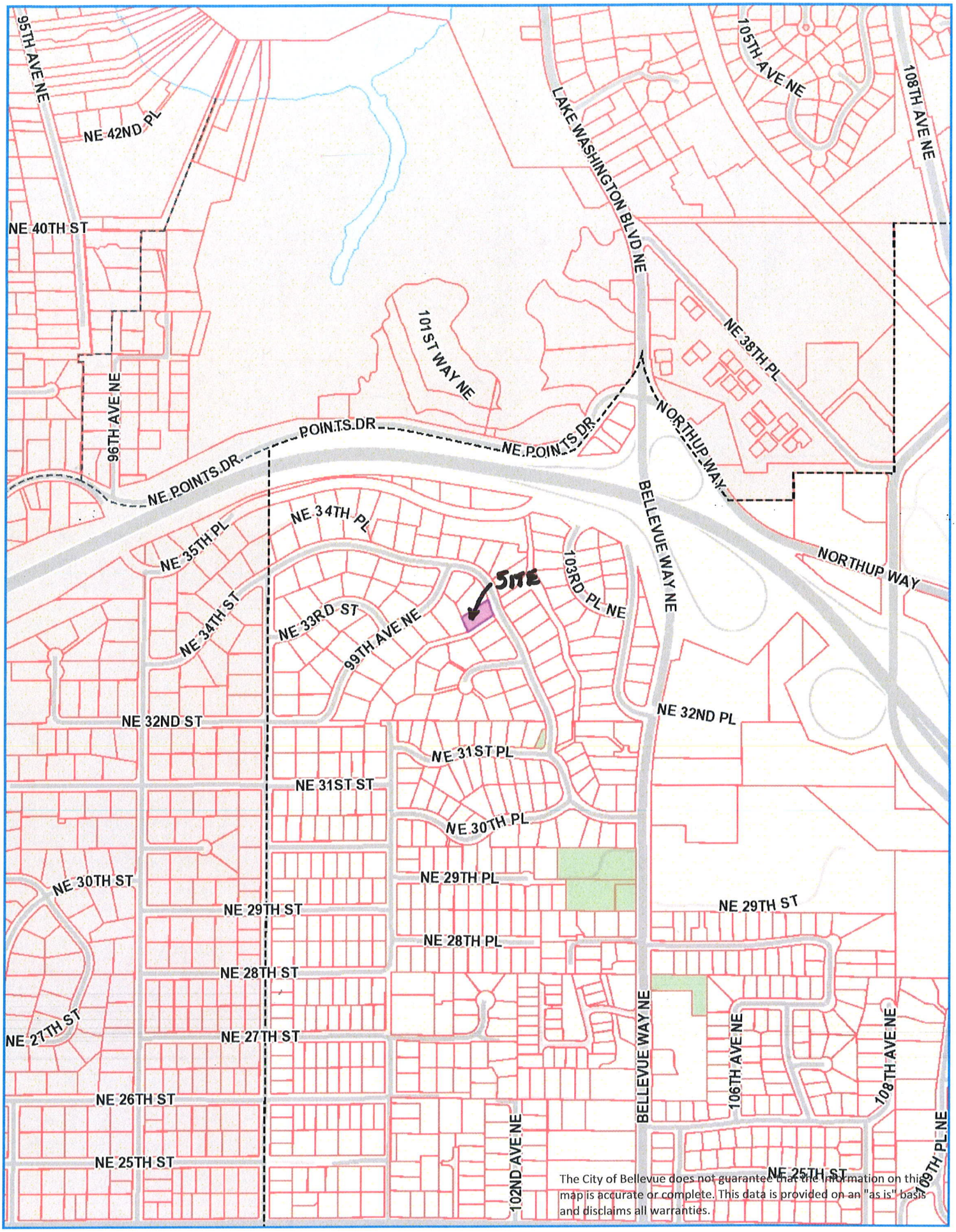

The City of Bellevue does not guarantee that the information on this map is accurate or complete. This data is provided on an "as is" basis and disclaims all warranties.

ENVIRONMENTAL CHECKLIST

UPDATED 2014

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

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. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

DJ 12/22/14

A. background

1. Name of proposed project, if applicable: *Wu/He Residence*

2. Name of applicant: *Michelle Wu*

3. Address and phone number of applicant and contact person:
   8810 NE 24th Street
   Clyde Hill, WA 98004

4. Date checklist prepared: *December 1, 2014*

5. Agency requesting checklist: *City of Bellevue, WA.*

6. Proposed timing or schedule (including phasing, if applicable):
   Construction of the single family home is anticipated to begin in 2015.

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

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
   A critical areas report and buffer impact/mitigation plan has been prepared by Altmann Oliver Associates, LLC.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
   None to our knowledge.

10. List any government approvals or permits that will be needed for your proposal, if known.
    Building permit.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)
    The proposal is for the construction of one single family detached home upon the property within the same general vicinity as an existing single-family residence which will be demolished. The property is 13,511 s.f. in size and the proposed lot coverage will be 2,247 s.f. for the new building. The proposed project requires the modification of the buffer and structure setback from an off-site Type F stream.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic

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map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project is located at 3323 – 102nd Ave. NE in the City of Bellevue, WA. The tax parcel is 412230-0085.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site
Flat, rolling, **hilly**, steep slopes, mountainous,
other _____

b. What is the steepest slope on the site (approximate percent slope)?
35% (17% average)

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

The NRCS has mapped the entire site as Arents, Alderwood Material, 6 to 15 % slopes.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. *None noted*

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

New excavation is minimal beyond the removal of existing residence. Need for imported fill and source to be determined pending removal of existing residence.

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

Due to slope of lot, the property has low to moderate erosion potential if left exposed. The proper use of "best management practices" (BMPs) should be used during development of the project.

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

Following construction, the site will contain 4,247 s.f. (31.4%) impervious surface.

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

The proper use of BMPs should be used during development of the project.

Erosion Control Further Mitigated for BCC 23.076 "Erosion Control"

D S. 12/22/04

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

Limited standard emissions associated with construction of a single-family residence.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. *None known.*

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

Construction equipment will be limited in use and will not be left idling on site.

3. **Water**

a. Surface Water:

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.

A small Type F stream drains from west to east off-site to the south.

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, the construction of the replacement home will be located within the buffer and structure setback of the creek.

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. *None.*

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.
No, there will be no surface withdrawals or diversions.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
No

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

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities

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withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.
No

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage, industrial, 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.
None, the home will be served by public sewer.

c. Water runoff (including stormwater):

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 will be directed to infiltrate on site.

2) Could waste materials enter ground or surface waters? If so, generally describe.
No

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. *No*

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

Standard best management practices will be used for the construction of the single family detached home and the driveway.

4. Plants

a. Check the types of vegetation found on the site: [help]

X deciduous tree: alder, maple, aspen, other
X evergreen tree: fir, cedar, pine, other
X shrubs
X grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
____ wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

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

No significant vegetation is currently proposed for removal. A hedge row of Douglas fir trees along the northeast property line may be reviewed in the future to determine if they are hazardous and require removal.

c. List threatened and endangered species known to be on or near the site. [help]

None known.

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

A buffer enhancement plan has been prepared that should increase the habitat functions of the buffer over current conditions.

e. List all noxious weeds and invasive species known to be on or near the site.

Himalayan blackberry (Rubus armeniacus) and English ivy (Hedera helix) are located on the site and will be removed as part of the buffer enhancement plan.

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include: [help]

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other: mice, voles, raccoons
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site. [help]

None known

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

The site is located within the Pacific Flyway.

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

A buffer enhancement plan has been prepared that should increase wildlife habitat over current conditions.

e. List any invasive animal species known to be on or near the site.

None known.

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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 needs? Describe whether it will be used for heating, manufacturing, etc.

Standard Residential/home heating, cooling and water heating.

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 this proposal? List other proposed measures to reduce or control energy impacts, if any:

High efficiency air and water heating units.

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. *None known.*

1) Describe any known or possible contamination at the site from present or past uses.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

4) Describe special emergency services that might be required.

5) Proposed measures to reduce or control environmental health hazards, if any:

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? *None known.*

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

The only source of noise would be from the limited use of construction equipment in building the home.

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3) Proposed measures to reduce or control noise impacts, if any: *None.* NOISE FURTHER MITIGATED PER BCC 9.18 "NOISE CONTROL"

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.
The site currently contains an existing single-family residence. Single family homes are located to the north and south and there will be no impact to these uses.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? *None.*

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: *No.*

c. Describe any structures on the site. *The site currently contains a single-family residence.*

d. Will any structures be demolished? If so, what? *Yes – the structure will be removed to allow for the construction of a new residence in the same general vicinity.*

e. What is the current zoning classification of the site? *R-2.5*

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

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

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.
Yes, a small Type F stream is located off-site to the south and the buffer and structure setback for the creek encroach into the project site.

i. Approximately how many people would reside or work in the completed project?
Approximately 2 to 6 people will live in the single family house

j. Approximately how many people would the completed project displace? *None.*

k. Proposed measures to avoid or reduce displacement impacts, if any: *None*

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: *None, the single family home will be very compatible.*

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any: *NA.*

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. *One middle/high income single family home will be constructed.*

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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.*

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? The house will be approx. 30' above av. grade. Principal exterior building material(s) proposed are composite.

b. What views in the immediate vicinity would be altered or obstructed? *None*

c. Proposed measures to reduce or control aesthetic impacts, if any: *None.*

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? *Typical lighting associated with single-family residence.*

b. Could light or glare from the finished project be a safety hazard or interfere with views? *No.*

c. What existing off-site sources of light or glare may affect your proposal? *None known.*

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

All lighting will be low wattage and directed down and not toward the stream buffer.

12. **Recreation**

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

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: *None.*

13. **Historic and cultural preservation**

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. *The existing residence was constructed in 1966.*

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. *None known.*

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c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. *None.*

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required. *NA.*

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.
The site is served by 102nd Ave. NE to the east.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? *Unknown*

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? *NA*

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). *No*

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. *No*

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? *Typical for one single-family residence.*

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe. *NA*

h. Proposed measures to reduce or control transportation impacts, if any: *None*

15. **Public services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. *No*

b. Proposed measures to reduce or control direct impacts on public services, if any. *None*

16. **Utilities**

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

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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. *NA - existing*

C. 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: John Altmann

Name of signee JOHN ALTMANN

DA 12/22/14

Altmann Oliver Associates, LLC

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

AOA

Environmental Planning & Landscape Architecture

December 10, 2014

AOA-4515

Bin He
Binhe68@yahoo.com

SUBJECT: **Revised Critical Areas Study for Project 14-136335 LO**
3323 – 102nd Ave. NE, Bellevue, WA
Stream Buffer Modification and Enhancement

Dear Bin:

We have prepared this revised critical areas study associated with the demolition and replacement of your single-family residence located at the subject property. The purpose of this revised report is to: 1) address the comments presented in the September 24, 2014 letter from Drew Folsom, Assistant Planner with the City of Bellevue's Department of Planning & Community Service and 2) address the site plan revisions due to comments by the geotechnical engineer.

1.0 EXISTING CONDITIONS

The project site is currently developed with an existing single-family residence and associated yard. A small Type F stream flows from west to east off-site to the south. Type F streams require a standard 50-foot buffer plus 50-foot structure setback from the ordinary high water of the stream per BMC 20.25H.035.A. The 50-foot stream buffer encroaches into the existing non-conforming residence and nearly the entire property is encumbered by the buffer and structure setback (**Figure 1**).

Trees on the site are limited to two large western red cedar (*Thuja plicata*) trees in the southwestern portion of the site and a hedge of Douglas fir (*Pseudotsuga menziesii*) trees in the northeastern corner of the property. Understory vegetation beneath the cedars in the southwestern portion of the site includes a mix of both native shrubs and non-native Himalayan blackberry (*Rubus armeniacus*), Portugal laurel (*Prunus lusitanica*), and English ivy (*Hedera helix*).

2.0 STREAM BUFFER AND STRUCTURE SETBACK MODIFICATION

The proposed project consists of the demolition of the existing residence and the construction of a new residence in the same vicinity as the old residence. As part of the re-construction, 122 s.f. of new structure would be constructed in the critical area buffer and 242 s.f. of new structure would be constructed in the critical area buffer structure setback. The proposed project would also create 409 s.f. of new impervious within the buffer and 654 s.f. of new impervious within the structure setback associated with reconstruction of the driveway and parking area. Total new buffer impacts are 1,427 s.f. (**Figure 2**).

Removal of existing impervious surfaces associated with the project include 274 s.f. within the buffer and 808 s.f. within the structure setback. Total net impervious surfaces following construction are therefore an increase of 257 s.f. within the buffer and an increase of 88 s.f. within the structure setback for a total net new impervious of 345 s.f.

The proposed project has been designed to avoid and minimize impacts to the buffer to the extent feasible. However, due to the lot size and configuration it is not possible to develop a new residence outside of the stream buffer and structure setback. No significant native vegetation is currently proposed for removal as part of the proposed project and the buffer areas impacted do not currently provide any meaningful protective or habitat functions to the riparian corridor. Furthermore, no part of the new structure would be located any closer to the stream than the closest point of the existing non-conforming structure and most of the impacted areas are currently separated from the stream by the existing driveway.

The hedge row of Douglas fir located along the outer edge of the structure setback in the northeast corner of the site may require a future arborist review to determine if they can safely be retained. These trees currently provide limited value to the riparian corridor due to their separation from the stream by the existing development.

3.0 CRITICAL AREA MITIGATION

Mitigation for the modification to the stream buffer and structure setback would occur through the removal of invasive non-native plant species (e.g., Himalayan blackberry, English ivy, and Portugal laurel) and re-planting with a variety of native plant species. Mitigation would occur throughout the buffer and structure setback area in the southwestern portion of the site.

Planting the area with native species would increase the plant species and structural diversity over existing conditions, thereby increasing the habitat value of the riparian corridor. In addition, it is our understanding that the proposal calls for all stormwater from the impervious surfaces on the site to be collected and infiltrated within the front yard. Since the current residence lacks an infiltration system, the proposed drainage plan would reduce the ability of pollutants to enter the stream and should increase water quality within the riparian corridor.

As part of the its review, the City of Bellevue requires an analysis of the level of protection of critical area functions and values provided by the regulations or standards of the City Code, compared with the level of protection provided by the proposal. This analysis includes:

- *A discussion of the functions and values likely to be provided by the critical area and critical area buffer on the site through the modifications and performance standards included in the proposal over the anticipated life of the proposed development*;

The proposed project would increase the habitat functions of the stream buffer over current conditions by increasing the structural and plant species diversity within the riparian corridor. Since the areas of proposed modification do not currently provide any significant habitat or protection functions to the stream, there would be a net increase in overall habitat function with implementation of the proposal.

In addition, the current residence does not provide any stormwater treatment to runoff draining from impervious surfaces. Under the proposed project, runoff from impervious surfaces would be collected and allowed to infiltrate within the front yard. This drainage plan should limit the potential of pollutants entering the stream and should increase water quality within the riparian corridor over current conditions.

- *A discussion of the performance standards applicable to the critical area and proposed activity pursuant to LUC 20.25H.080, and recommendation for additional or modified performance standards, if any. The performance standards in LUC 20.25H.080 include:*

1. *Lights shall be directed away from the stream.*

It is our recommendation that all outdoor lights from the residence should contain low-wattage bulbs with narrow angles of illumination directed away from the stream buffer. Metal hoods should be added to all exterior lights to direct lighting down and not out from fixtures.

2. *Activity that generates noise such as parking lots, generators, and residential uses shall be located away from the stream or any noise shall be minimized through use of design and insulation techniques.*

Not applicable – the new residence would replace an existing residence that is currently located within the buffer.

3. *Toxic runoff from new impervious area shall be routed away from the stream.*

Stormwater collected from impervious surfaces would be infiltrated within the front yard, thereby reducing the potential of pollutants from entering the stream.

4. *Treated water may be allowed to enter the stream critical area buffer.*

Infiltrated runoff would slowly percolate into the groundwater and re-enter the riparian corridor.

5. *The outer edge of the stream critical area buffer shall be planted with dense vegetation to limit pet or human use.*

A planting plan has been prepared that would significantly increase the density of native plants within the buffer and structure setback over current conditions.

6. *Use of pesticides, insecticides and fertilizers within 150 feet of the edge of the stream critical area buffer shall be in accordance with the City of Bellevue's "Environmental Best Management Practices," now or as hereafter amended.*

All plants utilized in the buffer enhancement plan are native species that should not require pesticides, insecticides, or fertilizers to establish or maintain.

- *A discussion of the mitigation requirements applicable to the proposal pursuant to LUC 20.25H.210, and a recommendation for additional or modified mitigation, if any.*

The proposed enhancement area contains a native canopy with a 100% non-native groundcover and some non-native (laurel) shrubs. The non-natives will be removed and re-planting will be conducted as depicted on the buffer enhancement plan. This plan has been designed to allow for the establishment of dense native shrub and groundcover stratum beneath the existing canopy. The enhancement area consists of 2,318 s.f., which represents a 6.7:1 enhancement area to new impervious ratio within the riparian corridor.

- *The functions that will be enhanced by the restoration actions, addressing at minimum habitat, hydrology, water quality and (where applicable) stream process functions.*

As previously discussed, the proposed project would enhance the habitat functions of the riparian corridor by increasing the plant species and structural diversity. In addition, the hydrologic support and water quality functions would increase through the implementation of a drainage plan that focuses on infiltration rather than diverting runoff directly into the storm system in the roadway.

- *Functions that will be provided outside of the reduced regulated buffer dimension proposed by the project, if any (for example, stormwater quality and quantity controls or low impact development features).*

The existing residence is currently located within the stream buffer and the proposed project would replace this structure with a larger residence in the same general vicinity. The area of expansion is developed with yard and does not currently provide significant functions to the stream. Implementation of the buffer enhancement plan would increase the habitat and water quality functions of the buffer over current conditions.

- *The relative importance of the enhanced functions to the ecosystem in which they exist.*

Although entirely surrounded by existing development and disconnected from other significant habitat areas, the off-site stream is considered by the City of Bellevue to contain fish habitat. Maintaining a diverse vegetated corridor adjacent the stream is important to allow for continued shade and for the ability of nutrients and other organic detritus to enter the stream system. The enhanced buffer also aids in the trapping of sediments and other pollutants and helps maintain water quality in downstream areas. The trapping of sediments prevents fish habitat degradation by limiting silt accumulation within spawning areas.

- *A description of the net gain in functions by the restoration actions in the reduced regulated buffer area and the proposal, compared to the functions that would be preserved under standard buffer provisions of the CAO without restoration.*

The areas of buffer and structure setback proposed for modification consist of existing yard areas that do not currently provide any significant benefit to the stream system. Following implementation of the buffer enhancement plan, the structural and plant species diversity within the riparian corridor will increase, thereby increasing the wildlife habitat value. In addition, the water quality functions of the buffer should increase post construction since a drainage plan has been developed to infiltrate collected stormwater runoff.

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

As discussed above, the existing residence located within the buffer lacks a drainage plan and it is my understanding that much of the stormwater runoff currently enters the storm system in the street. It is also my understanding that the current proposal has been designed to allow for infiltration within the front yard of the new residence. Infiltration should allow for stormwater to slowly percolate into the riparian corridor and aid in the removal of sediments and other pollutants.

3.1 Goal, Objectives, and Performance Standards for Mitigation Area

The primary goal of the mitigation plan is to increase the habitat functions of the selected buffer and structure setback areas. To meet this goal, the following objectives and performance standards have been incorporated into the design of the plan:

Objective A: Increase the structural and plant species diversity within the mitigation area.
Performance Standard: There will be 100% survival of all woody planted species throughout the mitigation area at the end of the first year of planting. For Years 2-5, success will be based on an 85% survival rate or similar number of recolonized native woody plants.

Objective B: Limit the amount of invasive and exotic species within the mitigation area.
Performance Standard: After construction and following every monitoring event for a period of five years, exotic and invasive plant species will be maintained at levels below 10% total cover in the designated mitigation areas. Invasive species include, but are not limited to, Himalayan blackberry, English ivy, and Portugal laurel.

3.2 Construction Management

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

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

3.3 Monitoring Methodology

The monitoring program will be conducted for a period of five years, with annual reports submitted to the City. Vegetation monitoring will include general appearance, health, mortality, colonization rates, percent cover, percent survival, volunteer plant species, and invasive weeds.

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

3.4 Maintenance Plan
Maintenance will be conducted on a routine, year round basis. Additional maintenance needs will be identified and addressed following periodic maintenance reviews. Routine removal and control of non-native and other invasive plants within the designated mitigation area shall be performed by manual means. Undesirable and weedy exotic plant species shall be maintained at levels below 10% total cover within the mitigation area during the monitoring period.

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

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

If you have any questions regarding the critical areas study, please give me a call.

Sincerely,

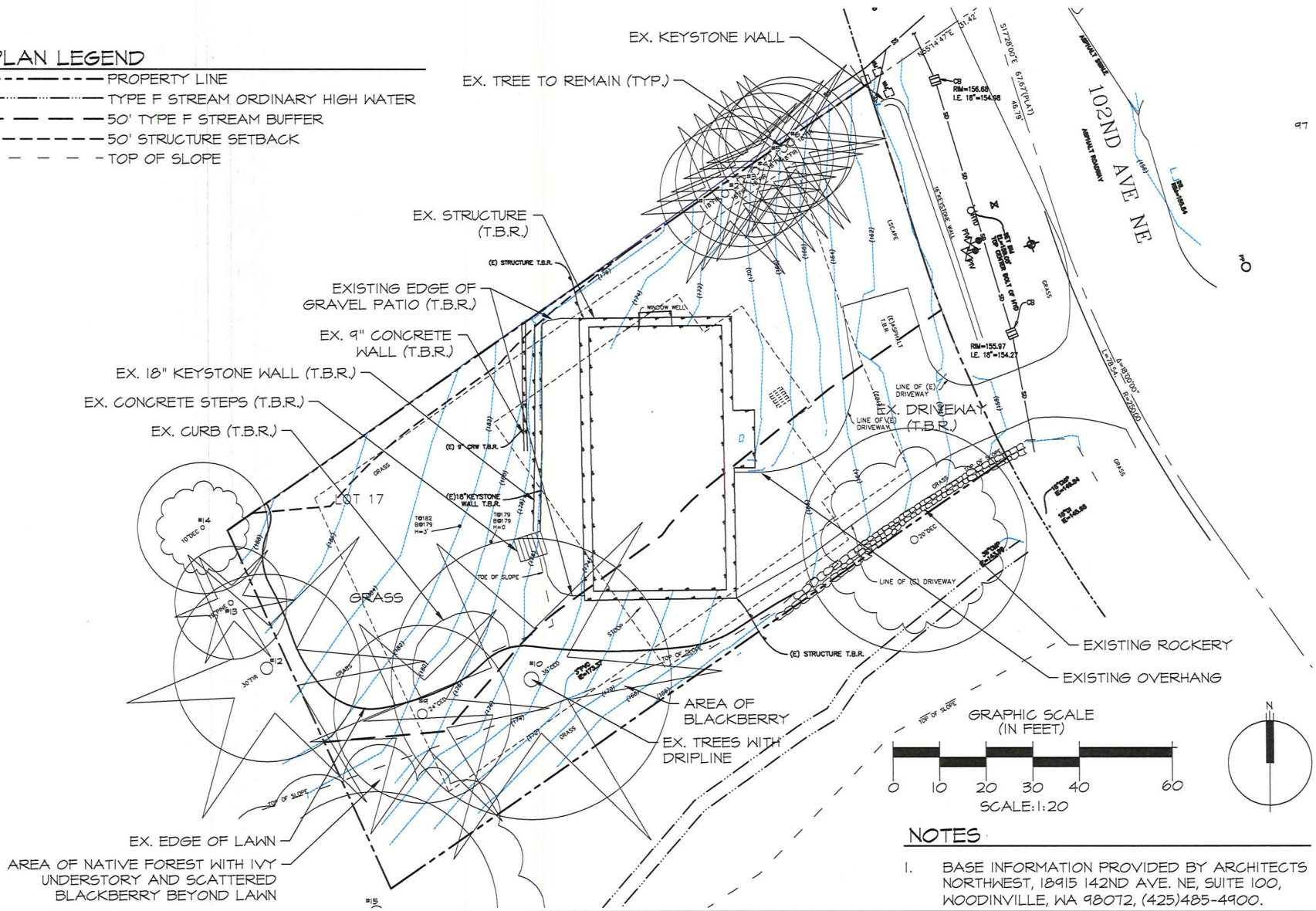
ALTMANN OLIVER ASSOCIATES, LLC

John Altmann

John Altmann
Ecologist

PLAN LEGEND

- PROPERTY LINE
- TYPE F STREAM ORDINARY HIGH WATER
- 50' TYPE F STREAM BUFFER
- 50' STRUCTURE SETBACK
- TOP OF SLOPE



NOTES

1. BASE INFORMATION PROVIDED BY ARCHITECTS NORTHWEST, 18915 142ND AVE. NE, SUITE 100, WOODINVILLE, WA 98072, (425)485-4900.

DRAWN	SO
SCALE	AS NOTED
DATE	12-09-14
REVISED	
PROJECT	4515

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FIGURE 1: EXISTING CONDITIONS
BUFFER MITIGATION PLAN
KU PROPERTY
3323 102ND AVE. NE, BELLEVUE, WA 98004
PARCEL #412230-0085-07, PROJECT #14-136335 LO

Altmann Oliver Associates, LLC
AOA Environmental Planning & Landscape Architecture
PO Box 578 Carnation, WA 98014 Office (425) 333-4535 Fax (425) 333-4536

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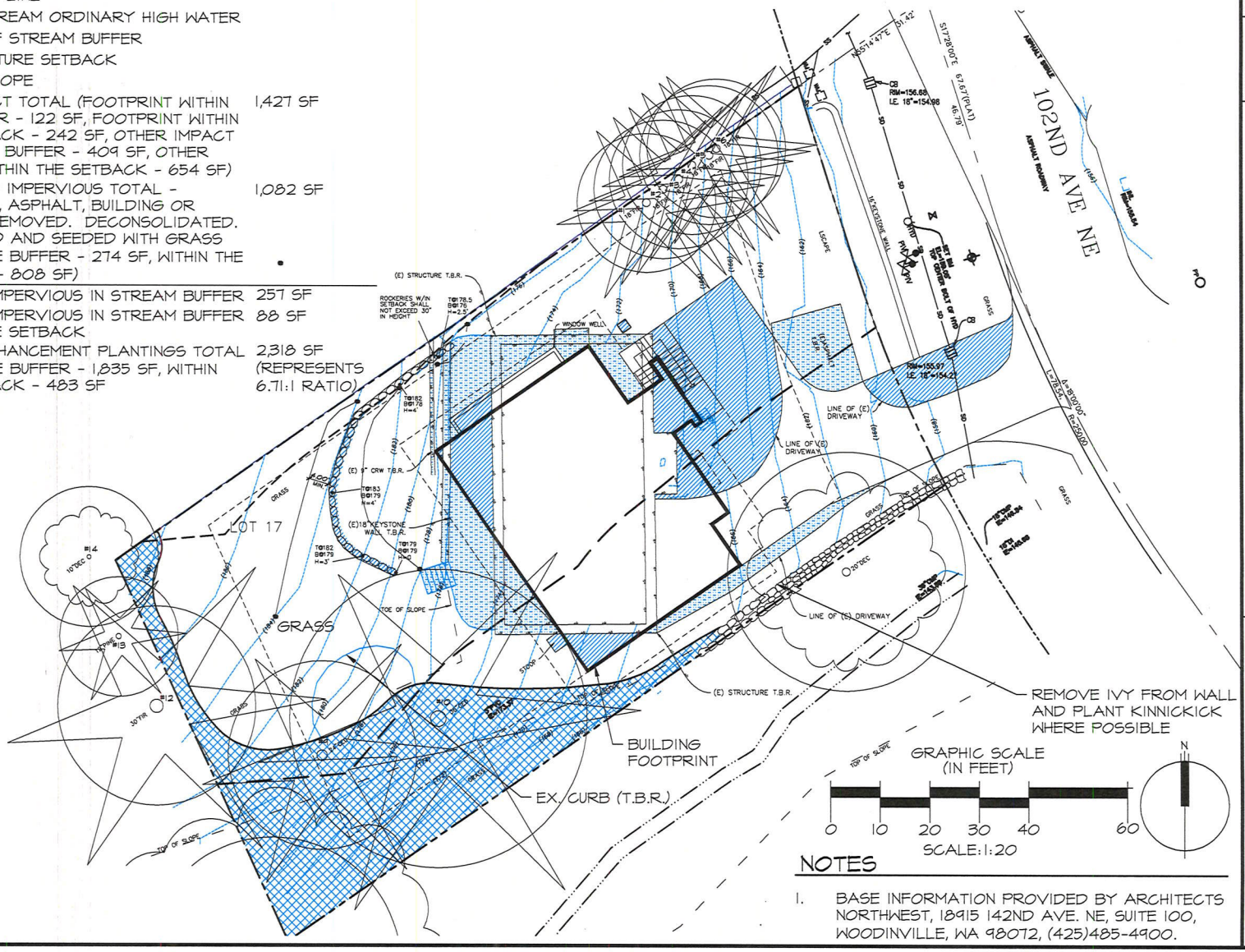
PLAN LEGEND

- PROPERTY LINE
- TYPE F STREAM ORDINARY HIGH WATER
- 50' TYPE F STREAM BUFFER
- 50' STRUCTURE SETBACK
- TOP OF SLOPE
- NEW IMPACT TOTAL (FOOTPRINT WITHIN THE BUFFER - 122 SF, FOOTPRINT WITHIN THE SETBACK - 242 SF, OTHER IMPACT WITHIN THE BUFFER - 409 SF, OTHER IMPACT WITHIN THE SETBACK - 654 SF) — 1,427 SF
- RESTORED IMPERVIOUS TOTAL - CONCRETE, ASPHALT, BUILDING OR GRAVEL REMOVED. DECONSOLIDATED. TOPSOILED AND SEEDED WITH GRASS (WITHIN THE BUFFER - 274 SF, WITHIN THE SETBACK - 808 SF) — 1,082 SF

NET NEW IMPERVIOUS IN STREAM BUFFER — 257 SF

NET NEW IMPERVIOUS IN STREAM BUFFER STRUCTURE SETBACK — 88 SF

- NATIVE ENHANCEMENT PLANTINGS TOTAL (WITHIN THE BUFFER - 1,835 SF, WITHIN THE SETBACK - 483 SF — 2,318 SF (REPRESENTS 6.71:1 RATIO)



NOTES

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PROJECT	4515

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FIGURE 2: BUFFER IMPACTS & MITIGATION
BUFFER MITIGATION PLAN
WU PROPERTY
3323 102ND AVE. NE, BELLEVUE, WA 98004
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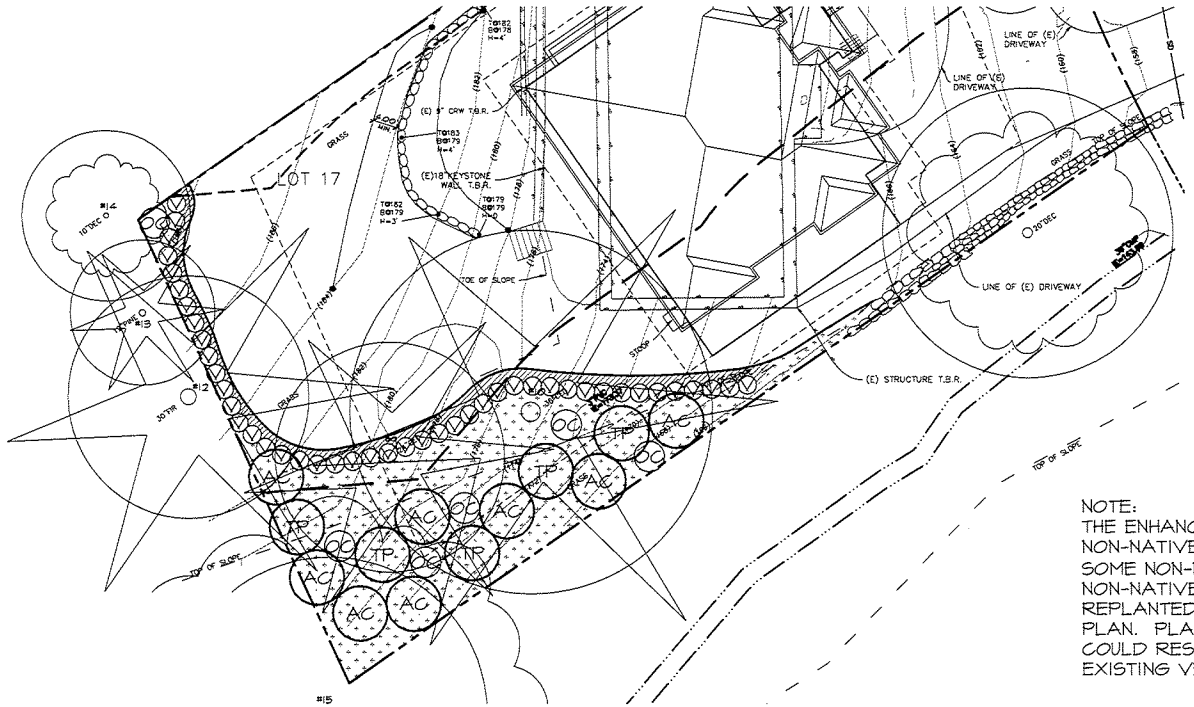


NOTE:
THE ENHANCEMENT AREA IS FORESTED WITH 100% NON-NATIVE GROUNDCOVER UNDERSTORY AND SOME NON-NATIVE (LAUREL) SHRUBS. THE NON-NATIVES WILL ALL BE REMOVED AND REPLANTED WITH THE PLANTINGS DEPICTED ON THIS PLAN. PLANTING DENSER THAN THAT DEPICTED COULD RESULT IN NEGATIVE IMPACTS TO THE EXISTING VEGETATION.

PLANT SCHEDULE

TREES

KEY	SCIENTIFIC NAME	COMMON NAME	SPACING	QTY.	SIZE (MIN.)	NOTES
AC	ACER CIRCINATUM	VINE MAPLE	9' O.C.	8	2 GAL.	MULTI-STEM (3 MIN.)
TP	THUJA PLICATA	WESTERN RED CEDAR	9' O.C.	5	2 GAL.	FULL & BUSHY

SHRUBS

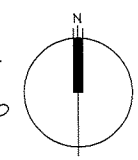
KEY	SCIENTIFIC NAME	COMMON NAME	SPACING	QTY.	SIZE (MIN.)	NOTES
OC	OEMLERIA CERASIFORMIS	INDIAN PLUM	5' O.C.	6	1 GAL.	MULTI-STEM (3 MIN.)
V	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	6' O.C.	44	1 GAL.	MULTI-STEM (3 MIN.)

GROUNDCOVER

KEY	SCIENTIFIC NAME	COMMON NAME	SPACING	QTY.	SIZE (MIN.)	NOTES
	ARCTOSTAPHYLOS UVA-URSI	KINNIKINNICK	2' O.C.	51	1 GAL.	FULL & BUSHY
	POLYSICHUM MUNITUM	SWORD FERN	3' O.C.	188	1 GAL.	FULL & BUSHY

GRAPHIC SCALE
(IN FEET)

SCALE: 1:20



NOTES

1. BASE INFORMATION PROVIDED BY ARCHITECTS NORTHWEST, 18915 142ND AVE. NE, SUITE 100, WOODINVILLE, WA 98072, (425)485-4900.

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PROJECT	4515
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FIGURE 3: PLANTING PLAN
BUFFER MITIGATION PLAN
WU PROPERTY
3323 102ND AVE. NE, BELLEVUE, WA 98004
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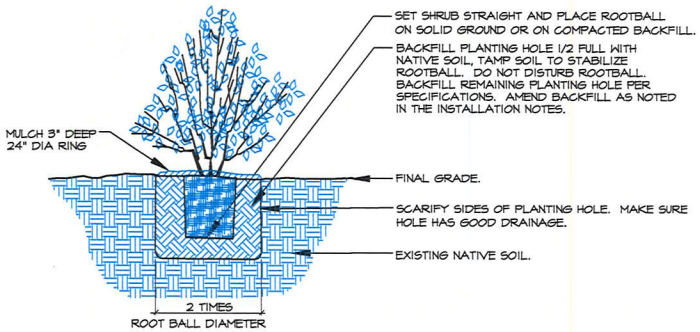
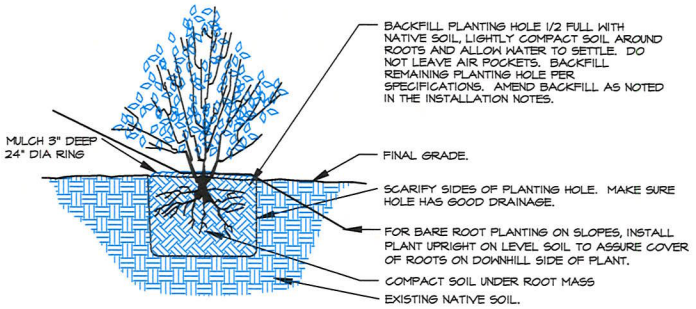


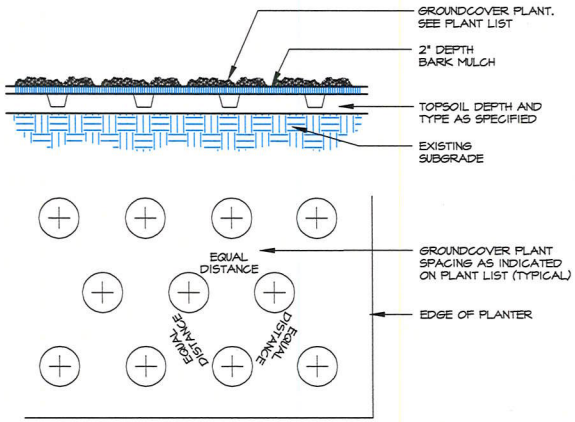
1 CONTAINER PLANTING DETAIL (TYP.)

SCALE: NTS



2 BARE-ROOT PLANTING DETAIL (TYP.)

SCALE: NTS



3 GROUNDCOVER PLANTING (TYP.)

SCALE: NTS

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REVISED	
PROJECT	4515

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FIGURE 4: PLANTING DETAILS
BUFFER MITIGATION PLAN
WU PROPERTY
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SPECIFICATIONS

1. CONTRACTOR INFORMATION. WHEN IT IS AVAILABLE, CONTACT INFORMATION SHALL BE PROVIDED TO THE CITY OF BELLEVUE THAT INCLUDES NAMES, ADDRESSES AND PHONE NUMBERS OF PERSONS/FIRMS THAT WILL BE RESPONSIBLE FOR INSTALLING REQUIRED PLANTS AND PERFORMING REQUIRED MAINTENANCE.
2. CONTRACTOR'S QUALIFICATIONS. ALL WORK SHALL BE PERFORMED BY A LICENSED LANDSCAPE CONTRACTOR REGISTERED IN THE STATE OF WASHINGTON. CONTRACTOR MUST BE EXPERIENCED IN MITIGATION AND RESTORATION WORK. THE CONTRACTOR SHALL PROVIDE THAT THERE IS ONE PERSON ON THE SITE AT ALL TIMES DURING WORK AND INSTALLATION WHO IS THOROUGHLY FAMILIAR WITH THE TYPE OF MATERIALS BEING INSTALLED AND THE BEST METHODS FOR THEIR INSTALLATION, AND WHO SHALL DIRECT ALL WORK BEING PERFORMED UNDER THESE SPECIFICATIONS. THIS PERSON SHALL HAVE A MINIMUM OF FIVE (5) YEARS EXPERIENCE INSTALLING NATIVE PLANT MATERIALS FOR WETLAND MITIGATION OR RESTORATION PROJECTS, UNLESS OTHERWISE ALLOWED BY THE LANDSCAPE DESIGNER, WETLAND BIOLOGIST AND/OR THE CITY OF BELLEVUE.
3. ALL PLANTS SHOULD BE INSTALLED BETWEEN DECEMBER 1ST AND MARCH 15TH.
4. INTERMEDIATE INSPECTIONS. ALL PLANTS SHALL BE INSPECTED AND APPROVED BY THE LANDSCAPE DESIGNER AND/OR WETLAND BIOLOGIST PRIOR TO INSTALLATION. CONDITION OF ROOTS OF A RANDOM SAMPLE OF PLANTS WILL BE INSPECTED, AS WELL AS ALL ABOVEGROUND GROWTH ON ALL PLANTS. ROOTS OF ANY BARE ROOT PLANTS, IF PERMITTED FOR USE, WILL BE INSPECTED. PLANT MATERIAL MAY BE APPROVED AT THE SOURCE, AT THE DISCRETION OF THE LANDSCAPE DESIGNER AND THE WETLAND BIOLOGIST, BUT ALL MATERIAL MUST BE RE-INSPECTED AND APPROVED ON THE SITE PRIOR TO INSTALLATION. PLANT LOCATIONS SHALL ALSO BE INSPECTED AND APPROVED PRIOR TO PLANTING.
5. PRIOR TO INSTALLATION OF PLANT MATERIAL ALL HIMALAYAN BLACKBERRY, ENGLISH IVY, ENGLISH HOLLY, CHERRY AND PORTUGAL LAUREL AND ANY OTHER INVASIVE PLANT SPECIES LOCATED IN THE PLANTING AREAS WILL BE REMOVED BY HAND GRUBBING ALL ROOTS AND EXPORTED OFFSITE. CARE SHALL BE TAKEN TO AVOID DISTURBANCE TO NATIVE WOODY VEGETATION LOCATION AMONGST NON-NATIVE VEGETATION. ALL NON-ORGANIC DEBRIS SHALL BE REMOVED FROM THE ENHANCEMENT AREA AND EXPORTED FROM THE SITE. IN GRADED AND LAWN PLANTING AREAS, SOD SHALL BE REMOVED AND 3" OF COMPOST SHALL BE PLACED AND TILLED INTO THE TOP 6" OF NATIVE SOIL.
6. IMPERVIOUS AREAS TO BE RESTORED SHALL BE REMOVED OF CONCRETE, GRAVEL AND OTHER IMPERVIOUS MATERIAL AND REPLACED WITH 6" IMPORTED TOPSOIL TILLED INTO THE TOP 12" OF NATIVE SOILS.
7. AOA TO REVIEW DEBRIS REMOVAL, IMPERVIOUS REMOVAL, GRADING, LAWN REMOVAL, COMPOST PLACEMENT, INVASIVE PLANT REMOVAL, TOPSOIL PLACEMENT AND PLANT LAYOUT PRIOR TO PLANTING.
8. ALL PLANTS SHALL BE PIT-PLANTED IN PLANTING PITS EXCAVATED 2X THE DIAMETER OF THE PLANT. PITS SHALL BE BACKFILLED WITH A 30/70 MIX OF STEERCO TO NATIVE SOIL. PLANTS SHALL BE INSTALLED 2" HIGH AND SURFACED MULCHED TO A DEPTH OF 2" WITH MEDIUM-COURSE BARK MULCH PLACED CONTINUOUSLY THROUGHOUT THE PLANTING BED.
9. ALL PLANTS SHALL BE NURSERY GROWN (IN WESTERN WA OR OR) FOR AT LEAST 1 YEAR FROM PURCHASE DATE, FREE FROM DISEASE OR PESTS, WELL-ROOTED, BUT NOT ROOT-BOUND AND TRUE TO SPECIES.
10. PLANT LAYOUT SHALL BE APPROVED BY AOA PRIOR TO INSTALLATION AND APPROVED UPON COMPLETION OF PLANTING.
11. UPON COMPLETION OF PLANTING, BARE AREAS SHALL BE STRAW MULCHED TO A DEPTH OF 1" AND ALL PLANTS SHALL BE THOROUGHLY WATERED.
12. UPON APPROVAL OF PLANTING INSTALLATION BY AOA, THE CITY OF BELLEVUE WILL BE NOTIFIED TO CONDUCT A SITE REVIEW FOR FINAL APPROVAL OF CONSTRUCTION.
13. MAINTENANCE SHALL BE REQUIRED IN ACCORDANCE WITH THE CITY OF BELLEVUE SENSITIVE AREAS MITIGATION GUIDELINES AND APPROVED PLANS.
14. PLANTS SHALL BE HAND-WATERED TO PROVIDE 1/2" OF FLOW 2-3 TIMES WEEKLY FROM JULY 1 –OCTOBER 31 THE FIRST YEAR AFTER PLANTING. FLOW SHALL REDUCE TO 1-2 TIMES WEEKLY THE SECOND YEAR AFTER PLANTING AND ONCE WEEKLY THE YEAR 3.
15. MAINTENANCE SHALL BE IMPLEMENTED ON A REGULAR BASIS ACCORDING TO THE SCHEDULE BELOW.

ANNUAL MAINTENANCE SCHEDULE

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

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

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SCALE AS NOTED
DATE 12-04-14 | 5/5
REVISED

FIGURE 5: SPECIFICATIONS
BUFFER MITIGATION PLAN
WU PROPERTY
3323 102ND AVE. NE, BELLEVUE, WA 98004
PARCEL #412230-0085-07, PROJECT #14-136335 LO

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PO Box 578 Carnation, WA 98014 Office (425) 333-4535 Fax (425) 333-4539

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Battermann
Geotechnical
Consulting
PLLC

September 29, 2014
Project No. 13040

Subsurface Exploration, Geologic Hazards, and Geotechnical Engineering Report
He Residence
3323 NE 102nd Avenue
Bellevue, Washington
File No. 14-136335

Introduction

The purpose of this study was to gain subsurface information and perform geologic and geotechnical engineering reconnaissance to be utilized in the design and development of a replacement single family residence for the existing residence on the subject lot. This report was prepared for the specific use of Mr. Bin He and his agents for this project. It is our understanding that the plan is to demolish the existing residence and replace it with a two story wood frame structure over a concrete daylight basement. The new structure would be located in the same location as the old. The house foot-print is not currently parallel with the lot lines. A topographic survey of the existing property was provided by Architects Northwest for our use in the preparation of this report.

Site Conditions

The subject property was located at 3323 102nd Avenue NE in Bellevue, Washington. The parallelogram shaped lot was about 161 feet in the southwest-northeast dimension and about 84 feet in the northwest-southeast dimension. The lot lies to the west side of 102nd Avenue NE and was bound by existing single family residences on all sides. A small creek separates this property from the neighboring property to the south. The lot had a moderate slope down to the east at average slope inclination of around 17.5 percent. Minor areas of the slope were slightly steeper and flatter. Total elevation change across the lot was about 28 feet.

Vegetation on the lot consisted mainly of poorly maintained grass lawn. There were moderate sized evergreens and deciduous trees along the south side in the creek corridor. A couple of short (less than 4 feet tall) rockeries provided minor grade relief for level terraces – one behind the house and one in front for a hammer-head parking stall. There was also an overgrown rockery along the south side of the driveway.

Subsurface Conditions

Subsurface conditions on the property were inferred from visual reconnaissance of the property, a

review of the Kirkland quad and King County geologic maps, a review of the Geomap NW online database, and a series of 3 subsurface exploration pits excavated with a small, track mounted backhoe across the property. The exploration pits were logged by a geologist and immediately backfilled. The exploration pits were located in the field based on visual reference and pacing from features shown on the topographic map/site plan. The approximate exploration pit locations are depicted on the Site and Exploration Plans attached to this report.

Stratigraphy

There was virtually no topsoil in any of the three exploration pits. There was a layer of sod and then immediately transitioned into the underlying silt and clay layer. In EP-3, the upper two feet of material consisted of medium stiff, dry, grey, silt and clay with bits of organic fragment strewn through it. It is our opinion that this material was either old fill soil or more likely, remnants of an old debris flow deposit.

Underlying the sod and debris flow deposit in all of the exploration pits were sediments consisting of medium stiff at the surface and rapidly with depth becoming stiff to very stiff, damp to moist with depth, grey-brown to blue-grey with depth, silt and clay. The fine grained unit was massively laminated with occasional very thin, fine to very fine sand layers. The thin sand layers were typically wet to saturated and some allowed free seepage into the side of the exploration pit excavation. These sediments have been interpreted to be Vashon Lawton clay deposited in a lacustrine environment (settling out of suspension) prior to the last glacial advance into the Puget Sound region about 15,000 years ago. The fine grained sediment was then consolidated to its very stiff condition by the weight of several thousand feet of glacial ice. The upper surface has since weathered to a slightly less dense condition. The unit has a very low permeability. Both geologic maps identify this area as being underlain by Vashon advance outwash sediments. We did not observe any sand and gravel deposits onsite and assume that this site is lower in the stratigraphic column and/or the sand and gravel deposits were eroded away during the retreat of the glacier.

Ground Water

There were very minor ground water seepages encountered in EP-2 and EP-3 below 4 feet from the very thin sand layers. The seepage amount was very minor. Thicker lenses of sand could produce more seepage but thick sand sequences are not typical to this sediment deposit. The presence of "horse tails" at the lower east side by the front rockery indicates that there is a possibility that some sand lenses do daylight the slope face. We do not anticipate that significant quantities of ground water will be encountered during the foundation installation for the planned residence. Minor seepages may occur in the temporary slope cuts.

Geologic Hazards

The following discussion of potential geologic hazards is based on the visual reconnaissance of the site and surrounding areas, the subsurface explorations, a review of aerial photographs and regional topographic maps of the area.

Landslide Hazard

The slope of the lot and the surrounding topography were moderate. There were no significant slopes around the subject property and there are no associated steep slope or landslide hazard areas

that effect this property. The areas around the subject project have been developed since the 1960's and to the best of our knowledge, there have not been any landslides in this area since development. It is our opinion that the risk of a landslide affecting this property are low and the planned development will not have an adverse effect on the existing stability of the slope.

Erosion Hazard

The onsite soils on the property have a low to moderate erosion potential if left exposed due to the slope of the lot. The exposed sediments would generate some turbid runoff due to their silt content but the silt and clay sediment does not tend to rapidly erode. Standard development erosion control BMP's of the installations of silt fences, keeping flow paths short, keeping exposed soils covered when not actively worked during development will mitigate the potential for offsite sediment transport. The proper use of "best management practices" BMPs should be used during development of the project to minimize the potential for erosion and sediment transport.

Seismic Hazard

Generally, there are four types of potential geologic hazards associated with large seismic events: 1) surficial ground rupture; 2) seismically induced landslides; 3) liquefaction; and 4) ground motion. The potential for each of these to impact the site is discussed below.

The site does not lie within a known geologic fault zone. Fault zones in the Puget Sound region are currently being studied by the United States Geological Service (USGS) and have been determined to be active and capable of producing large earthquakes. Much is still to be learned about these fault systems but it is generally hypothesized that their recurrence interval is several thousand years. Due to the suspected long recurrence interval and the uncertainty of where the next surface rupture may occur, the potential for surficial ground rupture is considered to be unpredictable and no mitigation is possible or necessary.

Based on the lack of any significant slopes on or around the subject property, there is a low risk of a seismically induced landslide impacting the property.

Based on the dense condition and the grain size distribution of the sediments underlying the site, it is our opinion that the risk of liquefaction on this site is very low.

Seismic hazards that will affect the structure would likely be due to the intensity and duration of the ground shaking. The structural design of the project should be consistent with 2012 International Building Code (2012 IBC) guidelines (Section 1613). Based on the results of our subsurface explorations and our estimation of soil properties at depth utilizing available geologic data, Site Class "C" may be used for the design of the project, as defined by ASCE 7 "Minimum Design Loads for Buildings and Other Structures", Chapter 20.

Geotechnical Engineering Recommendations

From a geotechnical engineering standpoint, the property is considered to be suitable to develop a replacement single family residence. The stiff to very stiff silt and clay sediments will be capable of providing suitable foundation bearing support for the planned residence. The current foundation plan requires a cut of about 12 feet at the northwest corner of the house. With the current house location and orientation, there is not room to slope the temporary cut slope without impacting the

neighboring property to the north. Either a temporary slope cut easement would need to be obtained from the neighbors or a soldier pile wall would need to be installed to support the cut slope and allow the foundation installation. Alternately, the planned residence could be rotated and shifted to the south to allow a temporary slope that would not impact the neighboring property. Grading plans for the project have not been finalized. BGC, pllc will be available to provide additional geotechnical engineering recommendations for a shoring wall if requested and are available to provide special inspections during the development of the project. As discussed in our previous letter for this project, there is no potential to infiltrate storm water runoff back into the ground water regime due to the low permeability of the fine grained sediments underlying the site.

Site Preparation and Site Grading

Site preparation for construction of the new residence will consist of removal of the old residence and the existing vegetation in the planned development area. The existing residence will be removed and any associated utilities that are not part of future development plans will need to be properly abandoned. The recommended TESCP measures will need to be established prior to foundation excavations or grading operations. All temporary slope cuts over 4 feet in height should be cut back to a 1H:1V inclination. Temporary slope cuts deeper than 4 feet for utility installations should either be sloped back or a trench shield should be utilized during installation.

All backfill placed under driveways, footing areas, floor slabs, or behind retaining walls should be placed and compacted as structural fill. Structural fill is defined as non-organic soil, placed in maximum 8-inch loose lifts, with each lift being compacted to at least 95 percent of the maximum dry density, using the modified Proctor test (ASTM: D1557) as the standard. All fill to be placed on sloping ground should first have horizontal level benches excavated into the slope to key the fill onto the slope. The size of the benches should be cut to suit the area being backfilled. Prior to placing any structural fill the exposed soils must either be undisturbed or be compacted to a dense, non-yielding condition and be approved for structural fill placement. In the case of utility trench filling, the backfill should be placed and compacted in accordance with the applicable City of Kirkland standards.

Placement and compaction of the structural fill should be monitored by a competent field technician. In situ density testing should be performed during fill placement to verify proper compaction of the fill soil. A sample of the planned structural fill soil will need to be available at least 48 hours prior to fill placement for laboratory analysis. The onsite soils would be very difficult to use as structural fill. The silt and clay sediments tend to be over optimum moisture in their in-situ condition and do not make good structural fill. We recommend that an imported sand and gravel soil be used in any fill area planned to provide structural support.

Foundations

The stiff to very stiff silt and clay and/or approved structural fill soil will be capable of providing suitable bearing support for the new foundation. An allowable foundation bearing capacity of 2500 pounds per square foot may be used for the spread footings which are set to bear on the stiff to very stiff sediments. A short term increase of one-third may be used for wind, snow, or seismic loads. The footings should be set to bear a minimum of 18 inches below surrounding grades for frost protection. Anticipated settlement of the foundations placed as described should be less than 1 inch. BGC, pllc should perform a bearing soil evaluation prior to placing footing concrete to verify the footings are set to bear on suitably dense soils. Steps in the footing elevation are permitted but

interior isolated column pads need to be set back away from grade steps such that a 1H:1V load line extending down from the edge of the footing does not daylight the grade step.

Lateral loads will be resisted by friction between the foundation and the supporting soils, and/or by passive earth pressure acting on the buried portions of the foundations. The foundations must be backfilled with fill compacted to a medium dense, non-yielding condition to achieve the passive resistance provided below. We recommend the following design parameters for lateral load calculations.

- Passive equivalent fluid = 300 pcf
- Coefficient of friction = 0.3

The above values are allowable and include a factor of safety of at least 1.5.

Retaining Walls and Lateral Earth Pressures

If the concrete foundation walls are free to yield laterally at least 0.1 percent of their height at the top may be designed for "active" lateral earth pressure equivalent to 35 pcf. Retaining walls that are fixed at the top and not free to yield laterally should be designed to resist "at-rest" soil pressure conditions using an equivalent fluid pressure of 50 pounds per cubic foot (pcf). The foundation walls should use either a full height chimney drain or approved drainage boards against the wall to prevent the build-up of hydrostatic pressure on the wall. The chimney drain should consist of a minimum 12 inch width of pea gravel or ¾ inch washed drain rock place immediately adjacent to concrete wall extending from the footing drain to within 2 feet of the ground surface. The upper two feet should be backfilled with a low permeability soil to discourage surface runoff from entering the wall drainage system. Approved drainage boards, such as Inca Mat or Mira Drain, should be placed to extend from approximately two feet below the top of the wall down to hydraulically tie into the footing drain system. Backfill of the foundation walls outside of the chimney drain should be placed in approximate 12 inch loose lifts and compacted to a medium dense condition around 90 percent of the modified Proctor maximum dry density. A higher degree of compaction is not recommended as this may increase the pressures acting on the basement walls. The onsite soil may be used for wall backfill provided that the backfill area is not providing structural support for some other element of the planned development. If the wall backfill would structurally support a column load, driveway, or other structural element that is settlement sensitive, then imported backfill should be used and properly compacted rather than the onsite soil.

Floor Support

The portion of the residences and/or garages that will utilize slab-on-grade concrete floors should be set to bear on native sediment or structurally compacted backfill. The floor slab preparation should include a capillary break consisting of a minimum of 4 inches of pea gravel or clean crushed rock with less than 5 percent fines (material passing the No.200 sieve). The capillary break will reduce the potential for moisture from wicking through the floor slab. A plastic sheeting vapor barrier should also be placed atop the capillary break material. All concrete placements should follow the guidelines set forth by the American Concrete Institute (ACI).

In the areas where structural or crawl space type floors are used, the ground surface should be covered with a moisture barrier to inhibit moisture transfer. Crawl space areas should be well ventilated to reduce the potential for mold growth.

Drainage Considerations

Foundation drains should be installed around the perimeter of the footing to protect the foundation/floor slab from ground water intrusion. The foundation drain should be set several inches below the bottom of the footing and have sufficient fall to allow gravity discharge away from the foundation. The drains should consist of 4 inch diameter, rigid, perforated, PVC drain pipe surrounded with a 6 inch minimum of pea gravel or washed drain rock. As previously discussed, all retaining/basement walls should be provided with drainage against the back of the wall to prevent the build-up of hydrostatic pressures.

Based on the fact that the site has no significant topsoil sequence and that the existing residence has had to have a sump pump retroactively installed in the upslope side window well, it is our opinion that during large rain events there is a significant sheet flow of water from the upslope (west) areas of this property and the neighboring properties that flows across the property towards the east/southeast. It would be a very good idea to incorporate surface drains across the property upslope of the residence in the landscaping plans to collect surficial runoff and route it to the creek rather than let it flow to the back of the new residence. The surface drainage can be accomplished with either trench drains, 1 foot wide by 2 feet deep trenches with a perforated drain pipe backfilled with washed drain rock or by grading topographic lows and installing yard drain catch basins and drain pipes to route storm water runoff to discharge into the creek. Discharge locations of surface drain pipes at the creek buffer boundary should discharge onto rock splash pads to prevent erosion.

Conclusion

Based on our site reconnaissance and subsurface explorations the site appears to be suitable to develop a replacement single family residence. With good construction techniques used in accordance with the recommendations in this report, the proposed residences will not have an adverse effect on the subject property or on adjacent properties. If the house orientation cannot be changed and shifted to allow a temporary slope cut for foundation installation, we should be contacted to provide recommendations for a temporary shoring wall.

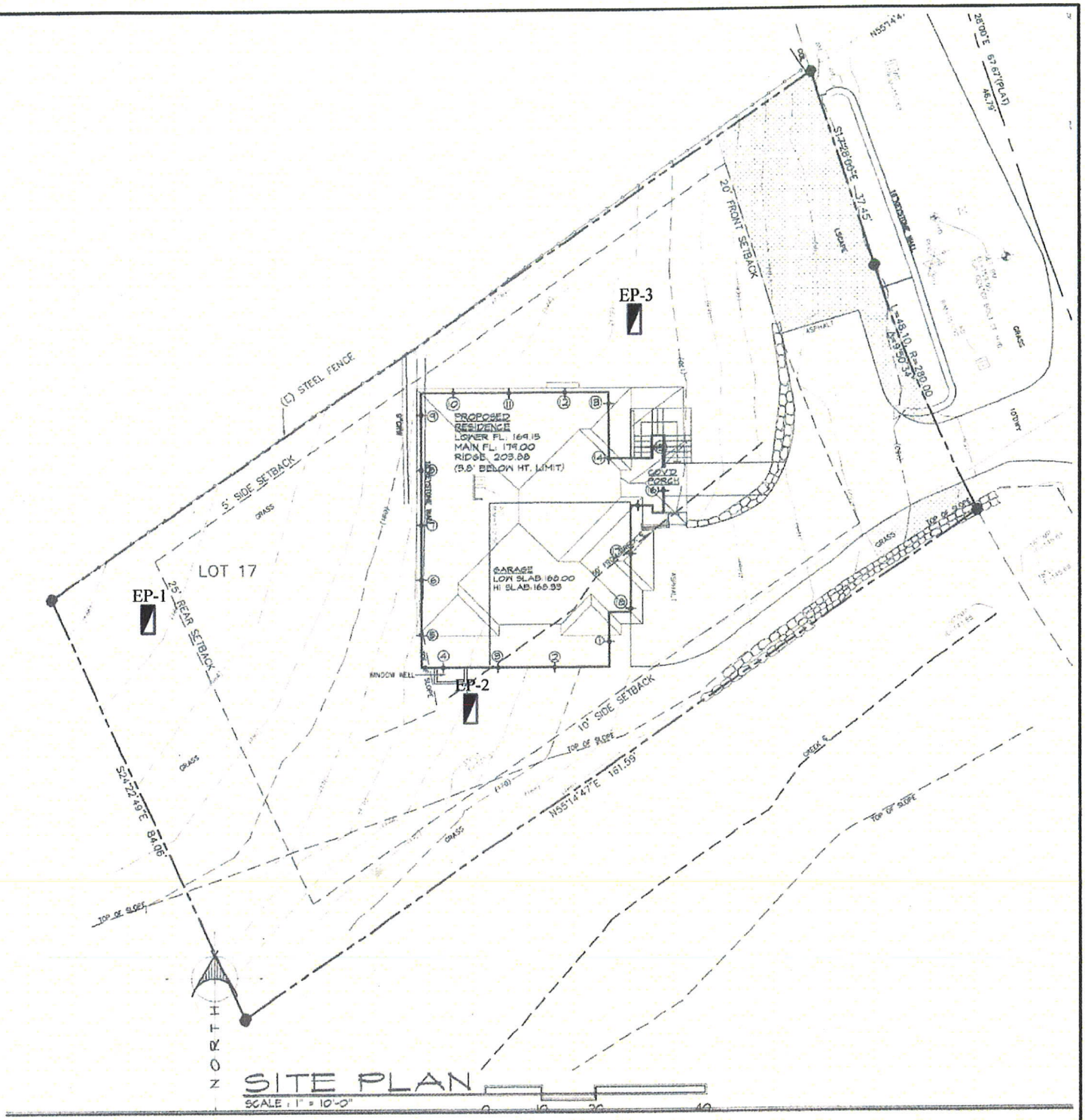
Our findings and recommendations provided in this report were prepared in accordance with generally accepted principles of engineering geology and geotechnical engineering as practiced in the Puget Sound area at the time this report was submitted. We make no other warranty, either express or implied.

We are available to provide additional geotechnical engineering design and consultation throughout the development of this project. We are also available to provide construction monitoring during development of the project for quality control and to help insure that the recommendations contained in this report are properly implemented. We have enjoyed working with you on this project. If there are any questions, please contact us at 425 273-5062.

Sincerely
Battermann Geotechnical Consulting, pllc
Jamey S. Battermann, P.E.

JAMEY S. BATTERMANN
STATE OF WASHINGTON
10-2-14
19627
REGISTERED
PROFESSIONAL ENGINEER

Attachments: Site and Exploration Plans
Exploration Pit Logs



EP-x Approximate location of exploration pit

Base map provided by Architects Northwest

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Site and Exploration Plan

He Residence
3323 102nd Avenue NE
Bellevue, Washington

Figure 1	Project No: 13040	September 26, 2014

EXPLORATION PIT LOG

Number EP-1

0	About 4 inches of sod — **TOPSOIL**
	VASHON LAWTON CLAY, Qvlc
1	Stiff to very stiff with depth, damp, grey-brown with orange mottling, silt and clay.
2	
3	
4	
5	
6	
7	
8	
9	BOH @ 9' No ground water seepage No caving or sloughing
10	
11	
12	
13	

Subsurface conditions depicted represent our observation at the time and location of this exploratory hole, modified by geologic interpretation, engineering analysis and judgment. We will not accept responsibility for the use or interpretation by others of information presented on this log.

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September 19, 2014
Project No. 13040

EXPLORATION PIT LOG

Number EP-2

About 4 inches of sod	**TOPSOIL**
	VASHON LAWTON CLAY, Qvlc
Stiff to very stiff with depth, damp, grey-brown with orange mottling, silt and clay.	
Very thin (about ½ thick) very fine sand seam, saturated	
BOH @ 7' No ground water seepage No caving or sloughing	

0 1 2 3 4 5 6 7 8 9 10 11 12 13

Subsurface conditions depicted represent our observation at the time and location of this exploratory hole, modified by geologic interpretation, engineering analysis and judgment. We will not accept responsibility for the use or interpretation by others of information presented on this log.

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EXPLORATION PIT LOG

Number EP-3

0	**TOPSOIL/DEBRIS FLOW** About 2 inches of sod Medium stiff, dry, grey with orange mottling, silt and clay with organic fragments, highly disturbed texture.
1	
2	**VASHON LAWTON CLAY, Qvlc** Stiff, damp to moist, grey-brown with orange mottling, silt and clay.
3	
4	
5	Very stiff, moist, blue grey, silt and clay. Ocassional very thin, saturated fine sand layers
6	
7	
8	BOH @ 8' very minor ground water seepages from thin sand seams No caving or sloughing
9	
10	
11	
12	
13	

Subsurface conditions depicted represent our observation at the time and location of this exploratory hole, modified by geologic interpretation, engineering analysis and judgment. We will not accept responsibility for the use or interpretation by others of information presented on this log.

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