _____ **YES** multiplier is 2 **NO** multiplier is 1	*(see p. 64)* Multiplier _____
◆	**TOTAL – Hydrologic Functions** Multiply the score from L3 by L4; then ***add score to table on p. 1***	

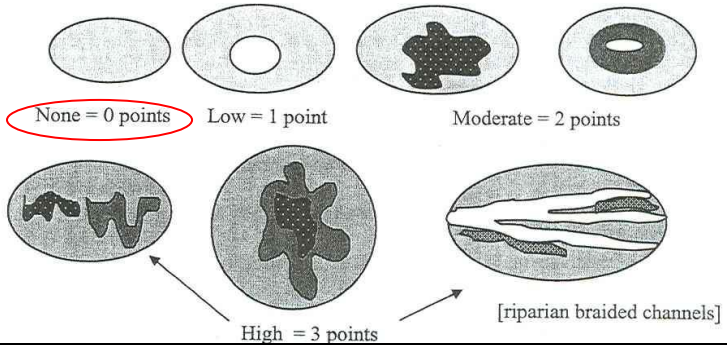
Comments:

Wetland name or number: Wetland A

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	(only 1 score per box)
S 1	**Does the wetland have the potential to improve water quality?**	*(see p.64)*
	S 1.1 Characteristics of average slope of unit: • Slope is 1% or less *(a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)*..... points = 3 • Slope is 1% - 2% ..... points = 2 • Slope is 2% - 5%. ..... points = 1 • Slope is greater than 5% ..... points = 0	1
	S 1.2 The soil 2 inches below the surface (or duff layer) is clay, organic *(Use NRCS definitions).* **YES** = 3 points **NO** = 0 points	0
	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* • Dense, uncut, herbaceous vegetation > 90% of the wetland area ..... points = 6 • Dense, uncut, herbaceous vegetation > 1/2 of area ..... points = 3 • Dense, woody, vegetation > 1/2 of area. ..... points = 2 • Dense, uncut, herbaceous vegetation > 1/4 of area ..... points = 1 • Does not meet any of the criteria above for vegetation ..... points = 0 **Aerial photo or map with vegetation polygons**	**Figure ___** 0
	Total for S 1 *Add the points in the boxes above*	1
S 2	**Does the wetland have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ____ Grazing in the wetland or within 150 ft X Untreated stormwater discharges to wetland ____ Tilled fields, logging, or orchards within 150 ft. of wetland X Residential, urban areas, or golf courses are within 150 ft. upslope of wetland ____ Other _____ **YES** multiplier is 2 **NO** multiplier is 1	*(see p. 67)* Multiplier 2
◆	**TOTAL – Water Quality Functions** Multiply the score from S1 by S2; then ***add score to table on p. 1***	2
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
S 3	**Does the wetland have the potential to reduce flooding and stream erosion?**	*(see p.68)*
	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms: *Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows).* • Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland ..... points = 6 • Dense, uncut, **rigid** vegetation> 1/2 area of wetland..... points = 3 • Dense, uncut, **rigid** vegetation > 1/4 area. ..... points = 1 • More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid ..... points = 0	0
	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. **YES** = 2 points **NO** = 0 points	0
	Add the points in the boxes above	0
S 4	**Does the wetland have the opportunity to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ____ Wetland has surface runoff that drains to a river or stream that has flooding problems ____ Other _____ *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* **YES** multiplier is 2 **NO** multiplier is 1	*(see p. 70)* Multiplier 1
◆	**TOTAL – Hydrologic Functions** Multiply the score from S3 by S4; then ***add score to table on p. 1***	0

Comments:

Wetland name or number: Wetland A

These questions apply to wetlands of all HGM classes.		**Points** (only 1 score per box)
	HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.	
H 1	**Does the wetland have the potential to provide habitat for many species?**	
	H 1.1 Vegetation structure *(see P. 72)*: *Check the types of vegetation classes present (as defined by Cowardin) – Size threshold for each class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____ Aquatic Bed ____ Emergent plants ____ Scrub/shrub (areas where shrubs have > 30% cover) ____ Forested (areas where trees have > 30% cover) *If the unit has a forested class check if:* ____ The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. *Add the number of vegetation types that qualify. If you have:* **Map of Cowardin vegetation classes** 4 structures or more ..... points = 4 — 3 structures ..... points = 2 2 structures ..... points = 1 — 1 structure ..... points = 0	**Figure ___** 0
	H 1.2 Hydroperiods *(see p.73)*: *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 acre to count (see text for descriptions of hydroperiods).* ____ Permanently flooded or inundated — 4 or more types present points = 3 ____ Seasonally flooded or inundated — 3 or more types present ..... points = 2 ____ Occasionally flooded or inundated — 2 types present ..... points = 1 ____ Saturated only — 1 type present ..... points = 0 X___ Permanently flowing stream or river in, or adjacent to, the wetland ____ Seasonally flowing stream in, or adjacent to, the wetland ____ **Lake-fringe wetland ..... = 2 points** ____ **Freshwater tidal wetland ..... = 2 points** **Map of hydroperiods**	**Figure ___** 0
	H 1.3 Richness of Plant Species *(see p. 75)*: Count the number of plant species in the wetland that cover at least 10 ft^2 *(different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.* If you counted: > 19 species ..... points = 2 5 – 19 species ..... points = 1 List species below if you want to: < 5 species ..... points = 0 _____ _____ _____ _____	0
	H 1.4 Interspersion of Habitats *(see p. 76)*: Decided from the diagrams below whether interspersion between Cowardin vegetation (described in H1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  Note: If you have 4 or more classes or 3 vegetation classes and open water, the rating is always "high". **Use map of Cowardin classes.**	**Figure ___** 0
	H 1.5 Special Habitat Features *(see p. 77)*: *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____ Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft. long) ____ Standing snags (diameter at the bottom > 4 inches) in the wetland ____ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft. (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft. (10m) ____ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____ At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ____ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	0
	H 1 TOTAL Score – potential for providing habitat *Add the points in the column above*	0

Wetland name or number: Wetland A

H 2	**Does the wetland have the opportunity to provide habitat for many species?**	(only 1 score per box)
	H 2.1 Buffers *(see P. 80)*: *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed".* ____ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% of circumference. No structures are within the undisturbed part of buffer (relatively undisturbed also means no grazing, no landscaping, no daily human use)..... **points = 5** X___ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference ..... **points = 4** ____ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% circumference ..... **points = 4** ____ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference ..... **points = 3** ____ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference ..... **points = 3** **If buffer does not meet any of the criteria above:** ____ No paved areas (except paved trails) or buildings within 25m (80 ft) of wetland > 95% circumference. Light to moderate grazing or lawns are OK ..... **points = 2** ____ No paved areas of buildings within 50m of wetland for > 50% circumference. Light to moderate grazing or lawns are OK ..... **points = 2** ____ Heavy grazing in buffer ..... **points = 1** ____ Vegetated buffers are < 2m wide (6.6 ft) for more than 95% circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) ..... **points = 0** ____ Buffer does not meet any of the criteria above ..... **points = 1** **Arial photo showing buffers**	**Figure ___** 4
	H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft. wide, has at least a 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? *(Dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor).* **YES** = **4 points** (go to H 2.3) **NO** = go to H 2.2.2 H. 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50 ft. wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR a Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? **YES** = **2 points** (go to H 2.3) **NO** = go to H 2.2.3 H. 2.2.3 Is the wetland: • Within 5 mi (8km) of a brackish or salt water estuary OR • Within 3 miles of a large field or pasture (> 40 acres) OR **YES** = 1 point • Within 1 mile of a lake greater than 20 acres? **NO** = 0 points	1

Comments:

	H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82): *(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)* Which of the following priority habitats are within 330 ft. (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ____ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ____ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*). ____ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock. ____ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. **(**Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. ____ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*). __X__ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*). __X__ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ____ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).* ____ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ____ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. __X_ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has **3 or more** priority habitats **= 4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat **= 1 point** No habitats = 0 points Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)	3
	H 2.4 Wetland Landscape: *Choose the **one** description of the landscape around the wetland that best fits (see p. 84)* • There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.....points = 5 • The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 mile .....points = 5 • There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. .....points = 3 • The wetland fringe on a lake **with** disturbance and there are 3 other lake-fringe wetlands within 1/2 mile.....points = 3 • There is at least 1 wetland within 1/2 mile .....points = 2 • There are no wetlands within 1/2 mile.....points = 0	2
	H 2 TOTAL Score – opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	10
	TOTAL for H 1 from page 8	0
◆	**Total Score for Habitat Functions** Add the points for H 1 and H 2; then ***record the result on p. 1***	10

Comments:

Wetland name or number: Wetland A

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

	Wetland Type – *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	
SC1	**Estuarine wetlands?** *(see p.86)* Does the wetland unit meet the following criteria for Estuarine wetlands? ____ The dominant water regime is tidal, ____ Vegetated, and ____ With a salinity greater than 0.5 ppt. **YES** = Go to SC 1.1 **NO** _____	
	SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? **YES** = Category I **NO** = go to SC 1.2	**Cat. 1**
	SC 1.2 Is the wetland at least 1 acre in size and meets at least two of the following conditions? **YES** = Category I **NO** = Category II ____ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp,. are only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category 1. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. ____ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland ____ The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual Rating I/II**
SC2	**Natural Heritage Wetlands** *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland being rated in a Section/Township/Range that contains a natural heritage wetland? *(This question is used to screen out most sites before you need to contact WNHP/DNR.)* S/T/R information from Appendix D _____ or accessed from WNHP/DNR web site _____ **YES** _____ Contact WNHP/DNR (see p. 79) and go to SC 2.2 **NO** _____ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state threatened or endangered plant species? **YES** = Category 1 **NO** _____ not a Heritage Wetland	**Cat I**
SC3	**Bogs** *(see p. 87)* Does the wetland **(or any part of the unit)** meet both the criteria for soils and vegetation in bogs? Use the key below to identify if the wetland is a bog. ***If you answer yes you will still need to rate the wetland based on its function.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of soil profile? (See Appendix B for a field key to identify organic soils)? **YES** = go to question 3 **NO** = go to question 2 2. Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? **YES** = go to question 3 **NO** = is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? **YES** = Is a bog for purpose of rating **NO** = go to question 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. 4. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine. WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)*? **YES** = Category I **NO** = Is not a bog for purpose of rating	**Cat. I**

SC4	**Forested Wetlands** *(see p. 90)* Does the wetland have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its function.* ____ **Old-growth forests**: (west of Cascade Crest) Stands of at least two three species forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm or more). NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ____ **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have an average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. **YES** = Category I **NO** = _____ not a forested wetland with special characteristics	**Cat. I**
SC5	**Wetlands in Coastal Lagoons** *(see p. 91)* Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ____ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks. ____ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom.)* **YES** = Go to SC 5.1 **NO** _____ not a wetland in a coastal lagoon SC 5.1 Does the wetland meet all of the following three conditions? ____ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing) and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ____ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland. ____ The wetland is larger than 1/10 acre (4350 square ft.) **YES** = Category I **NO** = Category II	**Cat. I** **Cat. II**
SC6	**Interdunal Wetlands** *(see p. 93)* Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? **YES** = Go to SC 6.1 **NO** _____ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula -- lands west of SR 103 • Grayland-Westport -- lands west of SR 105 • Ocean Shores-Copalis – lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger? **YES** = Category II **NO** = go to SC 6.2 SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? **YES** = Category III	**Cat. II** **Cat. III**
◆	**Category of wetland based on Special Characteristics** *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered **NO** for all types enter "Not Applicable" on p. 1	

Comments:

Appendix F — Qualifications

All field inspections, jurisdictional wetland boundary delineations, OHW determinations, habitat assessments, and supporting documentation, including this ***Critical Areas Study*** prepared for the ***Amalani/Goldenwood Project*** were prepared by, or under the direction of, Jeremy Downs and Railin Peterson of Soundview Consultants LLC.

Jeremy Downs, Principal Scientist and Environmental Planner

Jeremy Downs is the Principal Scientist and Environmental Planner for the project with professional training and extensive experience in land use, site planning and design, project coordination, permitting and management, marine and wetland ecology, habitat restoration, wetland, stream, and benthic delineations and assessments, stream assessments, underwater and terrestrial monitoring programs, and mitigation planning and design since 1987.

Jeremy earned a Bachelor's of Science degree in Biology from the University of California, Davis. In addition, he studied under the Environmental Risk and Recovery program at the Australian Institute of Marine Science. He also holds graduate-level professional certifications in various advanced wetland science and management programs from both Portland State University and San Francisco State University, and he has received professional training in Salmonid Biology from the University of California Extension.

Jeremy has been formally trained in the use of the Washington State Wetland Rating System, Determination of Ordinary High Water Mark, Designing Compensatory Mitigation and Restoration Projects, and Reviewing Wetland Mitigation and Monitoring Plans from the US Army Corps of Engineers and Washington State Department of Ecology, and in conducting Biological Assessments from the Washington Department of Transportation. He is also a Pierce County Qualified Wetland Specialist and Fisheries Biologist, and he holds similar qualifications from other jurisdictions.

1/31/2014

Jeremy Downs
Principal Scientist

Date

Soundview Consultants LLC
2907 Harborview Drive
Gig Harbor, WA 98335
(253) 514-8952 Office
(253) 514-8954 Fax
jeremy@soundviewconsultants.com

Railin Peterson, Environmental Scientist

Railin Peterson is a professional Environmental Scientist with background in both fresh water and marine ecology. She has experience in fisheries management, assessing marine, shoreline, stream, and wetland systems, conducting biological evaluations, documentation and coordination of ESA, MSA, and NEPA compliance efforts, NPDES compliance, Geographical Information Systems (GIS) mapping and analysis, and regulatory coordination and permitting. Railin earned a Bachelor's of Science degree from the Evergreen State College, Olympia and a Master's in Marine and Environmental Affairs from the University of Washington, Seattle.

In addition, she has received formal training in the National Environmental Policy Act (NEPA), GIS for Fisheries and Wildlife Biology Applications, Determining Ordinary High Water, Habitat Restoration, NPDES Phase I and II stormwater monitoring, and various other data analysis and regulatory subjects. For a list of representative projects, please contact her at Soundview Consultants LLC.

_____ 1/31/2014

Railin Peterson Date
Environmental Scientist

Soundview Consultants LLC
2907 Harborview Drive
Gig Harbor, WA 98335
(253) 514-8952 Office
(253) 514-8954 Fax
railin@soundviewconsultants.com