City of Bellevue
Development Services Department
Land Use Staff Report

Proposal Name:	Miller Residence
Proposal Address:	9600 SE 7th Street
Proposal Description:	Critical Areas Land Use Permit proposal to construct a proposed deck and stabilization wall within a 50-foot top-of-slope buffer. The work is associated with a proposal to demolish an existing single-family dwelling and construct a new single-family dwelling within the existing footprint. The proposal includes mitigation planting within the steep slope buffer.
File Number:	24-113878-LO
Applicant:	David Grubb, Gelotte Hommas Drivdahl Architecture
Decisions Included:	Critical Areas Land Use Permit (Process II. LUC 20.30P)
Planner:	Miranda Riordan, Associate Land Use Planner
State Environmental Policy Act Threshold Determination:	**Exempt per WAC 197-11-800 (1)**
Director's Decision:	**Approval with Conditions** Rebecca Horner, Director Development Services Department Reilly Pittman Reilly Pittman, Environmental Coordinator Development Services Department

Application Date:	June 24, 2024
Notice of Application Publication Date:	July 25, 2024
Decision Publication Date:	December 5, 2024
Project Appeal Deadline:	December 19, 2024

For information on how to appeal a proposal, visit Development Services Center at City Hall or call (425) 452-6800. Appeal of the Decision must be received in the City's Clerk's Office by 5 PM on the date noted for appeal of the decision.

CONTENTS

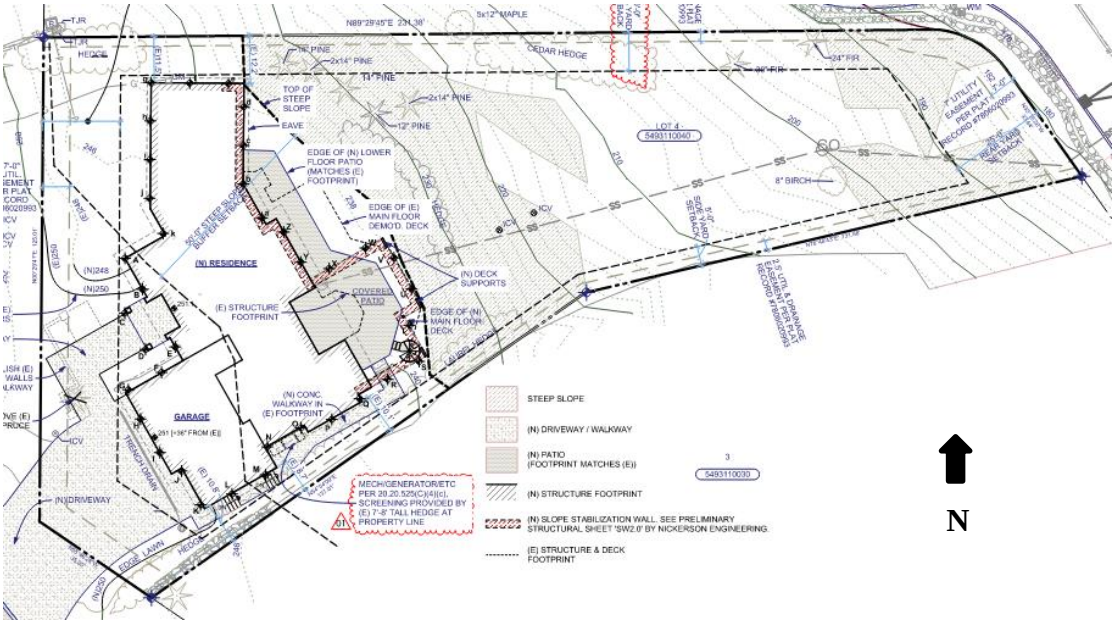
Attachments

1. Site Plan
2. Mitigation & Restoration Planting Plan
3. Critical Areas Report – Wetland Resources dated 08/27/2024
4. Geotechnical Report – Geotech Consultants, Inc. dated 02/23/2024

I. Proposal Description

Critical Areas Land Use Permit proposal to demolish an existing single-family dwelling and reconstruct a new single-family dwelling within the existing footprint. As part of this proposal, the applicant is proposing a new deck and stabilization wall, outside of the existing dwelling's footprint, and within the required 50-foot top-of-slope buffer. The stabilization wall will be located at or below grade within the steep slope buffer. The proposal includes mitigation planting within the steep slope buffer. **See Figure 1 below for site layout.**

Figure 1



A Critical Areas Land Use permit is required to for the proposed deck and wall to impact and reduce the required steep slope buffer. The proposed new single-family dwelling is within the existing footprint. Impact has been further avoided by a front yard setback reduction from 30 feet to 20 feet per LUC 20.25H.040.B which is allowed to avoid impacts.

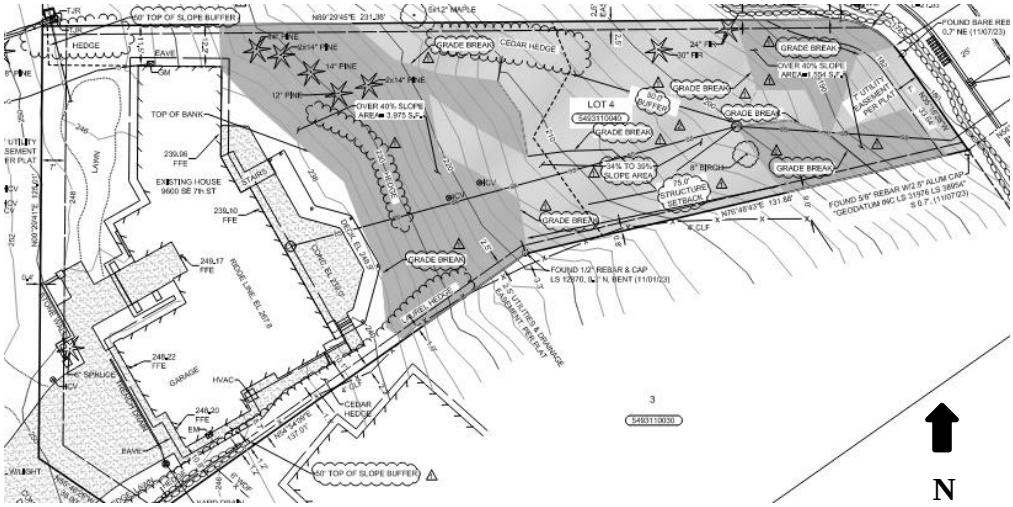
Land Use Code (LUC) 20.25H.120.B requires a 50-foot buffer from the surveyed top-of-slope. The request is to permanently reduce a portion of the steep slope buffer from 50 feet to 0 feet to construct a new deck and a stabilization wall. This will result in the permanent disturbance of 742 square feet of degraded critical area buffer. LUC 20.25H.230 allows for the reduction of a critical area buffer through a critical areas report. The critical areas report is a mechanism by which certain critical area requirements may be modified for a specific proposal. The critical areas report is intended to provide flexibility for sites where the expected critical areas functions and values are not present due to degraded conditions. The new deck and stabilization wall will be located in an existing degraded area due to the presence of an existing deck and ground level patio. The steep slope critical areas and buffers on the property are degraded in function and value because they lack the vegetative structural diversity found in higher-quality steep slope critical areas.

II. Site Description, Zoning, Land Use and Critical Areas

A. Site Description

The subject site is 21,951 square feet in size, abutting City Right-of-Way (ROW), SE 7th Street, 96th Avenue SE, and 97th Place SE. The site was developed with an approximately 4,300 square foot single-family residence, attached garage and a deck in 1996. Two steep slope critical areas with east-facing aspect slopes are located on the subject site with two benches, one of which contains all the existing development. Lawn, ornamental landscaping, and some native and non-native vegetation can be found on-site but the latter two are mostly located within the critical area steep slope. **See Figure 2 for more information.**

Figure 2



B. Zoning

The property is zoned R-1.8, single-family residential. **See Figure 3 for a zoning map**.

Figure 3

C. Land Use Context

The site has a Comprehensive Plan Land Use Designation of SF-L (Single-Family Low Density) and is surrounded by properties within the same comprehensive land use designation.

D. Critical Areas Functions and Values

i. Geologic Hazard Areas

Geologic hazards pose a threat to the health and safety of citizens when commercial, residential, or industrial development is inappropriately sited in areas of significant hazard. Some geologic hazards can be reduced or mitigated by engineering, design, or modified construction practices. When technology cannot reduce risks to acceptable levels, building in geologically hazardous areas is best avoided (WAC 365-190).

Steep slopes may serve several other functions and possess other values for the City and its residents. Several of Bellevue's remaining large blocks of forest are located in steep slope areas, providing habitat for a variety of wildlife species and important linkages between habitat areas in the City. These steep slope areas also act as conduits for groundwater, which drains from hillsides to provides a water source for the City's wetlands and stream systems. Vegetated steep slopes also provide a visual amenity in the City, providing a "green" backdrop for urbanized areas enhancing property values and buffering urban development.

III. Consistency with Land Use Code Requirements:

A. Zoning District Dimensional Requirements:

The R-1.8 zoning dimensional requirements found in LUC 20.20.010 are generally met by the proposed expansion, but conformance will be verified during building permit review. The applicant proposes to modify the front yard setback from 30 feet to 20 feet per LUC 20.25H.040.B in order to avoid the critical area steep slope located on-site. All setbacks, height, lot coverage by structure, and impervious surface may be required to be verified by survey through the building permit inspection process. **See Conditions of Approval in Section IX of this report**.

B. Consistency with Land Use Code Critical Areas Performance Standards:

The City of Bellevue Land Use Code Critical Area Overlay District (LUC 20.25H) establishes performance standards and procedures that apply to development on any site which contains in whole or in part any portion designated as critical area, critical area buffer, or structure setback from a critical area buffer. This site contains a steep slope with a 50-foot buffer and 75-foot toe-of-slope structure setback. The project is subject to the following performance standards which are reviewed below.

i. Consistency with Performance Standards for Steep Slopes 20.25H.125

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

1. 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;
The proposed deck, and stabilization wall will result in minimal alteration of the natural contours of the slope because the existing residence and deck modified the slope at the time of its construction. The deck will be constructed with piles and a below grade stabilization wall within the top-of-slope buffer to avoid any impact or alteration to the critical area steep slope. This standard is met.

2. **Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;**
Structures and improvements have been located in already disturbed areas and over degraded portions of the steep slope critical area buffer to avoid impacts to the critical area steep slope. The proposal does not result in the removal of any significant trees. This standard is met.

3. **The proposed development shall not result in great risk or a need for increased buffers on neighboring properties;**
The geotechnical report provided for the project states that the proposed development will not result in a greater risk or need for increased buffers on neighboring properties. Instead, the proposal will result in improved stability of neighboring properties due to the proposed stabilization wall. **See Section IX for conditions of approval associated with geotechnical documentation, inspections, and hold harmless agreement required for construction permit approval.**

4. **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 walls;**
A stabilization wall is incorporated into the project to protect the deck. There is minimal grading associated with the below grade wall and no grading is proposed on the steep slope. This standard is met.

5. **Development shall be designated to minimize impervious surfaces within the critical area and critical area buffer.**
The proposed deck and at grade patio will result in a 742 square foot of impervious surface within the steep slope buffer that is being removed from critical area status as part of the Critical Areas Land Use Permit. This area is degraded with minimal vegetation and already impacted by the existing development, which includes the existing deck and at grade patio. No new impervious surface is being proposed within the remaining critical areas and buffers. This standard is met.

6. **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;
The proposed deck and stabilization wall will be located outside the critical area steep slope in an already degraded area within the buffer. No changes in grade are proposed, nor is any yard area proposed within the steep slope. This standard is met.

7. **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 foundations.**
An at or below grade stabilization wall is proposed within the degraded buffer to support the proposed deck and stabilize the buffer. No change in grade is associated with the stabilization wall. No above-grade retaining walls nor foundation walls are proposed as part of the reconfigured deck. This standard is met.

8. **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;**
The proposed development is located outside of the steep slope critical area. This standard is not applicable.

9. **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**
The proposed development is located outside of the steep slope critical area. This standard is not applicable.

10. **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.**
A mitigation and restoration plan (Attachment 2) containing 1, 217 square feet of native planting and meeting the requirements of LUC 20.25H.210 has been submitted within this request. **See Section IX for condition of approval associated with temporary restoration and mitigation plans required for construction permit approval.**

C. Consistency with Critical Areas Report LUC 20.25H.230
The applicant supplied a complete critical areas report (Attachment 3) prepared by Wetland Resources. The report met the minimum requirements in LUC 20.25H.250. The existing buffer is degraded and lacks ecological function and values due to existing improvements. The proposal will provide mitigation that restores functions and values

and results in a net increase above the existing condition.

D. Consistency with Critical Areas Report LUC 20.25H.140 & 20.25H.145

Reduction of a steep slope and steep slope buffer requires a critical areas report as part of the application for a Critical Area Land Use Permit. The application includes a copy of the site plans for the proposal and a topographic survey. A geotechnical report was prepared by Geotech Consultants, Inc. dated February 23, 2024. The report includes an analysis of the site's geological characteristics and the proposed project. The report also determined the proposed development shall not result in greater risk or a need for increased buffers on neighboring properties. The report recommended that the buffer reduction from the steep slope for the proposal is adequate to mitigate hazards. Additionally, the report states that the proposal will comply with best management practices, will not further adversely affect other critical areas, and is designed that the hazard to the project is eliminated or mitigated to a level equal to or less than would exist if the proposed modifications to critical area buffers. Lastly, species of local importance were not identified on the site, thus the proposal would not impact any habitat for any species of local importance.

The proposal will approve construction which permanently disturbs 742 square feet of degraded buffer. The proposal will remove no significant trees within the existing critical area steep slope and buffer. These impacts are not environmentally significant, impact an existing degraded site, and will be mitigated by a mitigation plan which includes the planting of native vegetation.

See Section IX for conditions of approval, and for information on requirements for geotechnical monitoring, mitigation, and hold harmless letter submittal.

IV. Public Notice and Comment

Application Date:	June 24, 2024
Public Notice (500 feet):	July 25, 2024
Minimum Comment Period:	August 8, 2024

The Notice of Application for this project was published in the City of Bellevue weekly permit bulletin on June 24, 2024. It was mailed to property owners within 500 feet of the project site. No comments were received as of the writing of this staff report.

V. Summary of Technical Reviews

Clearing and Grading:

The Clearing and Grading Division of the Development Services Department has reviewed the proposed development for compliance with Clearing and Grading codes and standards and found no issues with the proposed development. A Building Permit with Clearing and Grading review is required, and the application must contain a letter from the project geotechnical engineer verifying the construction plans meet the recommendations contained within this report. The project will require geotechnical inspection and is subject to Clearing & Grading rainy season restrictions. **See Section IX for conditions of approval**

associated with Building Permit requirements, inspection requirements, and rainy season restrictions.

Utilities:
The Utilities Division of the Development Services Department has reviewed the proposed development for compliance with Utilities codes and standards. The Utilities staff found no issues with the proposed development.

VI. State Environmental Policy Act (SEPA)

The proposal is exempt from SEPA review, per WAC 197-11-800 and BCC 22.01.032.D. Construction of a single-family residence, even when located in a critical area, is a categorical exemption from SEPA review.

VII. Decision Criteria

A. Critical Areas Report Decision Criteria-Proposals to Reduce Regulated Critical Area Buffer LUC 20.25H.255.B

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

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

Finding: The proposal includes the 1,217 square feet of mitigation planting of native vegetation within steep slope buffer that currently is degraded with little vegetated coverage. This will result in an overall net gain in critical area and critical area buffer functions. This criterion is met.

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

Finding: The proposed 1,217 square feet of native vegetation planting. As stated in the Critical Areas Report, the mitigation will provide a net gain in critical area and critical area functions because "*the plantings will reduce erosion potential and add cover and forage resources for wildlife.*" (Attachment 3, pg. 8). This criterion is met.

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

Finding: The associated single family building permit will be required to comply with all applicable City of Bellevue stormwater requirements. Additionally, the proposed mitigation within the steep slope area will result in a net gain in stormwater quality functions. This criterion is met.

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

Finding: This is a proposal to reduce a steep slope buffer from 50 feet to 0 feet for the deck and stabilization wall. The applicant is proposing increased mitigation to the anticipated impact and has included a mitigation and restoration plan with the proposal. To ensure installation and appropriate maintenance of the proposed and required mitigation the applicant is required to submit a financial security device meeting the requirements of LUC 20.40.490. Mitigation measures must be installed before occupancy is granted and maintenance of required plantings is required for a period of five years. **See Section IX for conditions of approval associated with assurance device requirements.**

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

Finding: As discussed in Section III of this report, the proposal will reduce a critical area buffer from 50 feet to zero feet to construct a new deck and stabilization wall. The proposal will occur in a degraded buffer that was previously developed with an existing deck and ground level patio. The requested reduction has been mitigated by installing 1,217 square feet of native plantings resulting in an overall net increase in ecological functions within the steep slope area and steep slope buffer. This criterion is met.

6. The resulting development is compatible with other uses and development in the same land use district.

Finding: The proposal to construct a single-family residence, deck, and stabilization wall maintains consistency with the surrounding residential land use district. This criterion is met.

E. Critical Areas Land Use Permit Decision Criteria 20.30P

The Director may approve or approve with modifications an application for a critical areas land use permit if:

1. The proposal obtains all other permits required by the Land Use Code;

Finding: The applicant must obtain required development permits. **See Section IX for condition of approval associated with required permitting.**

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

Finding: The deck, stabilization wall, and native landscaping utilize the best available

construction, design, and development techniques. As noted previously, mitigation and restoration landscaping is proposed to increase the level of function of the steep slope critical area and steep slope buffer. This criterion is met.

3. The proposal incorporates the performance standards of Part 20.25H to the maximum extent applicable, and ;

Finding: As discussed in Section III of this report, the applicable performance standards of LUC Section 20.25H are being met.

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

Finding: The proposed activity will not impact public facilities and adequate services are available to serve the proposed project. This criterion is met.

5. The proposal includes a mitigation or restoration plan consistent with the requirements of LUC Section 20.25H.210; and

Finding: The proposal seeks reduction of the steep slope buffer to reconfigure a deck. Included with this proposal is a mitigation plan which provides approximately 1,217 square feet of native plantings within the critical area steep slope and buffer. The applicant is required to follow the recommendation included in the project geotechnical report, which shall be verified by an inspection made by a qualified engineer. **See Section IX for conditions of approval associated with temporary restoration and mitigation plan requirements.**

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

Finding: As discussed in Section III and V of this report, the proposal complies with all other applicable requirements of the Land Use Code.

VIII. Conclusion and Decision

After conducting the various administrative reviews associated with this proposal, including Land Use Code consistency, City Code and Standard compliance reviews, the Director of the Development Services Department does hereby **approve with conditions** the proposal to modify the steep slope buffer at 9600 SE 7th Street.

Note- Expiration of Approval: In accordance with LUC 20.30P.150 a Critical Areas Land Use Permit automatically expires and is void if the applicant fails to file for a Clearing and Grading Permit, Building Permit, or other necessary development permits within **one year** of the effective date of the approval.

IX. Conditions of Approval

The applicant shall comply with all applicable Bellevue City Codes and

Ordinances including but not limited to:

Applicable Ordinances	Contact Person
Clearing and Grading Code - BCC 23.76	Savina Uzunow, 425-452-7860
Utilities Code - BCC 24	James Henderson, 425-452-7889
Land Use Code - BCC 20.25H	Miranda Riordan, 425-452-6880

The following conditions are imposed under the Bellevue City Code authority referenced:

1. Building Permit: Approval of this Critical Areas Land Use Permit does not constitute an approval of a development permit. A Building Permit for the single-family residence and deck is required. All dimensional standards will be confirmed at the time of building permit review. Building Permit must include Clearing and Grading review.

Authority: Land Use Code 20.30P.140; Clearing and Grading Code 23.76.035
Reviewer: Miranda Riordan, Land Use; Savina Uzunow, Clear & Grade

2. Approved Reduction: The critical area steep slope buffer reduction approved is for a deck only as depicted in the project site plan (Attachment 1) and does not authorize additional site changes outside of this project scope. The reduction does not allow future structures or improvements to be located in the steep slope critical area or the steep slope buffer without geotechnical evaluation that may require additional review via a Critical Areas Land Use Permit.

Authority: Land Use Code 20.30P.140
Reviewer: Miranda Riordan, Land Use

3. Geotechnical Review: The project geotechnical engineer must review the final plans, including all foundation, retaining wall, shoring, and vault designs. A letter from the geotechnical stating that the plans conform to the recommendations in the geotechnical report and any addendums and supplements must be submitted to the clearing and grading section prior to issuance of the construction permit.

Authority: Land Use Code 20.30P.140, Clearing & Grading Code 23.76.050
Reviewer: Miranda Riordan, Land Use; Savina Uzunow, Clearing & Grading

4. Mitigation and Restoration Planting: Plans submitted for the building permit must provide 1,217 square feet of restoration planting that adheres to the minimum standards found in the City of Bellevue's Critical Areas Handbook.

Authority: Land Use Code, 20.30P.140
Reviewer: Miranda Riordan, Land Use

5. Rainy Season restrictions: No clearing and grading activity may occur during the rainy season, which is defined as October 1 through April 30 without written authorization

of the Development Services Department. Should approval be granted for work during the rainy season, increased erosion and sedimentation measures, representing the best available technology must be implemented prior to beginning or resuming site work.

Authority: Bellevue City Code 23.76.093.A
Reviewer: Savina Uzunow, Clearing & Grading

6. Maintenance and Monitoring: The planting area shall be maintained and monitored for 5 years as required by LUC 20.25H.220. An annual monitoring report is to be submitted to Development Services, Land Use Division in each of the five consecutive years following installation. The monitoring report shall include detailed information regarding the goals and standards outlined in the approved management plan. Photos from selected photo points shall be included in the monitoring reports to document the planting and ongoing success. As stated in the submitted maintenance and monitoring plan.

Annual monitoring reports are to be submitted to Land Use each of the five years. The reports, along with a copy of the planting plan, can be sent to Miranda Riordan at mriordan@bellevuewa.gov or to the address below:

Environmental Planning Manager
Development Services Department
City of Bellevue
PO Box 90012
Bellevue, WA 98009-9012

Authority: Land Use Code 20.30P.140; 20.25H.220
Reviewer: Miranda Riordan, Land Use

7. Planting Cost Estimate: A cost estimate for the proposed mitigation and restoration plant installation must be submitted prior to Building Permit issuance.

Authority: Land Use Code 20.30P.160
Reviewer: Miranda Riordan, Land Use

8. Maintenance and Monitoring Assurance Device: A maintenance assurance device in an amount equal to 100% of the cost of plants and for five years of maintenance labor and materials is required to ensure the plants are maintained and monitored. Release of this assurance device is contingent upon receipt of documentation reporting successful establishment in compliance with the approved management plan. Land Use inspection of the planting after 5-years is required to

release the surety. The maintenance surety is required to be submitted prior to building permit issuance.

Authority: Land Use Code 20.25H.220
Reviewer: Miranda Riordan, Development Services Department

9. Land Use Inspection: Following installation of the mitigation planting the applicant shall call the inspection line and request a Land Use inspection of the planting area prior to final building inspection. Staff will need to find that the plants are in a healthy and growing condition. Land Use inspection is also required to release the maintenance surety at the end of the 5-year monitoring period. Release of the maintenance surety is contingent upon successful monitoring and maintenance and submittal of the annual monitoring reports.

Authority: Land Use Code 20.30P.140
Reviewer: Miranda Riordan, Development Services Department

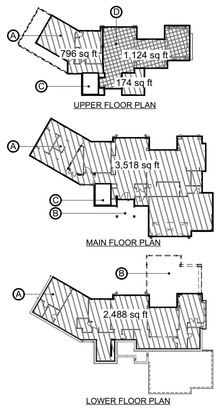
10. Hold Harmless Agreement: The applicant shall submit a hold harmless agreement in a form approved by the City Attorney which releases the City from liability for any damage arising from the location of improvements within a critical area, critical area buffer, and critical area structure setback in accordance with LUC 20.30P.170. The hold harmless agreement is required to be recorded with King County prior to clearing and grading permit issuance. Staff will provide the applicant with the hold harmless form.

Authority: Land Use Code 20.30P.170
Reviewer: Miranda Riordan, Land Use

11. Geotechnical Monitoring: The project geotechnical engineer of record or his representative must be on site during critical earthwork operations. The geotechnical engineer shall observe all excavations and fill areas. In addition, the engineer shall monitor the soil cuts prior to construction of rockeries and verify compaction in fill areas. The engineer must submit field report in writing to the DSD inspector for soils verification and foundation construction. All earthwork must be in general conformance with the recommendations in the geotechnical report.

Authority: Clearing & Grading Code 23.76.160
Reviewer: Savina Uzunow, Clearing & Grading

Attachment 1



(N) FLOOR AREA RATIO

SCALE 1"=40'

MAX. ALLOWED FAR = .50 (10,975.5 S.F.)
[**WITHOUT ADDITIONAL DEVELOPMENT REQUIREMENTS PER 20.20.010(43)]

LOT AREA:	21,951
LOWER FLOOR:	2,488
MAIN FLOOR:	3,518
UPPER FLOOR:	
SINGLE HEIGHT	174
SINGLE HEIGHT	796
DOUBLE HEIGHT	1,124
PROPOSED FAR:	**8,100 (36.9%)**

F.A.R. LEGEND

- (A) AREA COUNTED FOR F.A.R. ON EACH FLOOR
- (B) AREAS NOT COUNTED FOR F.A.R. (COVERED PATIO, OPEN DECK AND PORCH, ETC)
- (C) INTERIOR OPENINGS IN FLOOR PLATES (STAIR WELLS) NOT COUNTED IN F.A.R.
- (D) DOUBLE HEIGHT AREAS COUNTED TWICE

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HEIGHT MEASUREMENTS

POINT	SPOT ELEVATION EXISTING
A	248
B	248.3
C	248.6
D	248.6
E	248.6
F	248.2
G	248.2
H	248.2
I	248.2
J	248.2
K	248.2
L	248
M	246.2
N	245.7
O	244.8
P	244.2
Q	242
R	241.8
S	239
T	239
U	238
V	238
W	239
X	239
Y	239
Z	239
a	239
b	239
c	239
d	238
e	237.8
f	240.5
g	243.2
h	244.8
i	246.8
j	247
k	247.5

AVERAGE EXISTING GRADE	243.69	243'-8"
HEIGHT ALLOWED PER CODE SECTION 20.20.010	35	35'-0"
MAX ALLOWABLE BUILDING HEIGHT	**243.69 + 35 = 278.69**	**278'-8"**

ZONING REGULATION:

PARCEL NO:	5493110040
PROPERTY TYPE:	RESIDENTIAL
LAND AREA:	21,951
ADDRESS:	9600 SE 7TH ST. BELLEVUE WA 98004
ZONING:	R1.8
SETBACKS	FRONT: 30'-0" REAR: 25'-0" SIDE: 5'-0"
MAX. HEIGHT:	30/35
COVERAGE	
MAX STRUCT:	35%
MAX IMPERVIOUS:	45%
MAX HARD SURF:	75%
WATER:	WATER DISTRICT
SEWER/SEPTIC:	PUBLIC
ROAD ACCESS:	PUBLIC
STREET SURFACE:	PAVED

PREPARER:

GELOTTE HOMMAS DRIVDAHL ARCHITECTS
ATTN: DAVID GRUBB
2340 130TH AVE. NE, SUITE 100
BELLEVUE WA 98005
(425) 828-3081

LEGAL DESCRIPTION:

LOT 4, MEYDENBAUER PARK ADDITION II, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 107 OF PLATS, PAGES 3 AND 4, RECORRDS OF KING COUNTY, WA.

FINISH ELEVATIONS:

GARAGE SLAB	251.0
LOWER FLOOR	239.1
MAIN FLOOR	251.1
UPPER FLOOR	262.6

VERTICAL DATUM:

NAVD88 (SEE SURVEY)

(N) GREENSCAPE % OF FRONT YARD SETBACK

MIN. GREENSCAPE OF FRONT YARD SETBACK REQUIRED: 50% IN ZONE R-1.8 (PER TABLE 20.20.010)

FRONT YARD AREA: 3,065 SF (1,532.5 REQ'D.)

(E) GREENSCAPE	1,585
(E) GREENSCAPE	33
(E) GREENSCAPE	27
(E) GREENSCAPE	270
(N) GREENSCAPE	79
TOTAL (E) & (N) FRONT YARD GREENSCAPE	**1,994**

1,994 SF/3,065SF X 100% = **65.0%** > 50%

TOTAL (N) FRONT YARD HARDSCAPE	**1,071**

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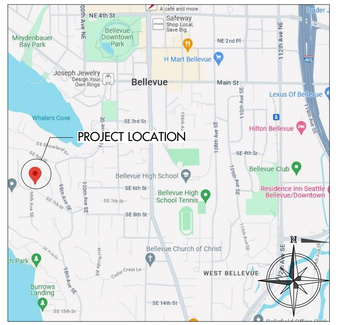

VICINITY MAP

(N) LOT COVERAGE BY STRUCTURES

STRUCTURAL COVERAGE ALLOWED: 35% IN ZONE R-1.8 (PER TABLE 20.20.010)

PER LUC 20.20.010 NOTE 13: "(13)Lot coverage is calculated after subtracting all critical areas and stream critical area buffers; provided, that coal mine hazards (LUC 20.25H.130), habitat associated with species of local importance (LUC 20.25H.150), and seismic hazards (LUC 20.25H.120.A.4) shall not be subtracted."

LOT AREA: 21,951 SF

STEEP SLOPE AREAS:
#1 3,975
#2 1,554
= 5,529 SF

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LOT AREA OUTSIDE OF STEEP SLOPES: 21,951 - 5,529 = **16,422 SF**

(N) DECK	742
(N) RESIDENCE	3,642
(N) COVERED ENTRY	143
TOTAL (N) LOT COVERAGE	**4,527**

4,527 SF/16,422 SF X 100% = **27.5** < 35%

/01

(N) IMPERVIOUS SURFACE

IMPERVIOUS COVERAGE ALLOWED: 45% IN ZONE R-1.8 (PER TABLE 20.20.010)

LOT AREA: 21,951 SF

(N) DECK	742
(N) RESIDENCE	3,642
(N) DRIVEWAY & WALKWAYS	1,855
(N) COVERED ENTRY	143
(N) EAVE OVERHANGS	512
TOTAL (N) IMPERVIOUS	**6,894**

6,894 SF/21,951 SF X 100% = 31.4% < 45%

/01

(N) HARD SURFACE

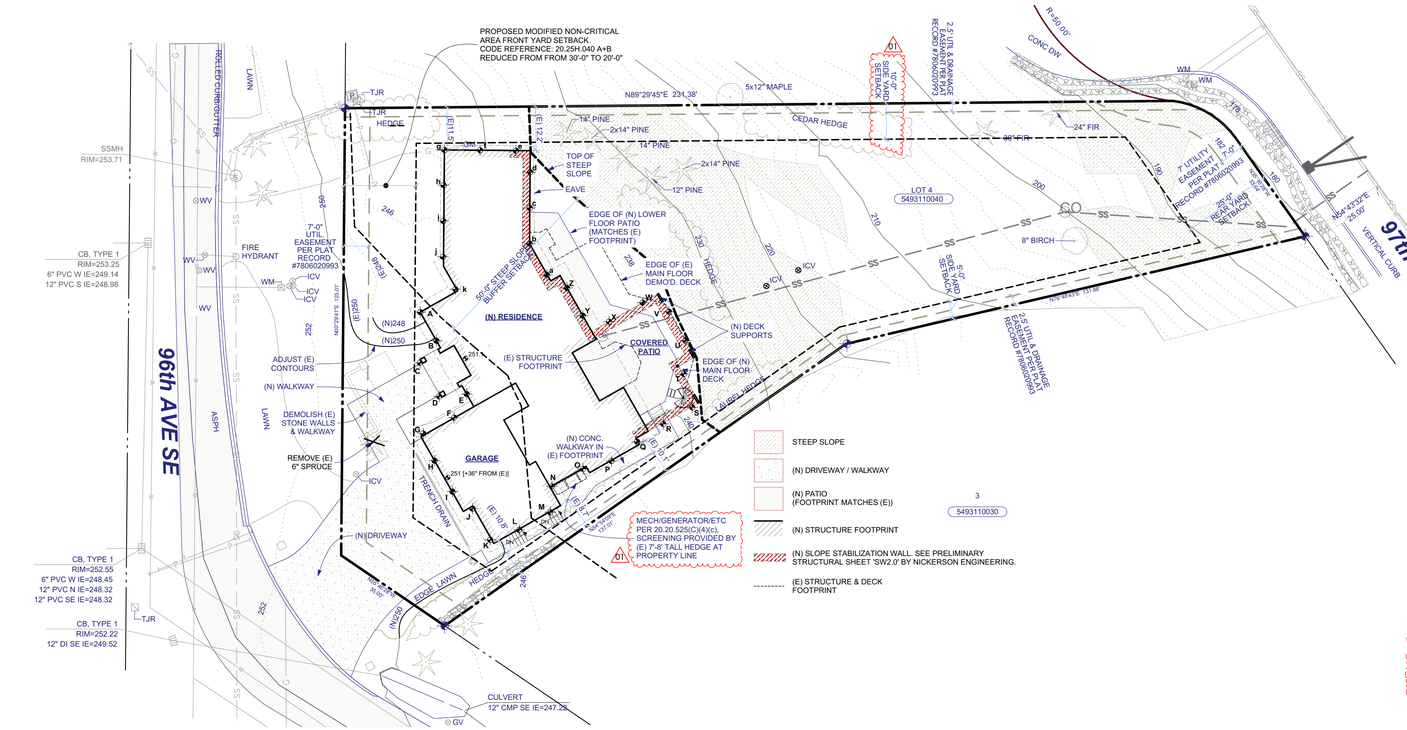
HARD SURFACE COVERAGE ALLOWED: 75% IN ZONE R-1.8 (PER TABLE 20.20.010)

LOT AREA: 21,951 SF

(N) DECK	742
(N) RESIDENCE	3,642
(N) DRIVEWAY & WALKWAYS	1,855
(N) COVERED ENTRY	143
(N) EAVE OVERHANGS	512
TOTAL (N) HARD SURFACE	**6,894**

6,894 SF/21,951 SF X 100% = 31.4% < 75%

/01

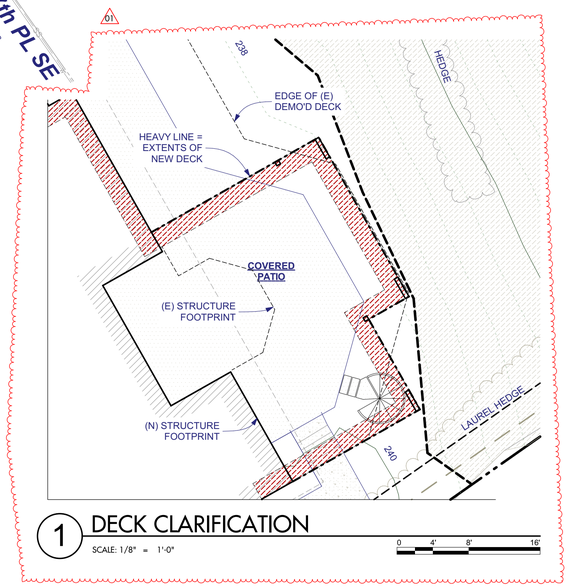


N

ARCHITECTURAL SITE PLAN

SCALE: 1" = 20'

0 10' 20' 40'



1 DECK CLARIFICATION

SCALE: 1/8" = 1'-0"

0 4' 8' 16'

GELOTTE HOMMAS DRIVDAHL ARCHITECTURE
THEARTOFARCHITECTURE.COM
2340 130th Ave. NE, Suite 100, Bellevue, WA 98005
425.828.3081

Miller Residence

9600 SE 7TH ST
BELLEVUE, WA 98004

Job No.	2310
Project Manager:	DG
Issue Date:	8/26/2024

NO.	DATE	REVISION
/01	08/26/2024	CALUP REPSONSE

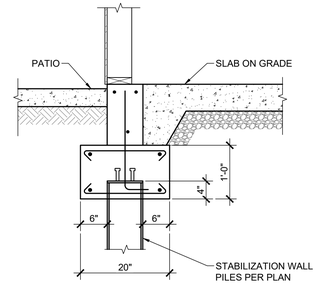
CALUP RESPONSE (2024-08-26)

PROPOSED ARCHITECTURAL SITE PLAN 'B'

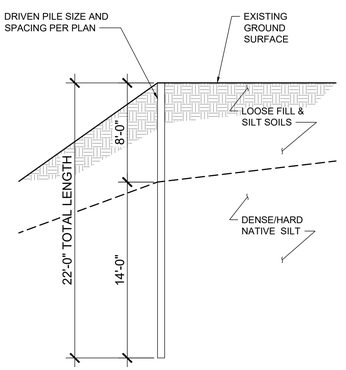
A1.03B

FILE: 2310 Miller Residence PRINTED: Monday, August 26, 2024

STABILIZATION WALL PLAN
SCALE: 3/16" = 1'-0"



TYPICAL PILE AT FOUNDATION
SCALE: 3/4" = 1'-0"



TYPICAL STABILIZATION WALL DETAIL
SCALE: NTS

3/16"=1'-0" 5' 0 5 10

NICKERSON ENGINEERING
2418 CALIFORNIA ST., SUITE C
EVERETT, WA 98201
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CHRISTOPHER NICKERSON
STATE OF WASHINGTON
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PROFESSIONAL ENGINEER
PRELIMINARY

MILLER RESIDENCE
SITE STABILIZATION WALL
9600 SE 7TH ST
BELLEVUE, WA 98004

No.	Date	Issue
A	05.31.24	Preliminary

Sheet Contents
STABILIZATION WALL PLAN

Job No. 24-022

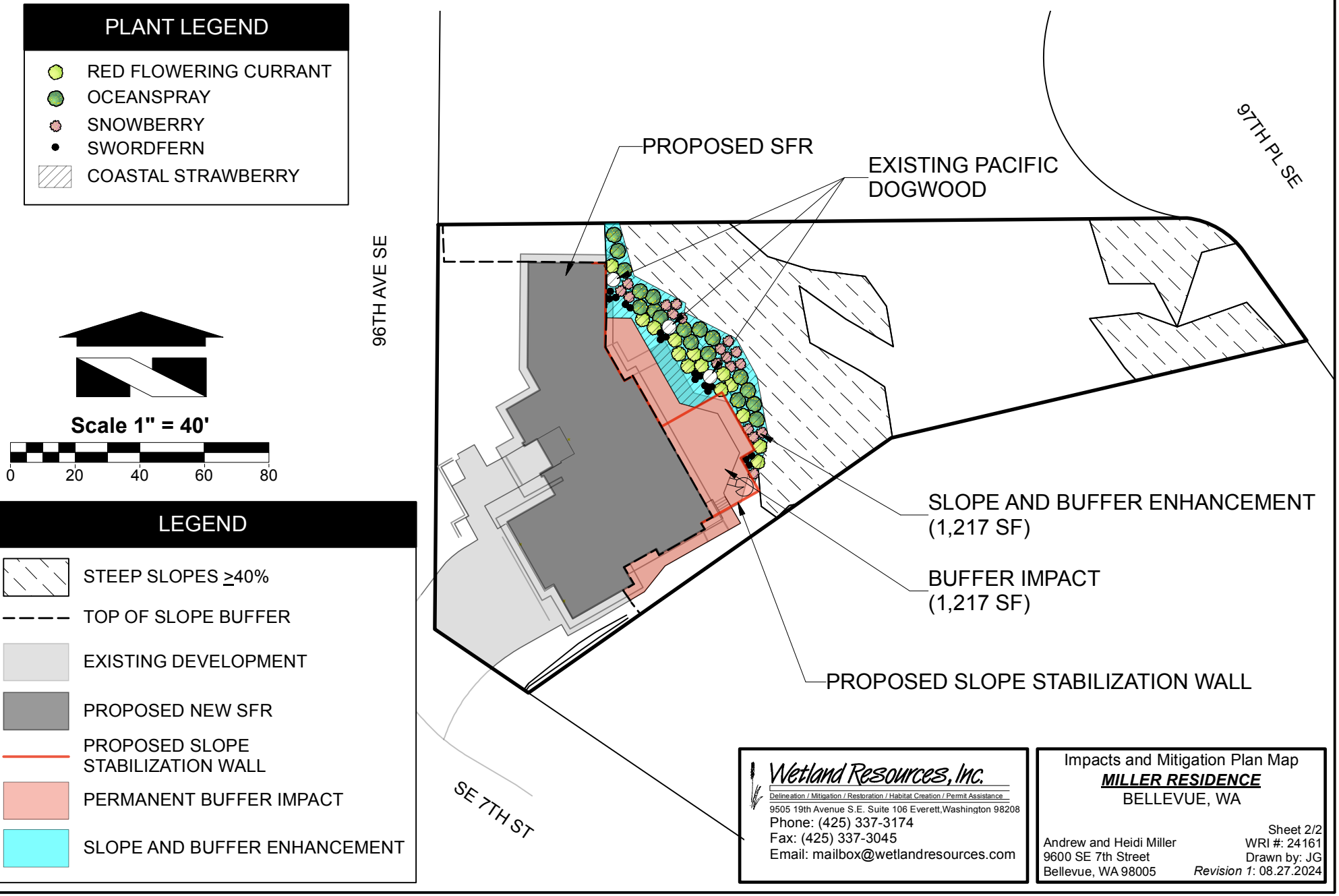
Sheet No.
SW2.0

CRITICAL AREAS REPORT - IMPACTS AND MITIGATION PLAN MAP

Attachment 2

MILLER RESIDENCE

PORTION OF SECTION 31, TOWNSHIP 25N, RANGE 5E, W.M.



Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

Impacts and Mitigation Plan Map
MILLER RESIDENCE
BELLEVUE, WA

Andrew and Heidi Miller
9600 SE 7th Street
Bellevue, WA 98005

Sheet 2/2
WRI #: 24161
Drawn by: JG
Revision 1: 08.27.2024

Attachment 3

CRITICAL AREAS REPORT
AND
BUFFER MITIGATION PLAN

FOR

MILLER RESIDENCE

Wetland Resources, Inc. Project #24161

Prepared By
Wetland Resources, Inc.
9505 19th Avenue SE, Suite 106
Everett, WA 98208
(425) 337-3174

Prepared For
Andrew and Heidi Miller
9600 SE 7th Street
Bellevue, WA 98005

Revision 1: August 27, 2024

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1.0 INTRODUCTION

Wetland Resources, Inc. (WRI) performed a site evaluation on June 3, 2024, to review critical areas on and in the vicinity of the property located at 9600 SE 7th Street in Bellevue, WA. The site consists of one tax parcel (King County parcel number 5493110040). The Public Land Survey System (PLSS) locator for the subject site is Section 31, Township 25N, Range 05E, W.M. The subject property is located in the East Lake Washington – Bellevue North drainage basin within the Cedar/Sammamish watershed, Water Resources Inventory Area (WRIA) 8.

1.1 SITE DESCRIPTION

The subject property is developed with a single-family residence in the westernmost portion of the parcel. Vegetation on the site consists of maintained lawn and landscaping. Topography of the site has an east facing aspect and includes slopes of 40 percent and greater. No wetlands or streams were identified on or in the vicinity of the site.

Figure 1 - Aerial photo of the subject property (not to scale)

The purpose of this report is to provide information on existing conditions of the site as required when a project is requesting a modification of critical areas, buffers, or setbacks. This assessment includes wetlands, streams, and steep slopes on and in the vicinity of the subject site. As no wetlands or streams were identified on or near the site, this report is focused on compliance with regulations associated with the steep slopes on the site. Please note that much of the information presenxted in

this report is based on the analysis provided by the project's geotechnical engineer, Geotech Consultants, Inc. Please refer to their report (*Geotechnical Engineering Study – Proposed Residence: 9600 Southeast 7th Street Bellevue, Washington*) prepared by Geotech Consultants, Inc., dated February 23, 2024. This report is included in Appendix A and is henceforth referred to as the *Geotechnical Engineering Study*.

2.0 CRITICAL AREAS DETERMINATION

Two steep slope areas occur on the site. One of these areas is directly east of the existing home, and the other is located in the easternmost part of the property. No other critical areas were identified on or in the vicinity of the site during the June 2024 site investigation. No species of local importance or habitats associated with these species were identified on site.

2.1 REVIEW OF EXISTING INFORMATION

Prior to conducting an on-site investigation of the project area, public resource information was reviewed to identify the presence of wetlands, streams, and other critical areas within and near the project area. The following information was examined:

- *U.S. Fish and Wildlife Service (USFWS) - National Wetlands Inventory*: This source does not depict any wetlands on-site or in the immediate vicinity.
- *Natural Resources Conservation Service- Web Soil Survey*: The Web Soil Survey maps the soils on the site as Alderwood gravelly sandy loam, eight to 15 percent slopes.
- *Washington Department of Fish and Wildlife (WDFW) SalmonScape Interactive Map*: The SalmonScape map does not identify presence of any salmonid species on or near the project site.
- *WDFW Priority Habitat and Species (PHS) Interactive Map*: No priority habitats or species are mapped on or near the site.
- *King County iMap Interactive Mapping Tool*: The King County iMap does not illustrate any wetlands or streams on, or in the immediate vicinity of, the subject property. The eastern portion of the site is mapped as an erosion hazard area.
- *Washington State Department of Natural Resources - Forest Practices Mapping Tool (FPMT)*: This source does not identify any streams on or near the site.
- *Bellevue Geologic Hazards Map:* This resource maps the easternmost part of the property as a very severe soil erosion hazard area. Steep slopes are mapped in the same area as the erosion hazard as well as directly east of the existing house.

2.2 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 are designated as a critical area under Bellevue's Land Use Code (LUC) 20.25H.120.A.2. Steep slopes cover a total of 5,529 square feet on the site. For additional details regarding the steep slopes present on the subject site, refer to the *Geotechnical Engineering Study*. Per LUC 20.25H.120, steep slopes require a 50-foot top of slope buffer and a 75-foot toe of slope structure setback. Per LUC 20.25H.120.B.2, "*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*." The existing house was built in 1996. Therefore, the top of slope buffer has been modified to terminate at the eastern edge of the existing structure.

2.3 HABITAT ASSESSMENT

Habitat associated with species of local importance listed in LUC 20.25H.165.A is designated as critical area under LUC 20.25H.150.B. Therefore, WRI performed an assessment of the property to determine the likelihood of use by these species.

2.3.1 Vegetation Description

Vegetation on the subject property consists of maintained lawn and landscaping.

2.3.2 Species of Local Importance

Based on the conditions on the site and in the surrounding area, wildlife species that are expected to utilize the site include those that are adapted to developed areas. Avian species that are expected to be present include American Robin (*Turdis migratorius*), American Crow (*Corvus brachyrhyncos*), Stellar's Jay (*Cyanocitta stelleri)*, Black-capped Chickadee (*Poecile atricapillus*), and Dark-eyed Junco *(Junco hyemalis)*. Mammalian species that may utilize this site include squirrels (*Sciurus spp.*), raccoons (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), and Virginia opossums (*Didelphis virginiana*). This list is not intended to be all-inclusive and may omit species that currently utilize or could utilize the site.

No priority species or habitats are identified by the WDFW PHS online mapping application, or any other commonly available public resource, as being present on the subject property.

No wildlife species on the City of Bellevue's Species of Local Importance list (LUC 20.25H.150(A)) were observed or are expected to utilize the site. The property lacks special habitat features such as large snags, large nesting trees, ponds, or streams. The subject property is located within a dense suburban residential development area which limits its use as a wildlife corridor. The vegetation on the site does not provide specific habitat for any species of local importance.

2.3.3 Potential Habitat Impact

No direct or indirect impacts are proposed to any habitats associated with species of local importance. The proposed development will not impact any natural vegetation. Native species will

be installed adjacent to the proposed SFR to compensate for buffer impacts associated with the installation of a slope stabilization wall. The mitigation plantings will increase native plant cover on the site, resulting in an improvement in wildlife habitat conditions on the site.

3.0 PROPOSED DEVELOPMENT

The applicant proposes to remove the existing single family residence (SFR) and build a new SFR within the same footprint. Based on the recommendations in the *Geotechnical Engineering Study*, a slope stabilization wall will be installed. An existing patio and walkway will be replaced, and a deck will be constructed over the footprint of the slope stabilization wall.

The existing home is located within the prescribed 50-foot top of slope buffer. Existing access to the property is from the west via Southeast 7th Street. Access from the east is not feasible due to steep slopes. The extent and location of steep slopes on the property makes it infeasible to locate a residence on the site that would be outside of steep slopes and/or buffers. Therefore, the applicant is requesting a modification to the top of slope buffer to accommodate the proposed development.

The proposed slope stabilization wall will be located entirely below ground and grading will be restored to pre-construction conditions after installation. The wall will improve stability of the steep slope. A Temporary Erosion and Sedimentation Control (TESC) plan will be in place to ensure that soils on the steep slope and in the buffer are stabilized as needed during and following construction. No development is proposed on the steep slopes.

The proposed development has been designed according to the recommendations in the *Geotechnical Engineering Study* (Appendix A). By implementing the design recommendations and construction techniques provided by the geotechnical engineer, the project will improve the integrity of the on-site steep slope.

3.1 IMPACTS AND MITIGATION

Grading of the western portion of the site was modified when the existing house was originally constructed. The proposed new SFR will be constructed within the footprint of the existing SFR. No impacts to the steep slope areas are proposed. A new patio and walkway are proposed on the east side of the house in the same footprint as the existing patio and walkway. A total of 1,217 square feet of the patio, walkway, and deck are located within the top of slope buffer. To compensate for the development within the buffer, the applicant proposes to provide enhancement of the slope and buffer. The proposed enhancement area currently consists mainly of bare soil and contains a few Pacific dogwood trees, which are expected to remain.

Figure 2 -East side of house where slope stabilization wall will be installed and patio will be replaced. Mitigation plantings are to be installed on the slope and in the top of slope buffer areas shown to the left of the patio.

4.0 PROPOSED MODIFICATION TO LUC

Both the eastern and western portions of the site are encumbered by steep slopes. Strict adherence to the provisions of the Bellevue Land Use Code would preclude any development on this parcel. Therefore, a modification of critical area buffers is necessary.

The purpose of this critical areas report is to modify the steep slope buffer identified in LUC 20.25H.120. Specifically, the applicant is proposing to infringe upon the steep slope buffer in the following manner:

- Install a slope stabilization wall within the top of slope buffer that will encroach into 26 square feet of area closer to the top of slope than the existing development.
- Replace the existing patio and walkway and construct a deck over the slope stabilization wall.

4.1 ADDITIONAL PROVISIONS REQUIRED FOR LANDSLIDE HAZARDS AND STEEP SLOPES

4.1.1 LUC 20.25H.125 Performance Standards – Landslide Hazards and Steep Slopes

The performance standards outlined in LUC 20.25H.125 are discussed on pages seven and eight of the *Geotechnical Engineering Study* (see Appendix A). Regarding LUC 20.25H.125.J, a mitigation plan is provided in Section 6 of this report. The slope stabilization wall will encroach into the top of slope buffer beyond the footprint of the existing development. Further, the existing patio and walkway will be replaced within the same footprint and a deck will be constructed over the slope stabilization wall. Enhancement of the slope and buffer will be provided to mitigate for the associated top of slope buffer impacts at a 1:1 ratio. Please refer to Section 6 below for further details of the mitigation plan.

4.1.2 LUC 20.25H.135 Mitigation and Monitoring Additional Provisions

Detailed information regarding temporary erosion and sediment control as well as stormwater management will be submitted with the building permit application.

4.1.3 LUC 20.25H.140 Critical Areas Report Additional Provisions for Landslide Hazard Areas and Steep Slopes

Compliance with the provisions of LUC 20.25H.140 are discussed on page eight of the Geotechnical Engineering Study (Appendix A). The geotechnical engineer has reviewed the residence location, design, and construction methods.

4.1.4 LUC 20.25H.145 Approval of Modification

The performance standards outlined in LUC 20.25H.145 are discussed on page nine of the *Geotechnical Engineering Study* (Appendix A). Regarding LUC 20.25H.145.G, a discussion of existing habitat conditions and analysis of development impact is provided in Section 2.3 Habitat Assessment of this report. No specific habitat for species of local importance occurs on the site. Installation of the slope stabilization wall and replacement of the SFR will not impact any natural vegetation. If existing dogwood shrubs in the landscape planting area east of the house are impacted during installation of the slope stabilization wall, they will be replaced at a 1:1 ratio with native shrub species from the approved mitigation planting plan. The proposed plan will not adversely impact wildlife or habitat.

4.2 LUC 20.25H.255 CRITICAL AREAS REPORT – DECISION CRITERIA

The following decision criteria are applied for evaluation of critical areas reports in Bellevue. Text in italics below is cited from LUC 20.45H.255, with responses in plain text.

A. General

Except for the proposal described in subsection B of this section, the Director may approve, or approve with modifications, the proposed modification where the applicant demonstrates:

1. *The modifications and performance standards included in the proposal lead to levels of protection of critical area functions and values at least as protective as application of the regulations and standards of this code;*

The proposed development will occur primarily within the footprint of existing development, so adverse impacts are negligible, and no vegetation will be impacted. The proposed slope stabilization wall will increase the stability of the steep slope, thus improving critical area functions. The mitigation plantings will further stabilize the slope and improve water quality functions by intercepting precipitation and slowing surface water flows. Additionally, the plantings will reduce erosion potential and add cover and forage resources for wildlife. Overall, the project will improve critical area and buffer functions and values on the site.

2. *Adequate resources to ensure completion of any required mitigation and monitoring efforts;*

The applicant will provide a surety at the time of the building permit application submittal. A project cost estimate for the installation of the mitigation measures is provided in Section 11.

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

The proposal will not result in any changes to critical areas or buffers off site. Therefore, there will be no change in off-site critical area and buffer functions and values. The slope stabilization wall and mitigation plantings on the site will benefit areas downslope and adjacent by improving overall slope stability and reducing erosion and landslide potential.

4. *The resulting development is compatible with other uses and development in the same land use district.*

The subject site is in a single-family residential neighborhood. This project will replace the existing SFR with a new SFR in the same footprint. The use is compatible with land use in the area and maintains the existing use on site.

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

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

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

The proposed development will be located in areas that have been previously disturbed by grading for the existing SFR. The slope stabilization wall will result in improved slope stability. The proposed development will not degrade the current functionality of the buffer as it relates to slope stability and erosion protection. Native vegetation will be installed on the slope and within the top of slope buffer to mitigate for the proposed buffer impacts. The vegetation will increase the stability of the top of the slope and buffer and will increase buffer functions.

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

No natural vegetation will be impacted, as the existing vegetation on the site consists exclusively of maintained lawn and landscaping. After the proposed development is installed, grading will be restored to pre-construction conditions and soils will be stabilized per the approved TESC plan. Enhancement of the slope and buffer is proposed to compensate for buffer impacts associated with the project. The proposed enhancement area currently consists of bare soil with a few dogwood trees. Native shrubs and groundcover plants will be installed to provide continuous vegetative cover. Overall, the project will improve slope stability and buffer functions.

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

The buffer area that will be impacted consists primarily of existing impervious surfaces, so no detrimental impacts to stormwater quality will occur. The proposed mitigation plantings on the slope and within the buffer will increase interception of precipitation, slow the flow of stormwater, and provide increased filtration of pollutants and sediments.

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

The applicant will provide a surety at the time of the building permit application submittal. A project cost estimate for installation of the mitigation measures is provided in Section 11.

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

The proposed modifications and performance standards will not affect critical area or buffer functions off-site.

6. *The resulting development is compatible with other uses and development in the same land use district.*

The subject site is in a single-family residential neighborhood. The proposed plan is to replace the existing SFR with a new SFR in the same footprint, which is compatible with development in the land use district.

5.0 LUC 20.30P.140 CRITICAL AREAS LAND USE PERMIT - DECISION CRITERIA

The following decision criteria are applied for evaluation of critical areas land use permits in Bellevue. Text in italics below is from LUC 20.30P.140, with responses in plain text.

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

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

All other necessary permits will be obtained.

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

No impacts to critical areas are proposed. By designing the project following the recommendations in the *Geological Engineering Study* (Appendix A), the proposal applies the best available construction, design, and development techniques, which will result in an improvement in slope stability on the site. The buffer impact area consists mainly of existing impervious surfaces. The proposed slope stabilization wall and mitigation enhancement plantings will result in an overall improvement in slope stability and buffer functions. The proposal represents the least amount of impact necessary to achieve the project goals.

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

A discussion of performance standards for landslide hazards and steep slopes in LUC 20.25H.125 is provided in the *Geotechnical Engineering Study* in Appendix A and in Section 6 of this report. The proposed development incorporates these performance standards.

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

The subject site is already adequately served by public facilities including streets, fire protection and utilities.

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

A mitigation plan that includes vegetation enhancement is provided below in Section 6 of this report. This mitigation plan is consistent with LUC 20.25H.210.

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

The proposal complies with the applicable requirements of code and all other necessary permits will be obtained.

6.0 BUFFER MITIGATION PLAN

The proposed development plan will affect a total of 1,217 square feet within the top of slope buffer. To compensate for these impacts, the applicant proposes enhancement of the slope and buffer at a 1:1 ratio. The proposed enhancement areas currently consist mainly of bare soil with a

few dogwood trees, which are expected to remain. Native shrubs and ground cover plants will be installed among the existing dogwoods.

Table 1 - Steep Slope Buffer Impacts and Mitigation Summary

Impact Area (square feet)	Mitigation Type	Mitigation Area (square feet)	Mitigation Ratio
1,217	Enhancement	1,217	1:1

6.1 MITIGATION SEQUENCING

The City of Bellevue requires that all reasonable efforts be taken to avoid and minimize impacts to critical areas and buffers. If impacts do occur, they must be compensated in the following order of preference (LUC 20.25H.215):

A) Avoiding the impact altogether by not taking a certain action or parts of an action;
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;
D) Monitoring the hazard or other required mitigation and taking remedial action when necessary.

The proposed project avoids any impacts to critical areas. However, complete avoidance of the steep slope buffer is not feasible due to the location of the steep slope on the site, the location of the existing development, and the necessary location of the proposed slope stabilization wall.

Impacts to the buffer represent the minimum necessary to achieve the project goals. No impacts to natural vegetation will occur, and proper TESC procedures and best management practices will be used during construction.

Buffer impacts consist of replacing an existing patio and walkway, installing a below ground slope stabilization wall, and constructing a deck over the wall. Impacts will be mitigated through enhancement of the slope and buffer. Mitigation measures will increase slope stability, enhance the protective functions of the buffer, and will also benefit wildlife by improving habitat. The result will be a net gain in functions and values.

The mitigation area will be monitored for a period of five years per the approved mitigation and monitoring plan. Contingency plans will be followed if deemed necessary by the City or the consulting biologist. The monitoring period will end when the definition of success is met. Please refer to Section 8 below for details of the monitoring program.

6.2 SLOPE AND BUFFER ENHANCEMENT PLAN

The proposed enhancement area is 1,217 square feet in size and includes a portion of the steep slope and the top of slope buffer. This area currently consists of bare ground with a few Pacific dogwood (*Cornus nuttallii*) trees, which are expected to remain. Native shrubs and ground cover plants will be installed in the enhancement area. If any of the existing dogwood plants in the enhancement area need to be removed during construction, they will be replaced with native shrub species from the specified plant list in Section 6.2.2. Any changes to the enhancement plan will be documented in the as-built report.

The proposed enhancement measures will result in improved slope stabilization and erosion control functions and will increase native plant cover and diversity and potential wildlife habitat. A net gain in steep slope buffer functions will be obtained through the proposed mitigation plan.

6.2.1 Site Preparation

Prior to starting work, a silt fence (or similar erosion control device) shall be installed on the downslope edge of the mitigation area and left in place until native plant installation is complete and soils are stabilized.

6.2.2 Buffer Enhancement Planting Plan

The proposed planting plan includes plant species recommended in the Geologically Hazardous Areas section of the City of Bellevue's Critical Areas Handbook. Please note that the quantities and locations of plants will be determined on site at the time of installation based on site conditions at that time.

Slope & Buffer Enhancement Planting Plan (1,217 SF)

Common Name	Latin Name	Size	Spacing	Quantity
Red flowering currant	*Ribes sanguineum*	1 gallon	4.5'	18
Oceanspray	*Holodiscus discolor*	1 gallon	4.5'	18
Snowberry	*Symphoricarpos albus*	1 gallon	4.5'	14
Swordfern	*Polystichum munitum*	1 gallon	2'	17
Coastal strawberry	*Fragaria chiloensis*	4 inch	2'	300

6.3 PLANTING NOTES

Plant between late fall and early spring and obtain all plants from a reputable nursery. Care and handling of all plant materials is extremely important to the overall success of the project. The origin of all plant materials specified in this plan shall be native plants, nursery grown in the Puget Sound region of Washington. Some species substitution may be allowed with agreement of the contracted ecologist.

Pre-Planting Meeting
Prior to control of invasive species or installation of mitigation plantings, a site meeting between the contracted landscaper and the consulting ecologist may occur to resolve any questions that may arise. During this meeting a discussion regarding plant spacing and proper locations of plant species will occur, as well as an inspection of the plants prior to planting. Minor adjustments to the original design may be required prior to and during construction.

Handling
Plants shall be handled so as to avoid all damage, including breaking, bruising, root damage, sunburn, drying, freezing or other injury. Plants must be covered during transport. Plants shall not be bound with wire or rope in a manner that could damage branches. Protect plant roots with shade and wet soil in the time period between delivery and installation. Do not lift container stock by trunks, stems, or tops. Do not remove from containers until ready to plant. Water all plants as necessary to keep moisture levels appropriate to the species horticultural requirements. Plants shall not be allowed to dry out. All plants shall be watered thoroughly immediately upon installation. Soak all containerized plants thoroughly prior to installation.

Storage
Plants stored by the Permittee for longer than one month prior to planting shall be planted in nursery rows and treated in a manner suitable to those species' horticultural requirements. Plants must be re-inspected by the landscape architect prior to installation.

Damaged plants
Damaged, dried out, or otherwise mishandled plants will be rejected at installation inspection. All rejected plants shall be immediately removed from the site, and properly replaced.

Plant Names
Plant names shall comply with those generally accepted in the native plant nursery trade. Any question regarding plant species or variety shall be referred to the landscape architect or consulting ecologist. All plant materials shall be true to species and variety and legibly tagged.

Quality and condition
Plants shall be normal in pattern of growth, healthy, well-branched, vigorous, with well-developed root systems, and free of pests and diseases. Damaged, diseased, pest-infested, scraped, bruised, dried out, burned, broken, or defective plants will be rejected. Plants with pruning wounds over 1 inch in diameter will be rejected.

Roots
All plants shall be balled and burlapped (B&B) or containerized, unless explicitly authorized by the landscape architect and/or consulting ecologist. Rootbound plants or B&B plants with damaged, cracked, or loose rootballs (major damage) will be rejected. Immediately before installation, plants with minor root damage must be root-pruned. Matted or circling roots of containerized plantings must be pruned or straightened, and the sides of the root ball must be roughened from top to bottom to a depth of at least an inch.

Sizes
Plant sizes shall be the size indicated in the plant schedule in approved plans, unless approved by the landscape architect or consulting ecologist. Larger stock may be acceptable provided that it has not been cut back to the size specified, and that the root ball is proportionate to the size of the plant. Smaller stock may be acceptable, and preferable under some circumstances, based on site-specific conditions. Measurements, caliper, branching, and balling and burlapping shall conform to the American Standard of Nursery Stock by the American Association of Nurserymen (latest edition).

Form
Evergreen trees shall have single trunks and symmetrical, well-developed form. Deciduous trees shall be single trunked unless specified as multi-stem in the plant schedule. Shrubs shall have multiple stems and be well-branched.

Timing of Planting
Unless otherwise approved by the landscape designer/consulting ecologist, all planting shall occur between November 1 and March 1. Overall, the earlier the plants go into the ground during the dormant period, the more time they have to adapt to the site and extend their root systems before the water demands of summer.

Weeding
Non-native, invasive vegetation in the mitigation area will be hand-weeded from around all installed plants on a routine basis throughout the monitoring period. No chemical control of vegetation on any portion of the site is recommended without prior approval from the City and consulting biologist.

Site conditions
The landscaping contractor shall immediately notify the landscape designer and/or consulting ecologist of drainage or soil conditions likely to be detrimental to the growth or survival of plants. Planting operations shall not be conducted under the following conditions: freezing weather, when the ground is frozen, excessively wet weather, excessively windy weather, or in excessive heat.

Planting Pits
Planting pits shall be circular or square with vertical sides and shall be at least 12 inches wider in diameter than the root ball of the plant. Break up the sides of the pit in compacted soils. Set plants upright in pits. All burlap shall be removed from the planting pit/rootball. Backfill of native soils shall be worked back into holes such that air pockets are removed without adversely compacting soils.

Fertilizer
Slow release fertilizer may be used if pre-approved by the consulting ecologist. If needed, fertilizers shall be applied only at the base of plantings underneath a covering of mulch (that does not make contact with stems of the plants). No fertilizers shall be placed within planting holes.

Support Staking
Most shrubs and many trees DO NOT require any staking. If the plant can stand alone without staking in a moderate wind, do not use a stake. If the plant needs support, then strapping or webbing should be used as low as possible on the trunk to loosely brace the tree with two stakes. Do not brace the plant tightly or too high on the trunk. If the plant is unable to sway, it will further lose the ability to support itself. Do not use wire in a rubber hose for strapping as it exerts too much pressure on the bark. As soon as supporting the plant becomes unnecessary, remove the stakes. All stakes must be removed within two years of installation.

Arrangement and Spacing
The plants shall be arranged as shown on the approved plan. Adjustments to the location of plants may occur with prior approval from the City and/or consulting biologist.

Compost
If native soils appear unsuitable for the long term survival of installed plant material, organic compost will be added to the planting area.

Erosion and Sediment Control Plan
A silt fence (or similar erosion control device) shall be installed at the downslope edge of the development and mitigation areas. All provisions in the approved project TESC plan shall be followed to ensure slope stability during and after construction.

7.0 PROJECT GOALS AND OBJECTIVES

The goal of this mitigation plan is to improve the stability and functions of the steep slope and buffer. The specific goals of the plan are to increase native species diversity and cover, increase opportunities for wildlife, improve soil stabilization, limit erosion, and improve the bio-filtration capacity of the buffer.

The objectives of this plan are to establish native shrubs and groundcover plants in the designated buffer enhancement area.

Over time, this mitigation project is expected to achieve a net-gain in functions to wildlife, water quality, hydrology, and soil stability within the buffer area, and is expected to better protect the on-site steep slope.

8.0 MONITORING PROGRAM

Monitoring shall be conducted annually for five years in accordance with the approved Buffer Mitigation Plan.

Requirements for monitoring project:

1. Initial compliance report/as-built map
2. Annual site inspections (once in the spring, once in the fall) for five years
3. Annual reports including final report (one report submitted in the fall of each monitored year)

Purpose for Monitoring

The purpose for monitoring shall be to evaluate the project's success. Success will be determined if monitoring shows at the end of five years that the definitions of success stated below are being met. Access shall be granted to the planting area for inspection and maintenance to the contracted landscaper and/or ecologist and the City during the monitoring period or until the project is evaluated as successful.

Vegetation Monitoring Methodology

Due to the small size of the buffer enhancement areas, a total plant count will be conducted in lieu of transect or sampling points for the first two monitoring years. For years three through five, survival of shrubs and aerial cover of ground cover will be documented. Monitoring of vegetation should occur annually between May 15 and September 30 (prior to leaf drop), unless otherwise specified.

The following data will be recorded for the buffer enhancement areas:

- Species and quantity present
- Quantity of dead plants
- General observations

8.1.2 Photo points

At least one permanent photo point will be established within the mitigation area. Photographs will be taken from this point to visually record condition of the mitigation area. Photos shall be taken annually between May 15 and September 30 (prior to leaf drop), unless otherwise specified. Location of the permanent photo point(s) shall be depicted on the mitigation plan map. They may be drawn by hand on the plan and shall be submitted with the first annual monitoring report.

8.1.3 Monitoring Reports

Monitoring reports shall be submitted by December 31 of each year during the monitoring period. As applicable, monitoring reports must include descriptions/data for:

(1) Site plan and vicinity map;
(2) Historic description of project, including date of installation, current year of monitoring, restatement of planting/restoration goals, and performance standards;
(3) Plant survival and vigor for every plant stratum and explanation of monitoring methodology in the context of assessing performance standards;
(4) Slope condition and site stability;
(5) Overall buffer conditions, e.g., surrounding land use, use by humans and/or wildlife;
(6) Observed wildlife, including amphibian, avian, and others;
(7) Assessment of invasive biota and recommendations for management;
(8) Color photographs taken from permanent photo points that shall be depicted on the monitoring report map.

8.1.4 Project Success and Compliance

Upon installation and completion of the approved mitigation plan, an inspection by a qualified ecologist and/or City will be made to determine plan compliance. A compliance report will be supplied to the City of Bellevue within 30 days of the completion of planting. The Applicant or consulting ecologist/landscape designer will perform condition monitoring of the plantings before October of each year for five years. A written report describing the monitoring results will be submitted to the City after each annual site inspection for each monitored year. Final inspection will occur five years after completion of this project, and a report on overall project success will be prepared. If the project fails to meet the required performance standards by the end of the fifth year, the monitoring period may be extended.

Performance Standards

Project success will be measured by native species survival. The mitigation area must achieve the following performance standards to be considered successful:

Year 1

100 percent survival of installed shrubs
At least 80 percent survival of installed ground cover plants
<10 percent cover of invasive species

Year 2

At least 90 percent survival of installed shrubs
At least 15 percent aerial cover of native ground cover
<10 percent cover of invasive species

Year 3

At least 80 percent survival of installed shrubs
At least 25 percent aerial cover of native ground cover
<10 percent cover of invasive species

Year 4
At least 30 percent aerial cover of native woody plants
At least 40 percent aerial cover of native ground cover
<10 percent cover of invasive species

Year 5
At least 50 percent aerial cover of native woody plants
At least 60 percent aerial cover of native ground cover
<10 percent cover of invasive species

Note: only installed plants shall be counted for assessment of survival. Volunteer native species may be counted toward percent aerial cover estimates.

9.0 MAINTENANCE PROGRAM

This mitigation project may require periodic maintenance to replace mortality of planted species and control invasive, non-native plant species, and other undesirable competing species. The mitigation planting area will be maintained (at a minimum) in spring and late summer of each year for the five-year monitoring period. Maintenance may include, but will not be limited to, removal of competing species and non-native vegetation (by hand if necessary), irrigation, and/or replacement of dead plants. The Applicant is responsible for ensuring that maintenance occurs in all monitoring years.

Duration and Extent
To achieve performance standards, the Permittee shall have the planting area maintained for the duration of the five-year monitoring period. Maintenance will include watering, weeding around the base of installed plants, replacement, re-staking, removal of all classes of noxious weeds (see Washington State Noxious Weeds List), and any other measures needed to insure plant survival.

Survival
The Permittee shall be responsible for the health of 100 percent of all newly installed plants for *one growing season* after installation has been accepted by the City. A growing season for these purposes is defined as occurring from spring to spring (March 15 to March 15 of the following year). For fall installation (often required), the growing season will begin the following spring. The Permittee shall replace any plants that are failing, weak, defective in manner of growth, or dead during this growing season.

Installation Timing for Replacement Plants
Replacement plants shall be installed between November 1 and March 1, unless otherwise determined by the consulting biologist and/or City staff.

Standards for Replacement Plants
Replacement plants shall meet the same standards for size and type as those specified for the original installation unless otherwise directed by the landscape designer, consulting ecologist, and/or City staff.

Herbicides/Pesticides and Fertilizer
Chemical control of invasive, non-native species, if necessary, shall be applied only after approval by the City of Bellevue or consulting ecologist. Herbicide shall be applied by a licensed applicator following all label instructions. Chemical control and fertilization within the mitigation areas will only be performed if deemed necessary.

Watering/Irrigation
Water should be provided during the dry season (at minimum from July 1 to September 30) to insure plant survival and establishment. Water should be applied at a rate of one inch of water twice per week during the dry season. The landscaping contractor and/or property owners will determine if additional watering is necessary. Due to the steep slopes on the site, hand watering or a drip system, that waters for short periods at a time, shall be used to prevent any erosion or slope stability issues.

10.0 CONTINGENCY PLAN

If, during any of the annual inspections, performance standards are not being met for species survival, additional plants of the same species will be added to the mitigation area. If invasive, non-native species exceed 5 percent cover (as measured by areal cover), manual control shall occur. If any of these situations persist to the next inspection, a meeting with the landscape designer/consulting ecologist and the Permittee will be held to decide upon contingency plans. Elements of a contingency plan may include but will not be limited to more aggressive weed control, mulching, replanting with larger plant material, species substitution, fertilization, soil amendments, and/or irrigation.

11.0 PROJECT COST ESTIMATE

The City of Bellevue may require a performance bond or maintenance assurance device if it is determined to be necessary. The City will determine the type and amount of assurance device required. The performance or maintenance assurance device amount is typically determined from the estimated cost of work. An estimate of the cost of project installation is provided below. This does not represent a bid.

Cost of Plants and Labor	
Qty 67; 1-gal pots ($20 per plant, installed)	$1,340.00
Qty 300; 4" pots ($8 per plant, installed)	$2,400.00
Cost of Silt Fence	
Qty 110 LF ($1.60/linear foot)	$176.00
TOTAL ESTIMATED COST	$3,916.00

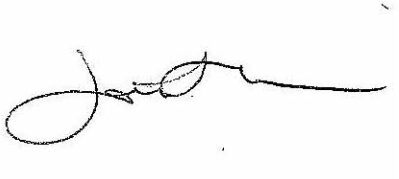
12.0 USE OF THIS REPORT

This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

The laws applicable to wetlands are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the laws now in effect.

The work for this report has conformed to the standard of care employed by wetland ecologists. No other representation or warranty is made concerning the work or this report, and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.



Joie Goodman, PWS
Senior Ecologist

13.0 REFERENCES

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Attachment 4

GEOTECH
CONSULTANTS, INC.

2401 10th Ave E
Seattle, Washington 98102
(425) 747-5618

February 23, 2024

JN 24027

Heidi and Andrew Miller
13121 Northeast 84th Street
Kirkland, Washington 98033

via email: hbrun78@hotmail.com and amiller@real-retail.net

Subject: **Transmittal Letter – Geotechnical Engineering Study**
Proposed Residence
9600 Southeast 7th Street
Bellevue, Washington

Greetings:

Attached to this transmittal letter is our geotechnical engineering report for the proposed new residence to be constructed in Bellevue. The scope of our services consisted of exploring site surface and subsurface conditions, and then developing this report to provide recommendations for general earthwork and design considerations for foundations, retaining walls, slope stability, subsurface drainage, and temporary excavations. This work was authorized by your acceptance of our proposal, P-11538, dated December 13, 2023.

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

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

Matthew K. McGinnis
Geotechnical Engineer

Marc R. McGinnis, P.E.
Principal

cc: **Gelotte Hommas Drivdahl Architecture** – David Grubb
via email: davidg@ghdarch.com

MKM/MRM:kg

GEOTECHNICAL ENGINEERING STUDY
Proposed Residence
9600 Southeast 7th Street
Bellevue, Washington

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

Development of the property is in the planning stage, and detailed plans were not made available to us at the time of writing this report. Based on discussions with Gelotte Hommas Drivdahl Architecture, and a set of preliminary floor plans, we understand that a new residence is proposed to be constructed at the site. However, two potential directions with the proposed construction have been discussed pending further investigation and design. The first option would be to demolish the existing house and construct a new residence in roughly the same footprint. The second option would be to demolish the existing development to its foundations and to reconstruct a new residence reusing the existing foundation system. The new, or reconstructed, residence will consist of two above-grade floors that are underlain by an east facing daylight basement. An on-grade garage space will be located near the southwestern corner of the footprint and will not be underlain by basement space. Deck and patio spaces will extend off the east face of the residence at the lower, main, and upper floor levels. Based on a cross section provided by the architect, a preliminary finish floor elevation of 240 feet is proposed for the basement floor level, which is approximately one foot above the basement slab elevation of the existing house. Considering this floor elevation, excavations ranging from upwards of 7 to 10 feet for the western basement wall, to as little as a few feet where the grade daylights to the east are anticipated at this time, with even less extensive excavations if the existing foundations are to be reused. Property line setbacks of approximately 11.5 feet from the north, 9 to 12 feet from the south, and greater than 15 feet from the west are currently proposed. The residence will be located well away from the distant, eastern property line. A steep slope exists on the east side of the property, and the majority of the development area is situated within the City of Bellevue's prescriptive 50-foot steep slope buffer.

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

SITE CONDITIONS

SURFACE

The Vicinity Map, Plate 1, illustrates the general location of the site in the Moorland neighborhood of Bellevue, near Meydenbauer Bay. The rectangular-shaped site comprises a total area of just over an acre. The property is bordered to the north and south by developed single-family parcels, to the east by 97th Place Southeast, and to the west by Southeast 7th Street/96th Avenue Southeast.

The grade across the site slopes downward from west to east, with a total elevation change of up to 70 feet across the property. The grade descends gently to moderately from the western property line across a driveway and landscaped yard, continuing to the location of the existing residence, which sits on a gently to moderately sloped plateau. The existing residence is one-story in height, underlain by an east-facing daylight basement beneath all but the garage area of the residence. The grade descends moderately across the residence footprint, facilitating the drop between the main and daylight basement levels. A basement level patio and main level deck extend off the east

face of the residence. Small landscaping areas are present along the eastern perimeter of the patio before the grade descends steeply downward to the east. This slope is inclined on the order of 50 to 55 percent with an elevation change of 24 to 26 feet. The grade then flattens out across a more moderately-inclined grade of slope at 25 to 30 percent. Near the eastern property line, the grade again becomes steeply inclined, descending across a shorter slope that is inclined at 40 percent.

Much of the eastern slope is covered with grass, landscaping, blackberries, and underbrush. Scattered young and older trees were scattered through the eastern slope area. While no signs of recent, deep seated instability was observed during our recent site visit, shallow movement in the loose upper fill and weathered native soils is common within this area of Bellevue and has been experienced on other properties within this neighborhood and on the steep slopes extending down to Southeast Shoreland Drive.

The adjacent northern and southern parcels both contain single-family residences of similar construction to the existing residence at the site. The adjacent, northern residence is two stories in height and contains basement space. This residence is sited closer to the level of 97th Place Southeast and is generally set well away from the property line. Terraced rockeries facilitate a lowered western yard grade at this property. Also, appears that the northern property line also contains a utility easement for power and communication lines. The southern residence is located approximately 10 feet from the property line, but has a deck and walkway that extend within 10 feet of the property boundary. This residence's lower floor appears to be located around 2 feet below the subject site's basement floor slab.

The City of Bellevue GIS maps the slope east of the residence as a Steep Slope Area. This slope is over 10 feet in height, comprises a total area of more than 1,000 square feet, and would meet Bellevue's code criteria for a Steep Slope Area. Based on the previous shallow landslides that have occurred in the vicinity of the site over the years, the slopes would also meet the general criteria for a Landslide Hazard per Bellevue Code.

SUBSURFACE

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

The test borings were drilled on February 8, 2024 using a track-mounted, hollow-stem auger drill. Samples were taken at approximate 2.5 and 5-foot intervals with a standard penetration sampler. This split-spoon sampler, which has a 2-inch outside diameter, is driven into the soil with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler a given distance is an indication of the soil density or consistency. A geotechnical engineer from our staff observed the drilling process, logged the test borings, and obtained representative samples of the soil encountered. The Test Boring Logs are attached as Plates 3 through 6.

Soil Conditions

Test Borings 1 and 2 were drilled east of the existing patio and deck, near the top of the steep slope. Beneath the ground surface, loose/soft native silt was revealed in both of these borings. The native silt became medium-dense and stiff beneath depths of 2.5 to 5, feet and dense/hard beneath a depth of 7.5 feet. The dense/hard silt continued with depth to the

base of the borings, generally increasing in density around a depth of 15 to 20 feet, continuing to the base of the borings at a depth of 26.5 feet.

Test Borings 3 and 4 were drilled to the west of the existing residence. Layers of loose fill were revealed beneath the ground surface in these borings. The loose fill was revealed to a depth of 6 to 7 feet, where native, medium-dense silty sand and medium-stiff silt was revealed. These soils continued to depths of 10 to 12.5 feet, where hard silt was revealed to the base of the borings at depths of 21.5 feet.

Based on the observed soil samples, and the recorded blow counts, it is apparent that the underlying native stiff to hard or dense silt has been glacially compressed. The conditions encountered in the borings are typical for the area, but are actually better than those we have found in borings on nearby sites.

No obstructions were revealed by our explorations. However, debris, buried utilities, and old foundation and slab elements are commonly encountered on sites that have had previous development.

Although our explorations did not encounter cobbles or boulders, they are often found in soils that have been deposited by glaciers or fast-moving water.

Groundwater Conditions

Perched groundwater seepage was observed from a depth of 8 to 9.5 feet in Test Boring 4 within a silty sand layer atop the hard silt. Further thin perched groundwater zones were observed within cleaner sand seams within the native silt throughout drilling of the borings. The borings were conducted during the wet season, following several months of precipitation.

It should be noted that groundwater levels vary seasonally with rainfall and other factors. We anticipate that at least localized groundwater could be found perched above the stiff to hard silt, which is essentially impervious. This is most likely to occur following extended wet weather.

The stratification lines on the logs represent the approximate boundaries between soil types at the exploration locations. The actual transition between soil types may be gradual, and subsurface conditions can vary between exploration locations. The logs provide specific subsurface information only at the locations tested. If a transition in soil type occurred between samples in the borings, the depth of the transition was interpreted. The relative densities and moisture descriptions indicated on the test boring logs are interpretive descriptions based on the conditions observed during drilling.

SUMMARY OF SLOPE STABILITY ANALYSES

As part of the preparation of this report, we have conducted a slope stability analysis on a typical cross section running through the area of the proposed development (cross section A-A' running west to east through the site and steep slope). Attached to this report as Appendix A are the results of our slope stability analyses conducted using the program Slope/W under both static and seismic loading conditions.

Future slope instability within the existing looser soils atop the eastern steep slope is possible. This risk has nothing to do with the proposed development on the property. Our slope stability analyses determined that under code-required seismic conditions there is a potential for deeper instability extending into the underlying native silts within the development area. In order to meet City of Bellevue code minimums for static and dynamic slope stability scenarios, and to allow for a reduction of the prescriptive 50-foot steep slope buffer, a stabilization wall will need to be constructed along the eastern perimeter of the development area. This stabilization wall would need to be designed to retain soil below the existing grade in the event of a future design seismic event and a resulting slope failure to the west of the development area, depending on the desired slope setback. Results of this post-construction condition yielded factors of safety of 2.16 and 1.15 for static and dynamic scenarios, respectively. These factors of safety exceed the City of Bellevue code minimums for areas at high risk of failure (1.5 and 1.15 for static and dynamic scenarios, respectively). The referenced slope stability cross section location can be found on Plate 2, and the slope stability analyses are attached to this report as Appendix A. Stabilization wall recommendations can be found in a subsequent section of this report.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

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

The test borings conducted for this study encountered loose fill and weathered native silt to depths of approximately 5 to 10 feet beneath the ground surface. Stiff to hard and dense silt were revealed beneath the weathered soils, continuing to the base of the borings. The fill and loose soils are not suitable to support foundations or floors. It is unlikely that the existing western basement wall was placed on the dense/hard silt. A new wall could be excavated deep enough to reach this suitable bearing soil. Overexcavation may be necessary to reach the competent bearing soils for this foundation. Overexcavations beneath the basement retaining wall foundation could be backfilled with compacted clean crushed rock such as ballast rock or quarry spalls, or lean mix concrete. We recommend that the remainder of the residence foundations, including the footings, slabs, and other settlement-sensitive elements be supported on deep foundations consisting of small-diameter pipe piles driven into the glacially compressed soils. If only shallow excavations for the western basement wall are planned, or it is deemed infeasible to overexcavate deep enough to reach competent native soils in this area, then it should also be supported on pipe piles. Coordination of the differing foundation designs will need to be discussed as the design progresses, as the layout is preliminary at this time. An expanded discussion of foundation recommendations can be found in the ***Conventional Foundations*** and ***Pipe Piles*** sections of this report.

If the existing residence's foundations are to be reused, they will need to be underpinned with pipe piles. The pipe piles would be driven near the existing foundations that are to remain in place and would be fastened to the foundations after each pile has been driven to refusal. It would be practical to assume that the entire residence foundation will need to be underpinned. Depending on the analysis of the existing foundations and retaining walls, additional lateral support may be needed in the basement wall. This could be accomplished by installing helical anchors through the basement wall, which would be embedded into the glacially compressed silt. Pipe pile and helical anchor recommendations can be found in subsequent sections of this report.

Floor slabs should not be placed on the existing fill or topsoil, as excessive post-construction settlement relative to the foundations would result. We recommend that the floor systems be designed to span between the pile supported foundations without any reliance on soil bearing, either as a structural slab, or as a framed floor atop a crawlspace.

Consideration of any patios, walkways, decks, site walls, pools, or other settlement sensitive on-grade elements placed around the proposed residence should be taken. Even lightweight elements, such as slabs, patios, and decks will undergo long-term settlement when placed on loose soils. Any new on-grade elements constructed placed on the existing loose fill and weathered soils surrounding the new residence may experience noticeable post-construction settlement relative to the new residence. While concrete can be reinforced with additional rebar to aid in a more uniform settlement over time, it will not prevent settlement and potential cracking from occurring. Preventing settlement of potential on-grade elements would entail supporting the on-grade elements on competent native soil, or on pipe piles that extend down to the dense, glacially compressed soils. We can provide further recommendations regarding on-grade elements as the design progresses.

Because the proposed development area is located close to a Steep Slope Hazard and Landslide Hazard Area, preventing instability in the development area is required by the City of Bellevue Land Use Code. This includes stability under static and seismic conditions. Future shallow soil movement in the looser, near-surface soils on the steep slope is possible, particularly in an earthquake. Based on our test borings, and the results of slope stability analyses, in order to satisfy City of Bellevue slope stability requirements in the event of the design earthquake, a subsurface stabilization wall will need to be constructed along the western side of the development area. This stabilization wall would be designed to retain the loose fill and upper weathered soils beneath the eastern perimeter of the development area in the event of a future landslide on the steep slope to the east. The stabilization wall would be constructed of closely spaced soldier piles. The wall should be continuous across the length of the development area and will need to return around the northern and southern corners of the development perimeter a distance of two to three piles. In order to determine the necessary depth of stabilization, we have conducted a slope stability analysis using the modeling program, Slope/W, which is developed by Geoslope. Based on this analysis, (attached to the end of this report as Appendix A for reference), the stabilization wall will need to be designed to retain to a depth of 8 feet beneath the existing ground surface. This is based on a wall location that borders the approximate top of steep slope, which delineates the perimeter of the development area at this time. Additional recommendations can be found in the ***Stabilization Wall*** section of this report. The stabilization wall will not increase or decrease the potential for future slope movement on the steep slope to the east of the wall, but will act to protect the development area behind the stabilization wall in the event of future slope instability.

The excavation depths for the new residence will vary depending on final siting and design. Based on the soils encountered in our test borings, temporary excavations should not be inclined steeper than a 1:1 (Horizontal:Vertical) extending continuously from top to bottom of a cut. Vertical excavations should not be attempted in the onsite soils at the base of sloped cuts, or near property lines or settlement-sensitive elements, such as streets and utilities. Unshored excavations should not extend beneath a 3:1 (H:V) line extending downward from any adjacent foundation or right-of-way. In developing an excavation plan for this project, it would be practical of the project team to account for a minimum of 2 feet of clear space at the top and toe of any sloped cuts to account for nominal working room, as well as for the installation of drainage and waterproofing. If the above-mentioned excavation inclination cannot be maintained within the property boundaries, and sufficient excavation easements are not able to be obtained from the adjacent property owners, then temporary shoring will be needed. If shoring is needed, a rigid shoring system consisting of drilled soldier piles will be needed if shoring is found to be necessary to facilitate the excavations.

Less aggressive shoring systems, such as ultra-blocks are not suitable for this project due to the soil composition. Temporary shoring recommendations can be provided if they are deemed necessary after the preliminary design has been completed.

The new foundations for the residence will be excavated into impermeable silt soils with a very low permeability. We recommend installing an underslab drainage system beneath the lower-level basement slab of the new residence. This system would consist of a layer of clean crushed rock beneath the interior slab or crawlspace. The rock layer should be at least 9 inches thick and contain 4-inch diameter, perforated PVC pipes at no more than 15-foot center-to-center spacings. The entire rock layer and pipe system should be covered with a thick vapor retarder/barrier. The perforated pipes should tie into the exterior footing drains. The ***Drainage Considerations*** section of this report contains an expanded discussion of our subsurface drainage recommendations.

As with any project that involves demolition of existing site buildings and/or extensive excavation and shoring, there is a potential risk of movement on surrounding properties. This can potentially translate into noticeable damage of surrounding on-grade elements, such as foundations and slabs. However, the demolition, shoring, and/or excavation work could just translate into *perceived* damage on adjacent properties. Unfortunately, it is becoming more and more common for adjacent property owners to make unsubstantiated damage claims on new projects that occur close to their developed lots. Therefore, we recommend making an extensive photographic and visual survey of the project vicinity, prior to demolition activities, installing shoring, and/or commencing with the excavation. This documents the condition of buildings, pavements, and utilities in the immediate vicinity of the site in order to avoid, and protect the owner from, unsubstantiated damage claims by surrounding property owners. Additionally, any adjacent structures should be monitored during demolition and construction to detect soil movements. To monitor their performance, we recommend establishing a series of survey reference points to measure any horizontal deflections of the shoring system. Control points should be established at a distance well away from the walls and slopes, and deflections from the reference points should be measured throughout construction by survey methods.

No soil generated from the project excavation or new structural fill should be placed downslope of the residence, particularly near the steep slope, as the surcharge from the additional soils could reduce the stability of the slope.

No significant volumes of water should be directed towards the steep slope along the eastern side of the development. Poorly managed stormwater runoff is a common cause of slope instability that is well documented in the Puget Sound area. Due to the silty, fine-grained nature of the upper fill and native soils onsite and the steep inclination of the slope to the west of the proposed residence, it is our professional opinion that onsite infiltration of stormwater runoff from impervious areas is infeasible for this project. All collected stormwater should be discharged to an approved stormwater system.

The erosion control measures needed during the site development will depend heavily on the weather conditions that are encountered. We anticipate that a wire-backed silt fence will be needed around the downslope sides of any cleared areas. Existing pavements, ground cover, and landscaping should be left in place wherever possible to minimize the amount of exposed soil. Rocked staging areas and construction access roads should be provided to reduce the amount of soil or mud carried off the property by trucks and equipment. Trucks should not be allowed to drive off of the rock-covered areas. Cut slopes and soil stockpiles should be covered with plastic during wet weather. Any silty water accumulating on the site must be prevented from flowing off the property. In wet weather, temporary holding tanks will likely be needed to prevent water from

accumulating in the excavation and running toward the steep, eastern slope. Following clearing or rough grading, it may be necessary to mulch or hydroseed bare areas that will not be immediately covered with landscaping or an impervious surface. On most construction projects, it is necessary to periodically maintain or modify temporary erosion control measures to address specific site and weather conditions.

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

CRITICAL AREAS DISCUSSION

The onsite eastern slope meets the City of Bellevue's criteria for both a steep slope and a landslide hazard. The planned development will likely lie well within the City's prescriptive 50-foot buffer from the top of a steep slope, the same as the existing development. As a result, we expect that a Critical Area Land Use Permit (CALUP) will need to be obtained.

The recommendations presented in this report are intended to allow a reduction to the prescriptive steep slope buffer without adverse impacts to slope stability, while protecting the structures from damage in the event of future slope movement.

In order to respond to specific geotechnical criteria in the Bellevue Municipal Code for a CALUP, we present the following discussion:

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

A. The existing grades surrounding the development area have already been modified by excavating and filling when the residence was originally constructed. The grades to the east of the house have been made both by cutting and filling to create the flat eastern patio area, and the area west of the residence was at least partially graded out to create the sloped landscaping and driveway area. The new construction will be supported either on conventional foundations bearing on the glacially compressed soils, or upon deep foundations. Both of these foundations systems will be supported on the underlying glacially compressed soils, which are not susceptible to deep-seated instability. A stabilization wall will be installed to protect the residence from damage in the event of potential future slope movement.

B. The new construction will extend within the prescriptive 50-foot buffer from the top of the eastern steep slope. Again, these areas have at least partially been disturbed by previous grading, but the new construction will not create significant disturbance, and will preserve the existing landforms and vegetation in the steep slope and landslide hazard areas east of the planned development.

   As part of the submitted plans and critical area report, a temporary erosion and sedimentation control (TESC) plan will likely need to be generated. This plan will clearly delineate the area of construction, as well as the means and methods used to reduce the erosion potential and potential for disturbance outside of the construction area. The area surrounding the new residence will be landscaped to maintain appropriate permanent erosion control.

C. The proposed development will not result in greater risk or a need for increased buffers on neighboring properties. In fact, the proposed development will improve the stability of the neighboring properties. This is due to the proposed stabilization wall lining the eastern extent of the development area, which will be designed to retain the looser upper soils and protect the development area in the event of future instability on the eastern slope. Properly-installed surface and subsurface drainage measures will improve the stability of the site and neighboring properties.

D. No formal plans have been developed at the time of this report. However, we do not anticipate that significant retaining walls outside of the basement walls will be needed for the new construction. We anticipate that the existing topography through the development area will be maintained close to its current state following the completion of construction.

E. The existing site development has created extensive impervious areas. A robust surface and subsurface drainage system will need to be implemented as part of the new construction to direct any collected stormwater away from the steep slope. Directing new stormwater runoff from impervious areas away from the steep slope will act to increase the surficial stability of the slope soils, as seasonal storms and heavy concentrated runoff are a common trigger for shallow landslides on slopes in the Puget Sound area. No infiltration or dispersion systems should be constructed at the site, as they would act to adversely affect the upper soils on the steep slope.

F. There is no planned clearing or grading of the steep slope to the east of the development area.

G. New retaining walls are anticipated as part of the proposed development related to the construction of the basement spaces. No new site retaining walls are anticipated.

H. Not applicable. No construction is proposed to occur on the eastern steep slope.

I. Not Applicable. Parking or garages will not be constructed on slopes in excess of 40 percent or as part of the proposed development.

J. Outside of the footprint of the new construction, we expect that all areas of new permanent disturbance and all areas of temporary disturbance will be mitigated with erosion control plans as a part of the building permit.

Section 20.25H.140 Critical Areas Report – Additional Provisions for Landslide Hazards and Steep Slopes:

A. Not applicable. The site is not in a coal mine hazard.

B. 1. The final submitted critical area report prepared by others will contain a site plan for the proposal as well as a topographic survey.

2. This geotechnical report includes an assessment of the onsite soils as well as a review of the site history including publicly available information regarding previous geologic events and site grading. No information regarding these topics were found in our research, but conclusions regarding lot grading and fill placement were able to be made based on our time at the project site, as well as the subsurface conditions logged in our test borings. Please refer to the ***Surface, Subsurface***, and ***General*** sections of our report for additional discussions.

3. The above discussions contain descriptions of the proposed project, as well as its potential impact on the hazard areas and surrounding properties. The new residence will be supported entirely, or primarily, on deep foundations. These foundation systems will transmit the loads from the new construction through the loose fill and weathered soils to refusal in the stiff to hard, glacially compressed soils, which are not prone to instability. A stabilization wall consisting of closely-spaced, heavily-reinforced, concrete piles will need to be constructed on the east side of the development area to retain the upper soils in the event of future instability under code-required conditions for static and seismic scenarios. In utilizing the recommended stabilization wall, the stability of the existing slope will not be adversely affected, and the proposed development will not increase the possibility for adversely impacting the adjacent lots outside of what already exists.

4. The proposed residence will encroach well within the City of Bellevue prescriptive steep slope buffer of 50 feet from the top of the eastern steep slope. The steep slope to the east of the development area is mostly natural, but the top was at least partially graded out to level the eastern edge of the landscaping that lines the east side of the patio. The residence lies within the prescriptive steep slope buffer as well. No formal plans have been developed at this time, but provided that the stabilization wall is constructed at the easter perimeter of the development area, a reduction of the 50-foot buffer can be safely attained. Using a stabilization depth of 8 feet below the existing grade, it is possible to complete the development

without a buffer from the eastern slope. Considering the implementation of a stabilization wall, it is our opinion that the recommended buffers from the steep slope listed above are adequate to mitigate the landslide hazard to the new structures, and to prevent adverse impacts on the neighboring property.

Section 20.25H.145 Critical Areas Report – Approval of Modification:

A. The proposal will not increase the geological hazards to adjacent properties due to being supported on either shallow or deep foundations bearing on or into the glacially compressed soils that comprise the core of the site. The stabilization wall will be designed to retain the loose fill and weathered native soils within the development area.
B. The proposed modifications to the onsite buffers will not adversely impact other critical areas due to the construction of a stabilization wall and fully supporting the residence on the underlying glacially compressed soils, either on conventional foundations where possible, or pipe piles.
C. The hazard to the constructed project is mitigated to a level equal to or less than would exist if the proposed modifications to critical area buffers were not approved. The recommended foundation systems will transmit the structural loading down through the loose fill and weathered soils to the very stiff to hard, glacially compressed soils below. This will act to prevent a surcharge load to the loose fill soil on the slope and will not further adversely affect the critical area.
D. The proposed development protects life safety under the conditions that we anticipate. The proposed foundation systems and stabilization wall will protect the house and deck in the event of future soil movement on the steep, western slope.
E. This geotechnical report is intended to satisfy the criteria for a geotechnical report demonstrating no adverse impacts on stability of surrounding slopes or structures.
F. From our understanding of the current development proposal, it will comply with best management practices.
G. We are not aware of any species of importance in the planned work area.

SEISMIC CONSIDERATIONS

In accordance with the International Building Code (IBC), the site class within 100 feet of the ground surface is best represented by Site Class Type D (Stiff Soil). As noted in the USGS website, the mapped spectral acceleration value for a 0.2 second (S_s) and 1.0 second period (S_1) equals 1.35g and 0.47g, respectively.

The IBC and ASCE 7 require that the potential for liquefaction (soil strength loss) during an earthquake be evaluated for the peak ground acceleration of the Maximum Considered Earthquake (MCE), which has a probability of occurring once in 2,475 years (2 percent probability of occurring in a 50-year period). The MCE peak ground acceleration adjusted for site class effects (F_{PGA}) equals 0.63g. The soils beneath the site are not susceptible to seismic liquefaction under the ground motions of the MCE because of their glacially-compressed nature and the absence of near-surface groundwater.

PIPE PILES

Three- or 4-inch-diameter pipe piles driven with an 850- or 1,100- or 2,000-pound hydraulic jackhammer to the following final penetration rates may be assigned the following compressive capacities.

INSIDE PILE DIAMETER	FINAL DRIVING RATE (850-pound hammer)	FINAL DRIVING RATE (1,100-pound hammer)	FINAL DRIVING RATE (2,000-pound hammer)	ALLOWABLE COMPRESSIVE CAPACITY
3 inches	10 sec/inch	6 sec/inch	2 sec/inch	6 tons
4 inches	16 sec/inch	10 sec/inch	4 sec/inch	10 tons

Note: The refusal criteria indicated in the above table are valid only for pipe piles that are installed using a hydraulic impact hammer carried on leads that allow the hammer to sit on the top of the pile during driving. If the piles are installed by alternative methods, such as a vibratory hammer or a hammer that is hard mounted to the installation machine, numerous load tests to 200 percent of the design capacity would be necessary to substantiate the allowable pile load. The appropriate number of load tests would need to be determined at the time the contractor and installation method are chosen.

As a minimum, Schedule 40 pipe should be used. The site soils are not highly organic and are not located near salt water. As a result, they do not have an elevated corrosion potential. Considering this, it is our opinion that standard “black” pipe can be used, and corrosion protection, such as galvanizing, is not necessary for the pipe piles.

The City of Bellevue has adopted Seattle Director’s Rule 10-2009. This Director’s Rule contains several prescriptive requirements related to the use of pipe piles having a diameter of less than 10 inches. Under Director’s Rule 10-2009, load tests are required on 3 percent of the installed piles up to a maximum of 5 piles, with a minimum of one pile load test on each project. Additionally, full-time observation of the pile installation by the geotechnical engineer-of-record is required by Director’s Rule 10-2009.

Pile caps and grade beams should be used to transmit loads to the piles. Isolated pile caps should include a minimum of two piles to reduce the potential for eccentric loads being applied to the piles. Subsequent sections of pipe can be connected with slip or threaded couplers, or they can be welded together. If slip couplers are used, they should fit snugly into the pipe sections. This may require that shims be used or that beads of welding flux be applied to the outside of the coupler.

Lateral loads due to wind or seismic forces may be resisted by passive earth pressure acting on the vertical, embedded portions of the foundation. For this condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level compacted fill. We recommend using a passive earth pressure of 300 pounds per cubic foot (pcf) for this resistance. If the ground in front of a foundation is loose or sloping, the passive earth pressure given above will not be appropriate. We recommend a safety factor of at least 1.5 for the foundation's resistance to lateral loading, when using the above ultimate passive value.

CONVENTIONAL FOUNDATIONS

Depending on a more finalized design, the new western basement wall could potentially be designed to be supported on a conventional foundation system bearing on undisturbed, very stiff to hard, glacially compressed silt, or on structural fill placed above this competent native soil. Compacted structural fill placed beneath footings should consist of clean crushed rock (quarry spalls or railroad ballast rock) or lean-mix concrete containing at least one sack of cement per cubic yard. Prior to placing any structural fill beneath foundations, the excavation should be observed by the geotechnical engineer to document that adequate bearing soils have been exposed.

We recommend that continuous and individual spread footings have minimum widths of 16 and 24 inches, respectively. Exterior footings should also be bottomed at least 18 inches below the lowest adjacent finish ground surface for protection against frost and erosion. The local building codes should be reviewed to determine if different footing widths or embedment depths are required. Footing subgrades must be cleaned of loose or disturbed soil prior to pouring concrete. Depending upon site and equipment constraints, this may require removing the disturbed soil by hand.

Depending on the final site grades, overexcavation may be required below the footings to expose competent native soil. Unless lean-mix concrete is used to fill an overexcavated hole, the overexcavation must be at least as wide at the bottom as the sum of the depth of the overexcavation and the footing width. For example, an overexcavation extending 2 feet below the bottom of a 2-foot-wide footing must be at least 4 feet wide at the base of the excavation. If lean concrete is used, the overexcavation need only extend 6 inches beyond the edges of the footing.

An allowable bearing pressure of 3,000 pounds per square foot (psf) is appropriate for footings supported on competent native soil. A one-third increase in this design bearing pressure may be used when considering short-term wind or seismic loads. For the above design criteria, it is anticipated that the total post-construction settlement of footings founded on competent native soil, or on structural fill up to 5 feet in thickness, will be about one-half-inch, with differential settlements on the order of three-quarters of an inch in a distance of 30 feet along a continuous footing with a uniform load.

Lateral loads due to wind or seismic forces may be resisted by friction between the foundation and the bearing soil, or by passive earth pressure acting on the vertical, embedded portions of the foundation. For the latter condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level, well-compacted fill. We recommend using the following ultimate values for the foundation's resistance to lateral loading:

PARAMETER	ULTIMATE VALUE
Coefficient of Friction	0.40
Passive Earth Pressure	300 pcf

Where: pcf is Pounds per Cubic Foot, and Passive Earth Pressure is computed using the Equivalent Fluid Density.

If the ground in front of a foundation is loose or sloping, the passive earth pressure given above will not be appropriate. The above ultimate values for passive earth pressure and coefficient of friction do not include a safety factor.

FOUNDATION AND RETAINING WALLS

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

PARAMETER	VALUE
Active Earth Pressure *	40 pcf
Passive Earth Pressure	300 pcf
Coefficient of Friction**	0.40
Soil Unit Weight	135 pcf

Where: pcf is Pounds per Cubic Foot, and Active and Passive Earth Pressures are computed using the Equivalent Fluid Pressures.

*** For a restrained wall that cannot deflect at least 0.002 times its height, a uniform lateral pressure equal to 10 psf times the height of the wall should be added to the above active equivalent fluid pressure. This applies only to walls with level backfill.**

**** Only for use in the design of conventional foundations.**

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

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

The passive pressure given is appropriate only for the depth of level, well-compacted fill placed in front of a retaining or foundation wall. The values for friction and passive resistance are ultimate values and do not include a safety factor. Restrained wall soil parameters should be utilized the wall and reinforcing design for a distance of 1.5 times the wall height from corners or bends in the walls, or from other points of restraint. This is intended to reduce the amount of cracking that can occur where a wall is restrained by a corner.

Wall Pressures Due to Seismic Forces

Per IBC Section 1803.5.12, a seismic surcharge load need only be considered in the design of walls over 6 feet in height. A seismic surcharge load would be imposed by adding a uniform lateral pressure to the above-recommended active pressure. The recommended

seismic surcharge pressure for this project is 9**H** pounds per square foot (psf), where **H** is the design retention height of the wall. Using this increased pressure, the safety factor against sliding and overturning can be reduced to 1.2 for the seismic analysis.

Retaining Wall Backfill and Waterproofing

Backfill placed behind retaining or foundation walls should be coarse, free-draining structural fill containing no organics. This backfill should contain no more than 5 percent silt or clay particles and have no gravel greater than 4 inches in diameter. The percentage of particles passing the No. 4 sieve should be between 25 and 70 percent. The soil that will be excavated for the new construction will be fine-grained and is not free draining. We recommend against using the on-site soil to backfill any retaining walls taller than approximately 2 feet in height. The later section entitled ***Drainage Considerations*** should also be reviewed for recommendations related to subsurface drainage behind foundation and retaining walls.

The purpose of these backfill requirements is to ensure that the design criteria for a retaining wall are not exceeded because of a build-up of hydrostatic pressure behind the wall. Also, subsurface drainage systems are not intended to handle large volumes of water from surface runoff. The top 12 to 18 inches of the backfill should consist of a compacted, relatively impermeable soil or topsoil, or the surface should be paved. The ground surface must also slope away from backfilled walls at one to 2 percent to reduce the potential for surface water to percolate into the backfill.

Water percolating through pervious surfaces (pavers, gravel, permeable pavement, etc.) must also be prevented from flowing toward walls or into the backfill zone. Foundation drainage and waterproofing systems are not intended to handle large volumes of infiltrated water. The compacted subgrade below pervious surfaces and any associated drainage layer should therefore be sloped away. Alternatively, a membrane and subsurface collection system could be provided below a pervious surface.

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

The above recommendations are not intended to waterproof below-grade walls, or to prevent the formation of mold, mildew, or fungi in interior spaces. Over time, the performance of subsurface drainage systems can degrade, subsurface groundwater flow patterns can change, and utilities can break or develop leaks. Therefore, waterproofing should be provided where future seepage through the walls is not acceptable. This typically includes limiting cold-joints and wall penetrations and using bentonite panels or membranes on the outside of the walls. There are a variety of different waterproofing materials and systems, which should be installed by an experienced contractor familiar with the anticipated construction and subsurface conditions. Applying a thin coat of asphalt emulsion to the outside face of a wall is not considered waterproofing and will only help to reduce moisture generated from water vapor or capillary action from seeping through the concrete. As with

any project, adequate ventilation of basement and crawl space areas is important to prevent a buildup of water vapor that is commonly transmitted through concrete walls from the surrounding soil, even when seepage is not present. This is appropriate even when waterproofing is applied to the outside of foundation and retaining walls. We recommend that you contact an experienced envelope consultant if detailed recommendations or specifications related to waterproofing design or minimizing the potential for infestations of mold and mildew are desired.

STABILIZATION WALL

As discussed in the ***General*** section, a stabilization wall is needed along the eastern side of the development area. Based on the soil conditions encountered in our test borings near the eastern steep slope, and our slope stability analysis, we recommend that the wall be designed for a retention depth of approximately 8 feet. This stabilization depth is measured from the existing grade along the eastern side of the development area. Several return piles will be needed along the north and south ends of the stabilization wall.

The stabilization wall should consist of closely-spaced soldier piles spaced no further apart than 3 feet edge-to-edge so that the soil will arch between them. Drilled piles would be constructed by setting steel H-beams or rebar cages in drilled holes and grouting the spaces between the steel reinforcements and the soil with concrete for the entire height of the hole. Excessive ground loss in the drilled holes must be avoided to reduce the potential for settlement of adjacent structures. If water is present in a hole at the time of construction, concrete must be tremied to the bottom of the hole. The contractor should be well prepared for this and have at least one casing and a tremie pipe of sufficient length prior to starting drilling.

The use of driven methods for installing the beams for the stabilization wall could be explored for feasibility at this site. However, the beam lengths and steel section sizes may be limited by the soil conditions, as it will become increasingly difficult to drive the beams into the underlying hard silts, especially past a depth of 15 feet where the blow counts increase in the eastern borings. It would be practical to discuss this with a specialty piling contractor early in the project design and may require that helical anchors are utilized to supplement the lateral capacity of the piles if a driven beam system is able to be utilized in order to decrease embedment depths.

The stabilization wall should be designed for an active soil pressure equal to that pressure exerted by an equivalent fluid with a unit weight of 45 pcf. An ultimate (no safety factor included) passive soil pressure equal to that pressure exerted by a fluid with a density of 350 pcf will resist the lateral movement of the piles below the stabilization (retention) depth.

Typical design considerations for a stabilization wall are depicted on Plate 7.

HELICAL ANCHORS

Depending on the preliminary design, helical anchors may need to be used to aid in the design of the stabilization wall, as well as the western existing basement wall if additional lateral support is deemed necessary.

Helical anchors consist of single or multiple helixes that are rotated into the ground on the end of round or square metal shafts. These anchors can be used to support either compression or tension

loads, but their lateral capacity is negligible due to the relatively small diameter of the metal shafts. The design capacity of single helix anchors is the allowable soil bearing capacity on the helix area. Multiple-helix anchors are typically assumed to have a design capacity equal to the sum of the allowable bearing capacity on each helix if they are separated more than three helix diameters.

The minimum diameter of a single helix anchor is 8 inches. The ultimate capacity of the anchor in tension or compression can be estimated roughly by multiplying the installation torque by 10. We recommend that the helix be installed at least 5 feet into very stiff soil. A typical anchor capacity for a single 8-inch helix is about 10 to 15 kips, but the specific loading and placement of these anchors will need to be determined by the structural engineer. If anchors are installed using hand carried tooling, we recommend that allowable loads be kept low due to potential installation complications. If larger installation equipment can access the work areas, larger helical anchors can be installed, and larger anchor capacities could be attained on the order of 20 to 25 kips. Anchors for the project, if needed, would be installed at key elevations determined by the project structural engineer.

All installed helical anchors should be field torque tested during installation to at least 200 percent of the allowable capacity. At least one anchor should be load tested to at least 200 percent of the design load to verify the allowable capacity.

The anchors should be installed by a specialty contractor familiar with the design and installation of helical anchor systems. The contractor can assist with refining the anchor design and details and estimating capacities for different soil and anchor conditions.

BUILDING FLOORS

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

As noted by the American Concrete Institute (ACI) in the *Guides for Concrete Floor and Slab Structures*, proper moisture protection is desirable immediately below any on-grade slab that will be covered by tile, wood, carpet, impermeable floor coverings, or any moisture-sensitive equipment or products. ACI recommends a minimum 10-mil thickness vapor retarder for better durability and long-term performance than is provided by 6-mil plastic sheeting that has historically been used. A vapor retarder is defined as a material with a permeance of less than 0.3 perms, as determined by ASTM E 96. It is possible that concrete admixtures may meet this specification, although the manufacturers of the admixtures should be consulted. Where vapor retarders are used under slabs, their edges should overlap by at least 6 inches and be sealed with adhesive tape. The sheeting should extend to the foundation walls for maximum vapor protection.

If no potential for vapor passage through the slab is desired, a vapor *barrier* should be used. A vapor barrier, as defined by ACI, is a product with a water transmission rate of 0.01 perms when tested in accordance with ASTM E 96. Reinforced membranes having sealed overlaps can meet this requirement.

We recommend that the contractor, the project materials engineer, and the owner discuss these issues and review recent ACI literature and ASTM E-1643 for installation guidelines and guidance on the use of the protection/blotter material.

EXCAVATIONS AND SLOPES

Temporary excavation slopes should not exceed the limits specified in local, state, and national government safety regulations. Also, temporary cuts should be planned to provide a minimum 2 to 3 feet of space for construction of foundations, walls, and drainage. Based upon Washington Administrative Code (WAC) 296, Part N, the soil at the subject site would generally be classified as Type B. Therefore, temporary cut slopes greater than 4 feet in height should not be excavated at an inclination steeper than 1:1 (Horizontal:Vertical), extending continuously between the top and the bottom of a cut. In general, vertical cuts in the loose soils should be avoided. Additional considerations for temporary excavations are discussed above in the **General** section.

All permanent cuts into native soil should be inclined no steeper than 3:1 (H:V). Water should not be allowed to flow uncontrolled over the top of any temporary or permanent slope. All permanently exposed slopes should be seeded with an appropriate species of vegetation to reduce erosion and improve the stability of the surficial layer of soil.

Any disturbance to the existing steep slope outside of the building limits may reduce the stability of the slope. Damage to the existing vegetation and ground should be minimized, and any disturbed areas should be revegetated as soon as possible. Soil from the excavation should not be placed on the slope, and this may require the off-site disposal of any surplus soil.

DRAINAGE CONSIDERATIONS

Footing drains should be used where: (1) crawl spaces or basements will be below a structure; (2) a slab is below the outside grade; or (3) the outside grade does not slope downward from a building. Drains should also be placed at the base of all earth-retaining walls. These drains should be surrounded by at least 6 inches of 1-inch-minus, washed rock that is encircled with non-woven, geotextile filter fabric (Mirafi 140N, Supac 4NP, or similar material). At its highest point, a perforated pipe invert should be at least 6 inches below the bottom of a slab floor or the level of a crawl space. The discharge pipe for subsurface drains should be sloped to flow to the outlet point. Roof and surface water drains must not discharge into the foundation drain system. A typical footing drain detail is attached to this report as Plate 8. For the best long-term performance, perforated PVC pipe is recommended for all subsurface drains. Clean-outs should be provided for potential future flushing or cleaning of footing drains.

Drainage inside the building's footprint should also be provided where (1) a crawl space or slab will slope or be lower than the surrounding ground surface, (2) an excavation encounters significant seepage, or (3) an excavation for a building will be close to the expected high groundwater elevations. Recommendations for underslab drainage can be found attached to this report as Plate 9.

As a minimum, a vapor retarder, as defined in the ***Building Floors*** section, should be provided in any crawl space area to limit the transmission of water vapor from the underlying soils. Crawl space grades are sometimes left near the elevation of the bottom of the footings. As a result, an outlet drain is recommended for all crawl spaces to prevent an accumulation of any water that may

bypass the footing drains. Providing a few inches of free draining gravel underneath the vapor retarder is also prudent to limit the potential for seepage to build up on top of the vapor retarder.

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

GENERAL EARTHWORK AND STRUCTURAL FILL

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

Structural fill is defined as any fill, including utility backfill, placed under, or close to, a building, or in other areas where the underlying soil needs to support loads. All structural fills should be placed in horizontal lifts with a moisture content at, or near, the optimum moisture content. The optimum moisture content is that moisture content that results in the greatest compacted dry density. The moisture content of fill is very important and must be closely controlled during the filling and compaction process. As discussed in the ***General*** section, the on-site soils are not suitable for reuse as structural fill, due to their high fines content, moisture sensitivity, and poor drainage characteristics.

The allowable thickness of the fill lift will depend on the material type selected, the compaction equipment used, and the number of passes made to compact the lift. The loose lift thickness should not exceed 12 inches, but should be thinner if small, hand-operated compactors are used. We recommend testing structural fill as it is placed. If the fill is not sufficiently compacted, it should be recompacted before another lift is placed. This eliminates the need to remove the fill to achieve the required compaction. The following table presents recommended levels of relative compaction for compacted fill:

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

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

LIMITATIONS

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

The recommendations presented in this report are directed toward the protection of only the proposed residence from damage due to slope movement. Predicting the future behavior of steep slopes and the potential effects of development on their stability is an inexact and imperfect science that is currently based mostly on the past behavior of slopes with similar characteristics. Landslides and soil movement can occur on steep slopes before, during, or after the development of property. The owner of any property containing or located close to steep slopes must ultimately accept the possibility that some slope movement could occur, resulting in possible loss of ground or damage to the facilities around the proposed residence.

This report has been prepared for the exclusive use of Heidi and Andrew Miller, and their representatives, for specific application to this project and site. Our conclusions and recommendations are professional opinions derived in accordance with our understanding of current local standards of practice, and within the scope of our services. No warranty is expressed or implied. The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design. Our services also do not include assessing or minimizing the potential for biological hazards, such as mold, bacteria, mildew, and fungi in either the existing or proposed site development.

ADDITIONAL SERVICES

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

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

The following plates are attached to complete this report:

Plate 1	Vicinity Map
Plate 2	Site Exploration Plan
Plates 3 - 6	Test Boring Logs
Plate 7	Typical Stabilization Wall Detail
Plate 8	Typical Footing Drain Detail
Plate 9	Typical Underslab Drainage Detail
Attachment	Appendix A – Slope Stability Analysis

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

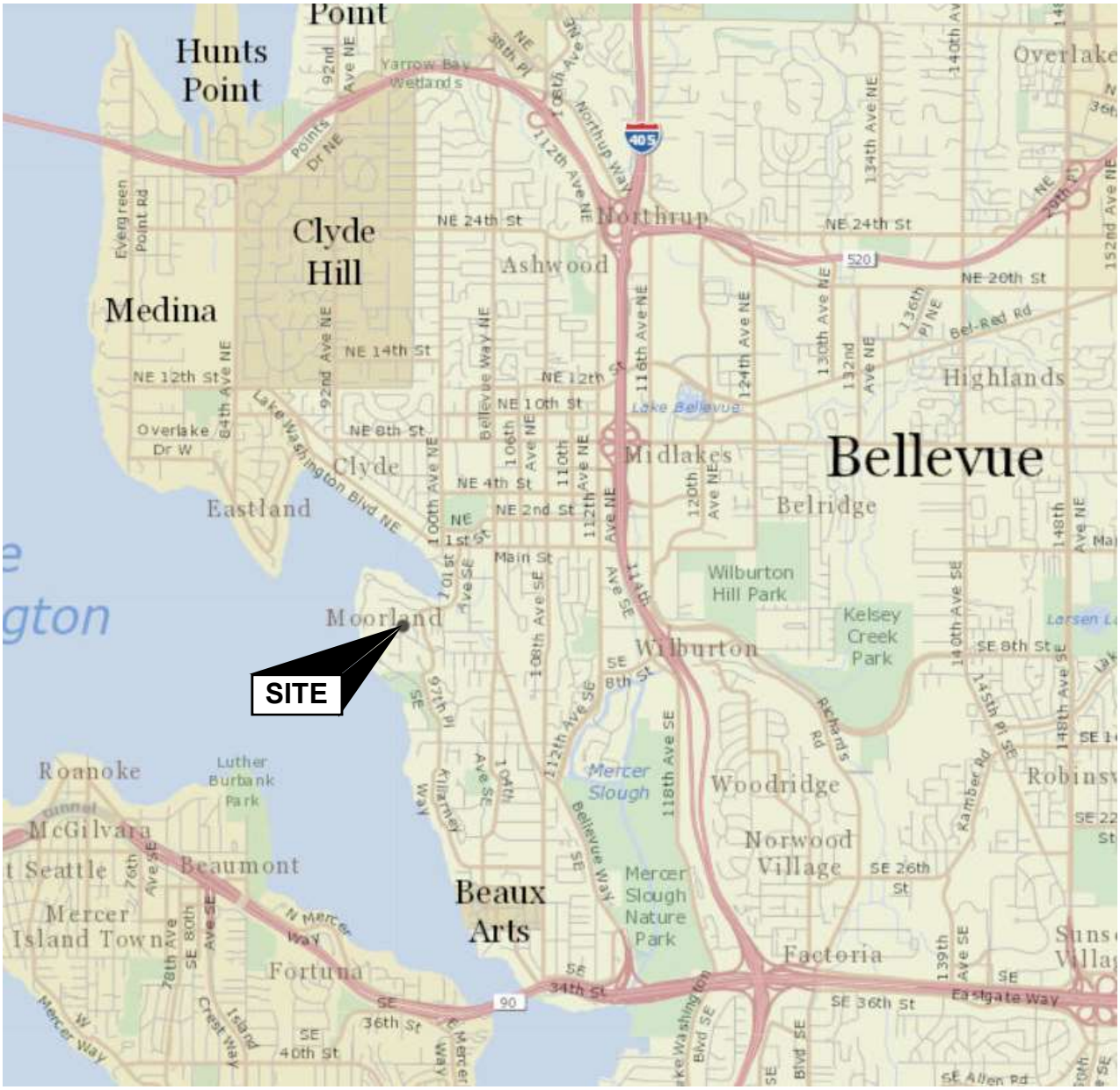
Respectfully submitted,

GEOTECH CONSULTANTS, INC.

02/23/2024
Marc R. McGinnis, P.E.
Principal

MKM:MRM:kg

NORTH



(Source: King County iMap)

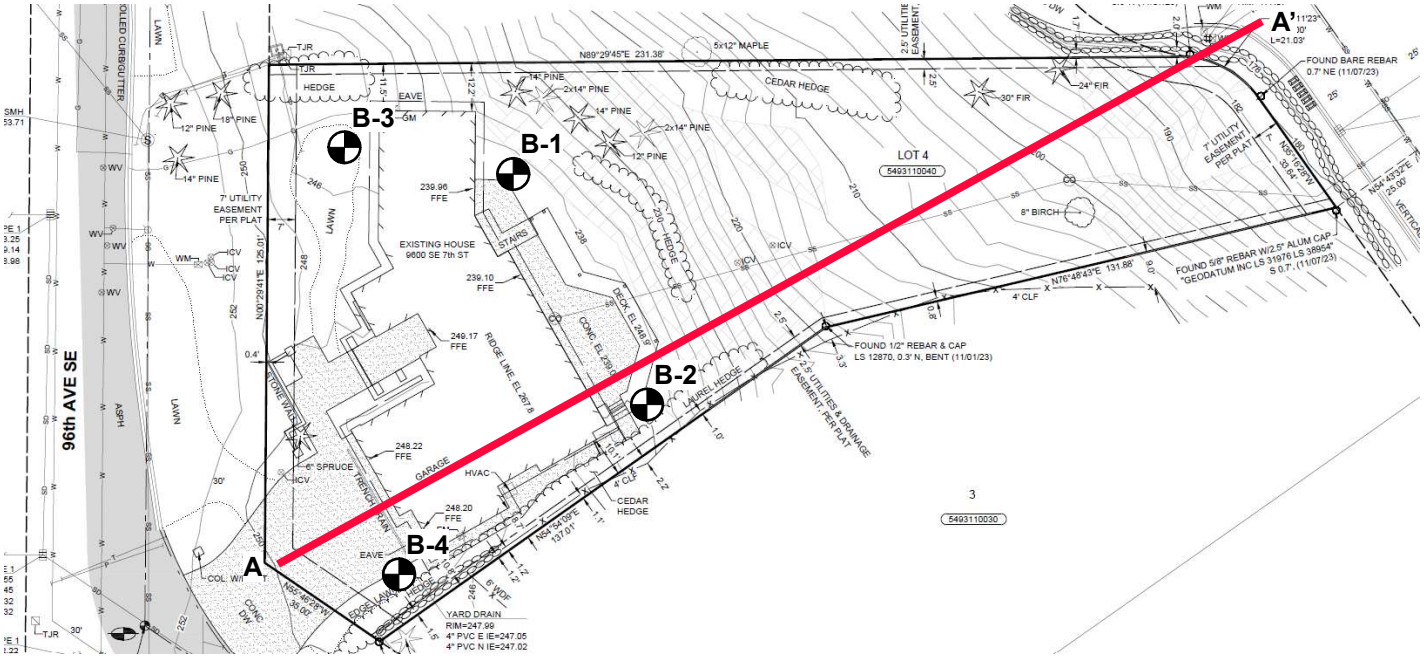
GEOTECH
CONSULTANTS, INC.

VICINITY MAP

9600 Southeast 7th Street
Bellevue, Washington

Job	Date:		Plate:
24027	Feb. 2024		1

NORTH



Legend:

Test Boring Location

(A-A') Slope Stability Cross Section Location

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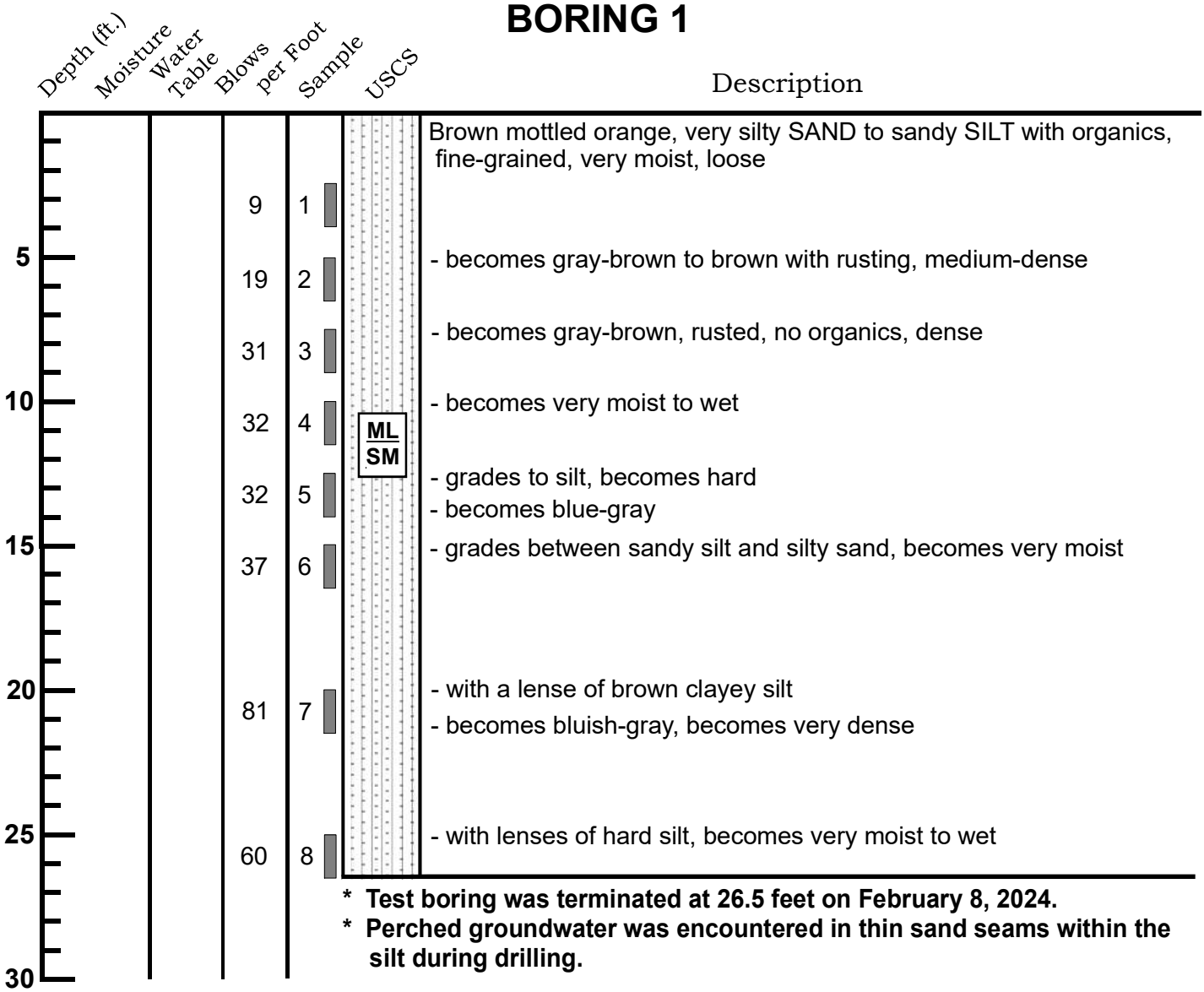
SITE EXPLORATION PLAN

9600 Southeast 7th Street
Bellevue, Washington

Job	Date:		Plate:
24027	Feb. 2024	No Scale	2

BORING 1



*** Test boring was terminated at 26.5 feet on February 8, 2024.**

*** Perched groundwater was encountered in thin sand seams within the silt during drilling.**

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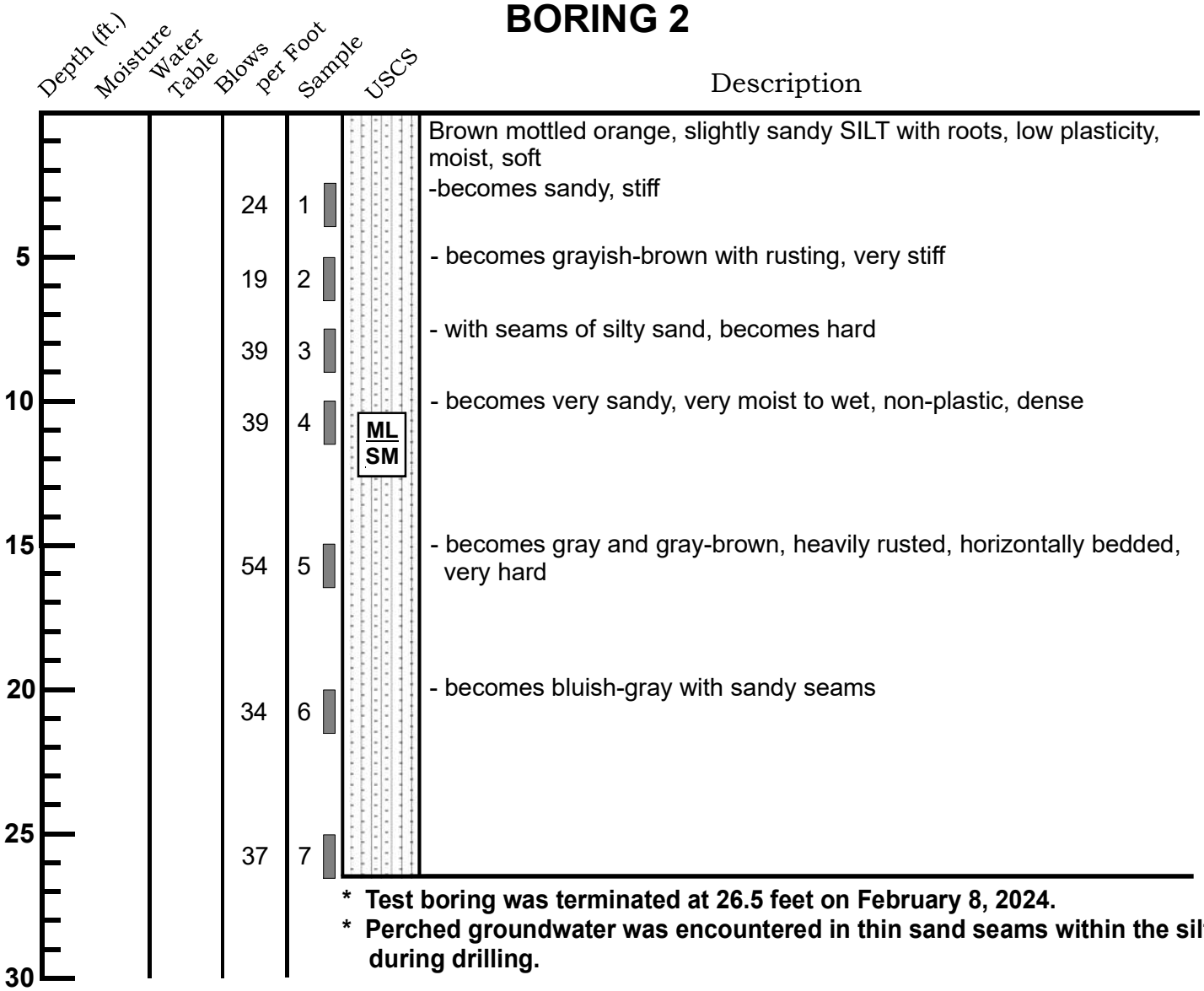
TEST BORING LOG

9600 Southeast 7th Street
Bellevue, Washington

Job	Date:	Logged by:	Plate:
24027	Feb. 2024	MKM	3

BORING 2



*** Test boring was terminated at 26.5 feet on February 8, 2024.**

*** Perched groundwater was encountered in thin sand seams within the silt during drilling.**

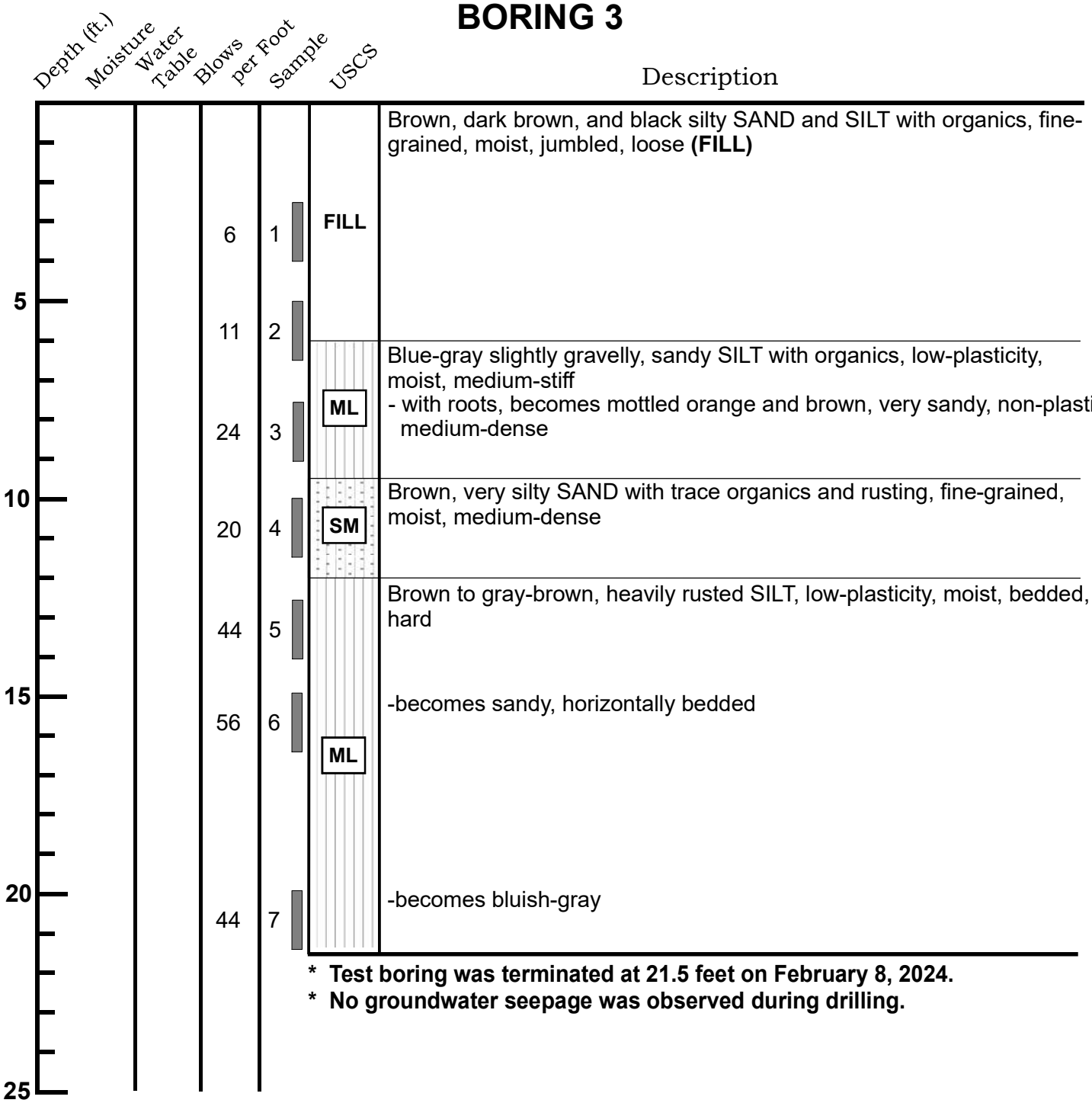
GEOTECH
CONSULTANTS, INC.

TEST BORING LOG

9600 Southeast 7th Street
Bellevue, Washington

Job	Date:	Logged by:	Plate:
24027	Feb. 2024	MKM	4

BORING 3



*** Test boring was terminated at 21.5 feet on February 8, 2024.**

*** No groundwater seepage was observed during drilling.**

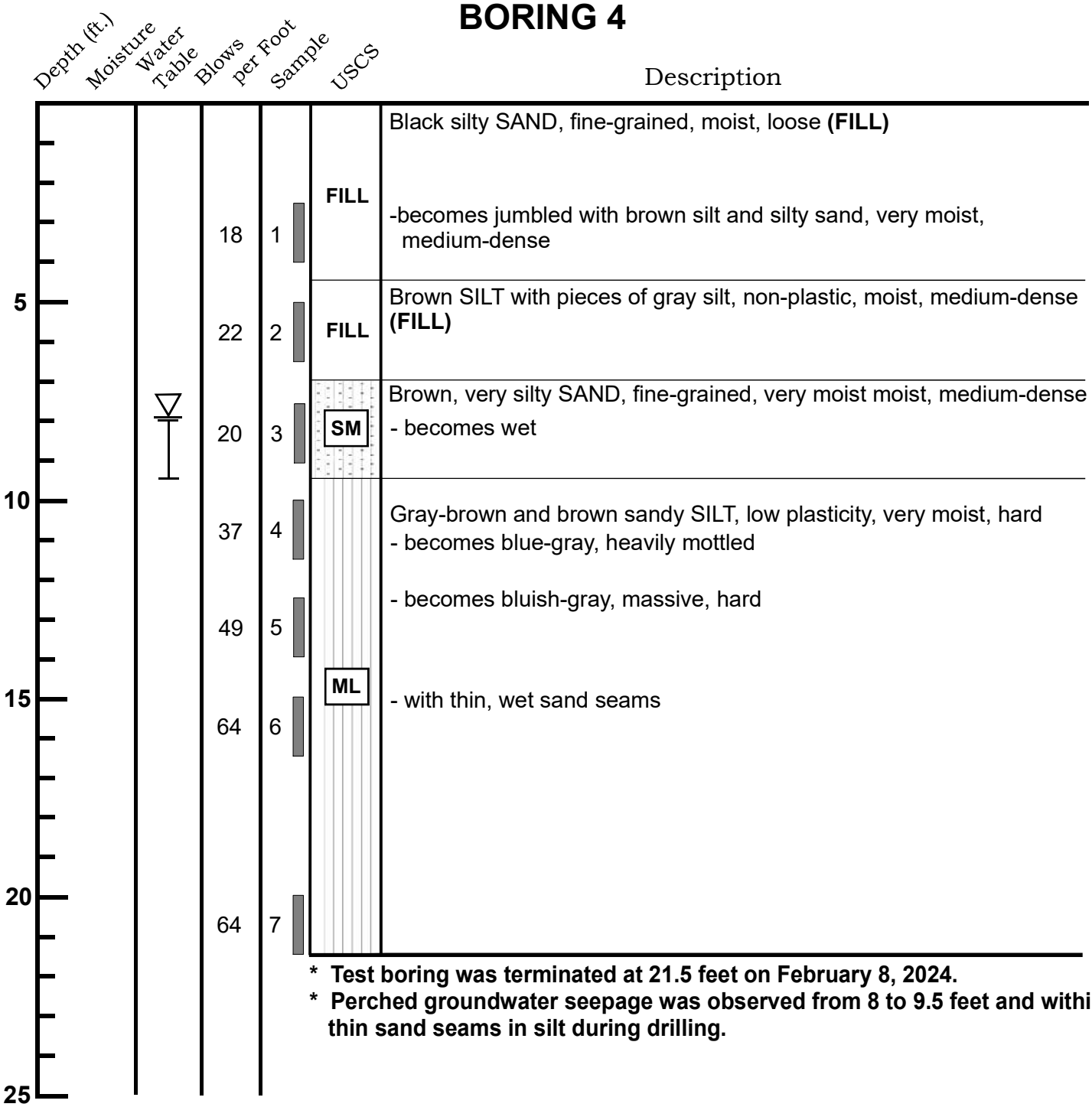
GEOTECH
CONSULTANTS, INC.

TEST BORING LOG

9600 Southeast 7th Street
Bellevue, Washington

Job	Date:	Logged by:	Plate:
24027	Feb. 2024	MKM	5

BORING 4



*** Test boring was terminated at 21.5 feet on February 8, 2024.**

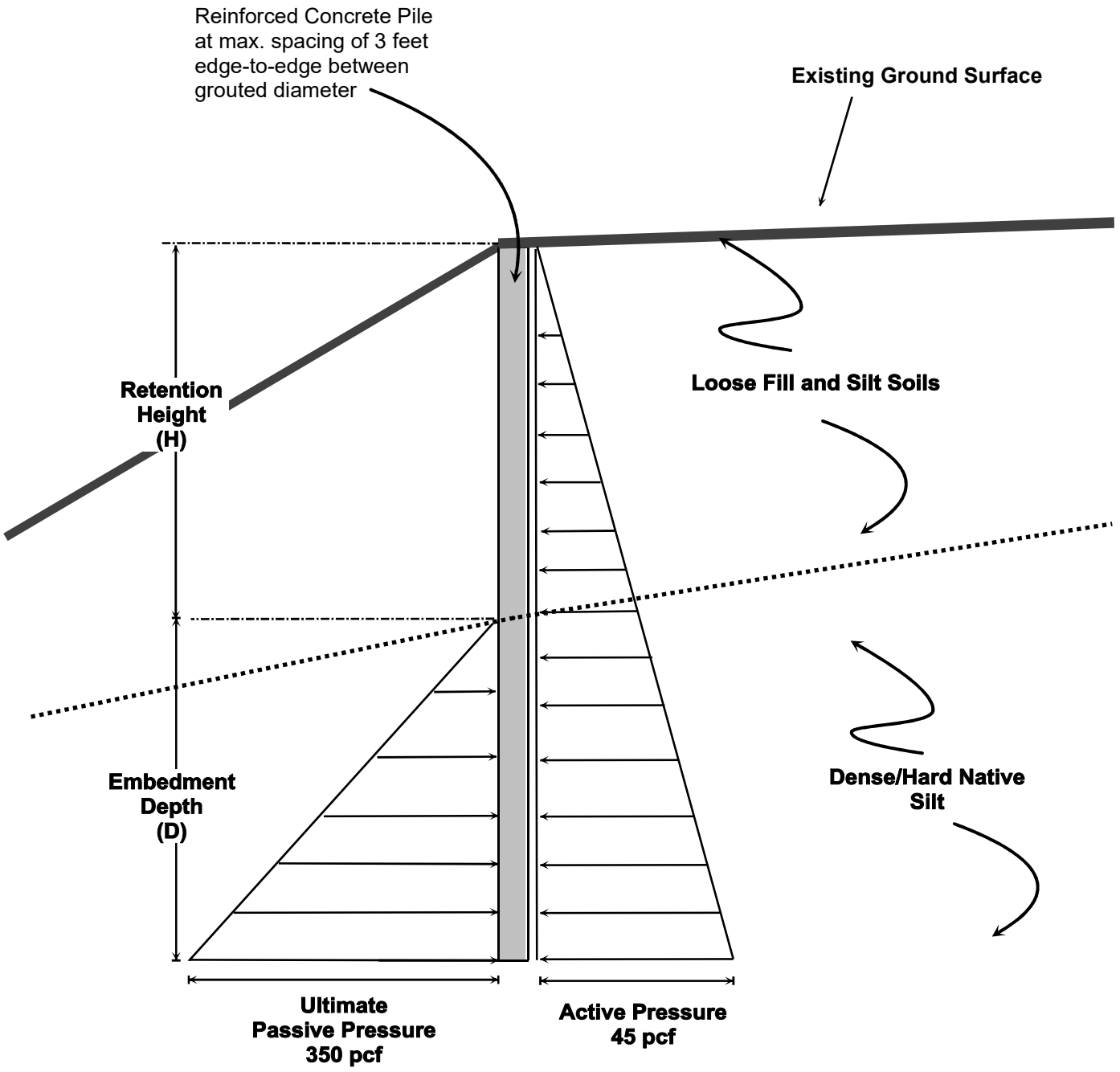
*** Perched groundwater seepage was observed from 8 to 9.5 feet and within thin sand seams in silt during drilling.**

GEOTECH
CONSULTANTS, INC.

TEST BORING LOG

9600 Southeast 7th Street
Bellevue, Washington

Job	Date:	Logged by:	Plate:
24027	Feb. 2024	MKM	6



Notes:

(1) The report should be referenced for specifics regarding design and installation.
(2) Active pressures act over the pile spacing within the retained height (H), and on the pile diameter in the embedded zone (D).
(3) Passive pressures act over three times the grouted soldier pile diameter or the pile spacing, whichever is smaller.
(4) It is assumed that no hydrostatic pressures act on the back of the shoring walls.
(5) Cut slopes or adjacent structures positioned above or behind shoring will exert additional pressures on the shoring wall.

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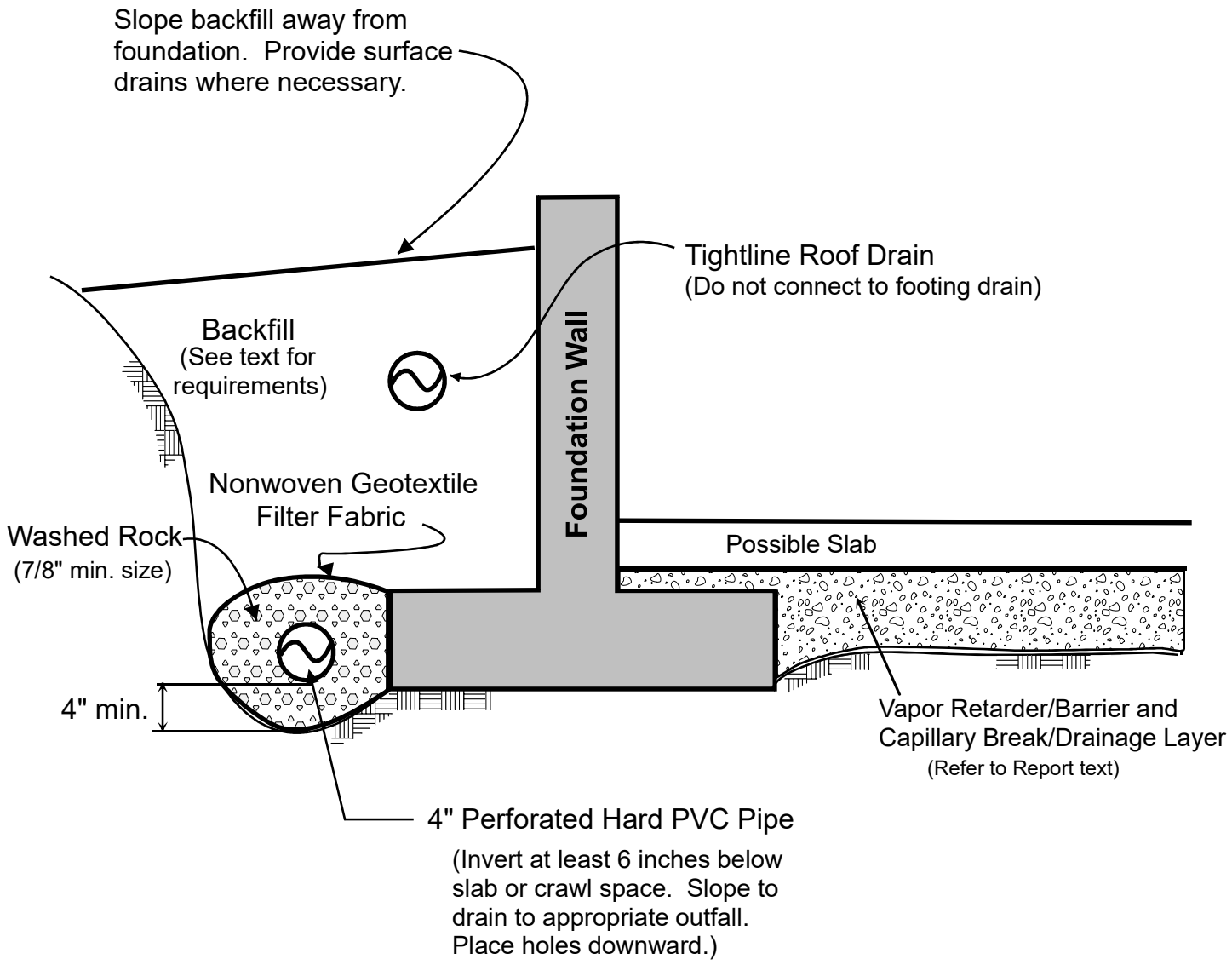
TYPICAL STABILIZATION WALL DETAIL

9600 Southeast 7th Street
Bellevue, Washington

Job	*Date:*		*Plate:*
24027	Feb. 2024		7



NOTES:

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

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

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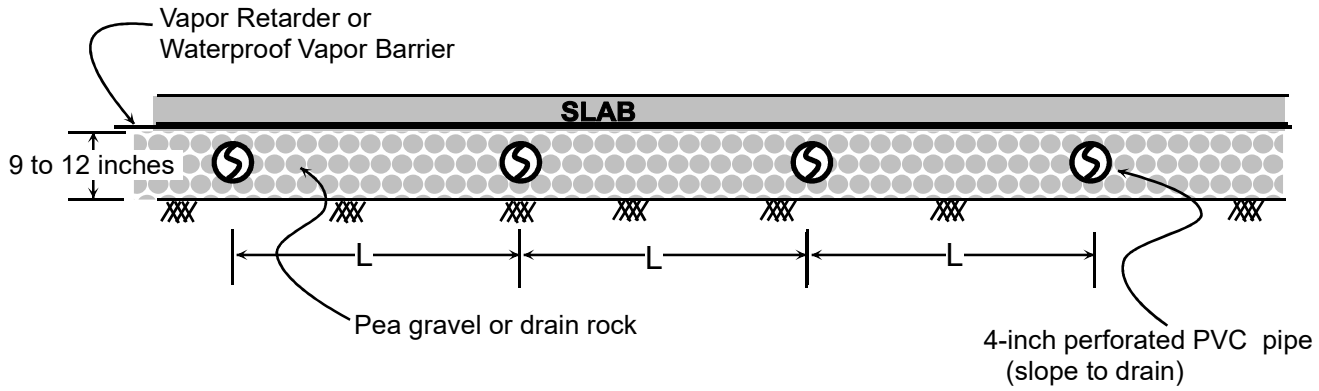
FOOTING DRAIN DETAIL

9600 Southeast 7th Street
Bellevue, Washington

Job	Date:		Plate:
24027	Feb. 2024		8



NOTES:

(1) Refer to the report text for additional drainage and waterproofing considerations.
(2) The typical maximum underslab drain separation (L) is 15 to 20 feet.
(3) No filter fabric is necessary beneath the pipes as long as a minimum thickness of 4 inches of rock is maintained beneath the pipes.
(4) The underslab drains and foundation drains should discharge to a suitable outfall.

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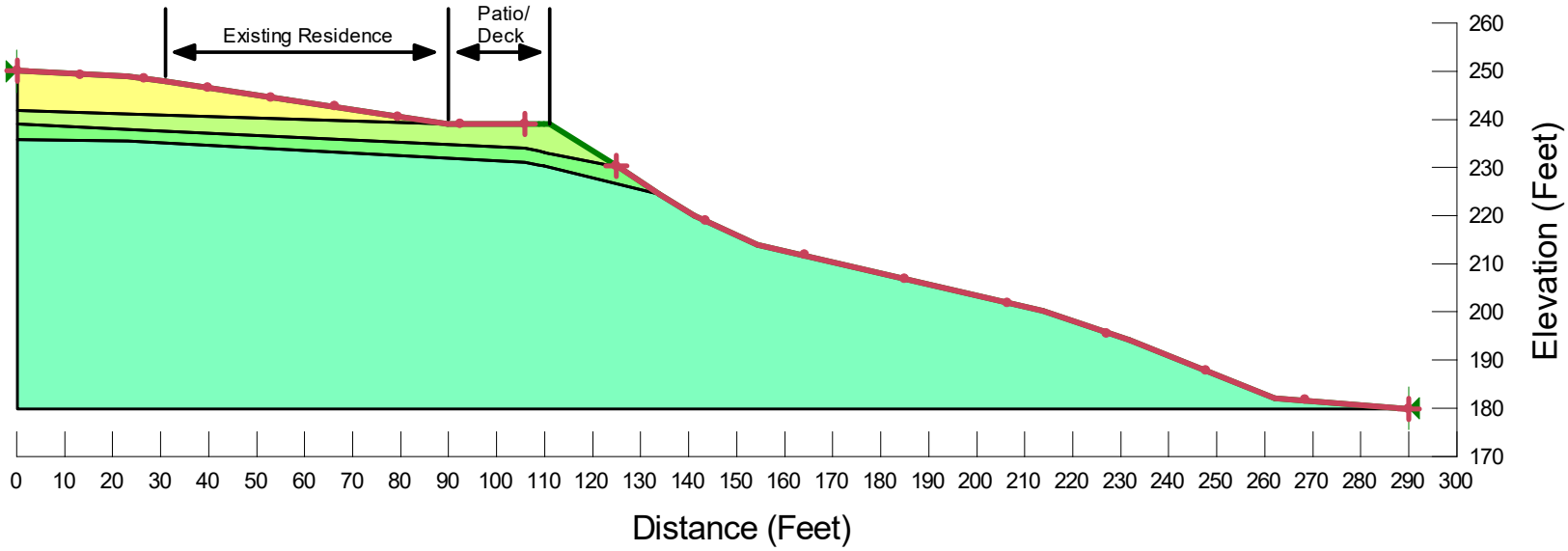
TYPICAL UNDERSLAB DRAINAGE

9600 Southeast 7th Street
Bellevue, Washington

Job	Date:		Plate:
24027	Feb. 2024		9

Appendix A
Slope Stability Analysis
JN 24027
Miller

24027 - Miller
Static



Materials
- Fill
- Loose Silty Sand and Silt
- Medium-Dense Silty Sand and Silt
- Dense/Hard Silt

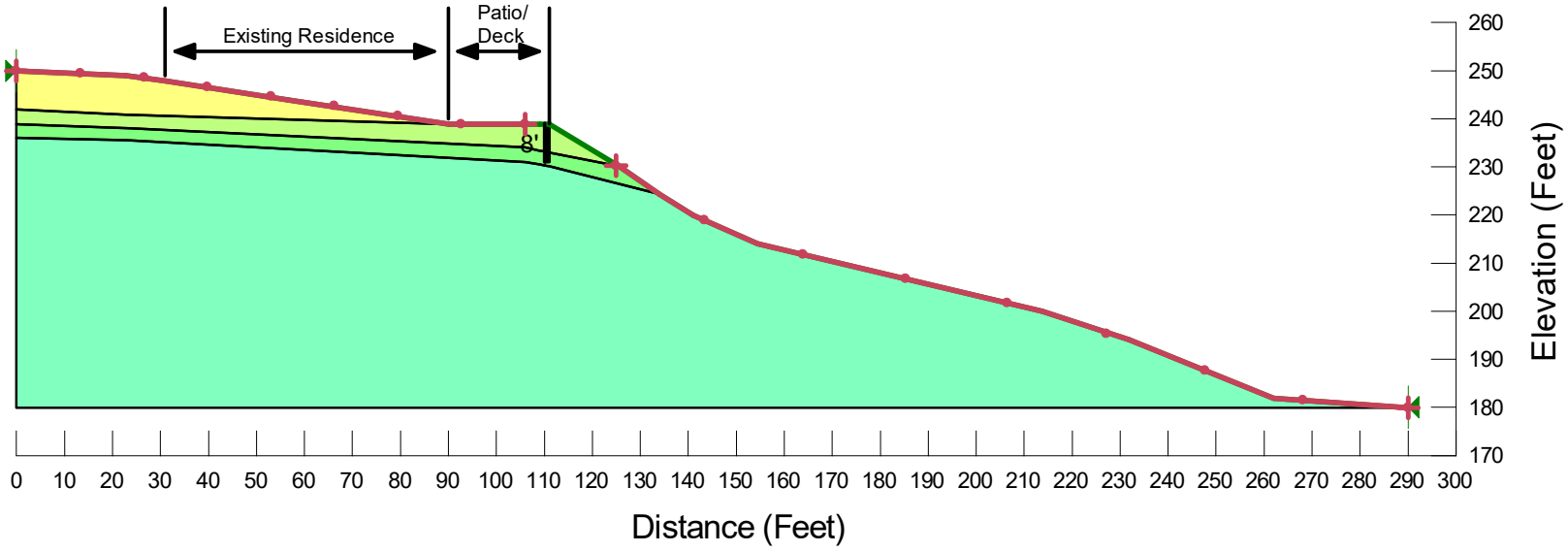
Fill
115 pcf
c=0 psf
phi=28 degrees

Loose Silty Sand and Silt
115 pcf
c=0 psf
phi=30 degrees

Medium-Dense Silty Sand and Silt
120 pcf
c=0 psf
phi=31 degrees

Dense/Hard Silt
130 pcf
c=250 psf
phi=32 degrees

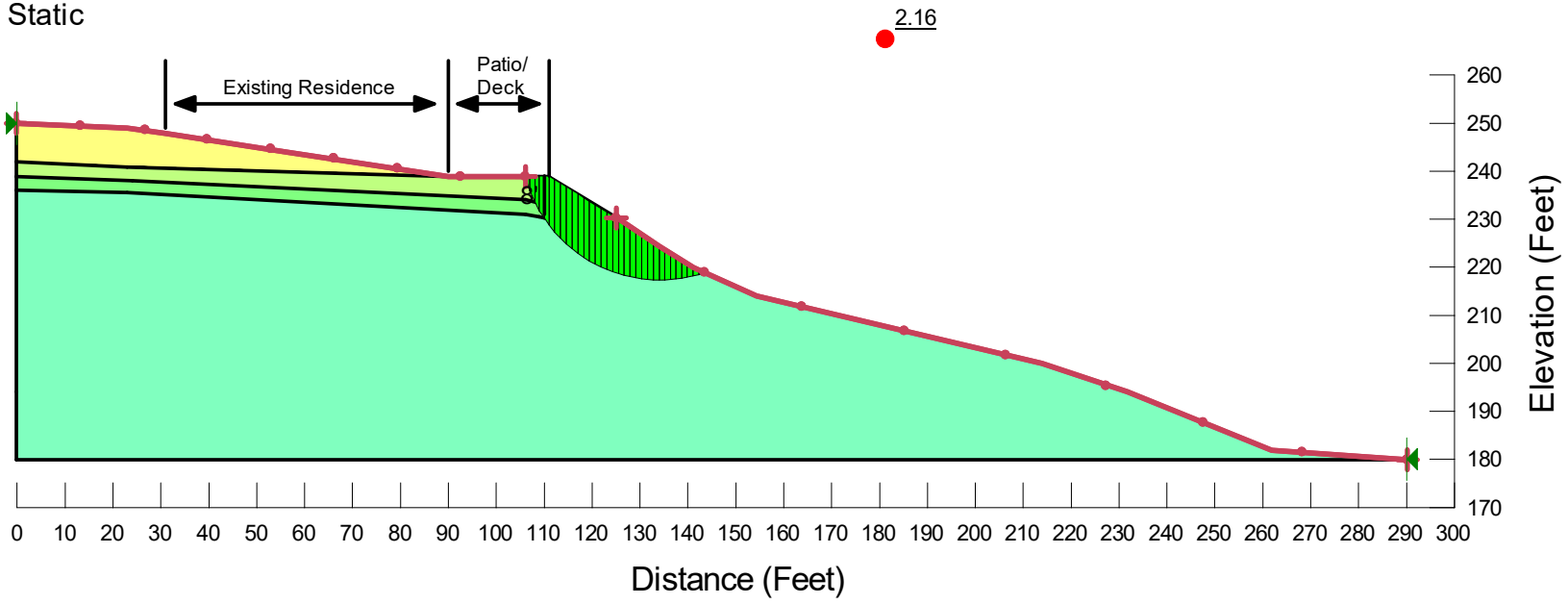
24027 - Miller
Static



Materials
- Fill
- Loose Silty Sand and Silt
- Medium-Dense Silty Sand and Silt
- Dense/Hard Silt
- Wall Retain Height

Fill	Loose Silty Sand and Silt	Medium-Dense Silty Sand and Silt	Dense/Hard Silt
115 pcf	115 pcf	120 pcf	130 pcf
c=0 psf	c=0 psf	c=0 psf	c=250 psf
phi=28 degrees	phi=30 degrees	phi=31 degrees	phi=32 degrees

24027 - Miller
Static



Materials
- Fill
- Loose Silty Sand and Silt
- Medium-Dense Silty Sand and Silt
- Dense/Hard Silt
- Wall Retain Height

Fill	Loose Silty Sand and Silt	Medium-Dense Silty Sand and Silt	Dense/Hard Silt
115 pcf	115 pcf	120 pcf	130 pcf
c=0 psf	c=0 psf	c=0 psf	c=250 psf
phi=28 degrees	phi=30 degrees	phi=31 degrees	phi=32 degrees

Static

File Information

File Version: 8.15
Title: 24027 - Miller
Created By: Matt McGinnis
Last Edited By: Matt McGinnis
Revision Number: 35
Date: 2/16/2024
Time: 8:33:33 AM
Tool Version: 8.15.6.13446
File Name: 24027 AA' Existing.gsz
Directory: C:\Users\MattM\Geotech Consultants\Shared Documents - Documents\2024 Jobs\24027 Miller (MRM)\24027 Slope Stability\
Last Solved Date: 2/16/2024
Last Solved Time: 8:33:35 AM

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

Static

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Resisting Side Maximum Convex Angle: 1 °
- Driving Side Maximum Convex Angle: 5 °
- Optimize Critical Slip Surface Location: No
- Tension Crack
  - Tension Crack Option: (none)

F of S Distribution

F of S Calculation Option: Constant

Advanced

Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Search Method: Root Finder
Tolerable difference between starting and converged F of S: 3
Maximum iterations to calculate converged lambda: 20
Max Absolute Lambda: 2

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion': 0 psf
Phi': 28 °
Phi-B: 0 °

Loose Silty Sand and Silt

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion': 0 psf
Phi': 30 °
Phi-B: 0 °

Medium-Dense Silty Sand and Silt

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 0 psf
Phi': 31 °
Phi-B: 0 °

Dense/Hard Silt

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion': 250 psf
Phi': 32 °
Phi-B: 0 °

Wall Retain Height

Model: High Strength
Unit Weight: 150 pcf

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0, 250) ft
Left-Zone Right Coordinate: (106, 239) ft
Left-Zone Increment: 8
Right Projection: Range
Right-Zone Left Coordinate: (125, 230.31034) ft

Right-Zone Right Coordinate: (290, 180) ft
Right-Zone Increment: 8
Radius Increments: 8

Slip Surface Limits

Left Coordinate: (0, 250) ft
Right Coordinate: (290, 180) ft

Points

	X (ft)	Y (ft)
Point 1	0	250
Point 2	23	249
Point 3	31	248
Point 4	56.5	244
Point 5	90	239
Point 6	106	239
Point 7	111	239
Point 8	141	220
Point 9	154.5	214
Point 10	213.75	200
Point 11	231.75	194
Point 12	262	182
Point 13	290	180
Point 14	23	241
Point 15	23	235.5
Point 16	106	234
Point 17	106	231
Point 18	106	212.5
Point 19	0	242
Point 20	125.5	230
Point 21	24	238
Point 22	0	239
Point 23	0	236
Point 24	134.00359	224.49317
Point 25	0	194
Point 26	0	180
Point 27	111	232.97436
Point 28	111	230
Point 29	109	239
Point 30	109	230.5
Point 31	109	233.38462
Point 32	110	239
Point 33	110	233.17949
Point 34	110	230.25
Point 35	111	231
Point 36	110	231

Regions

	Material	Points	Area (ft²)
Region 1	Fill	1,2,3,4,5,14,19	455.25
Region 2	Loose Silty Sand and Silt	6,5,14,19,22,21,16,31,33,32,29	404.14
Region 3	Dense/Hard Silt	34,30,17,15,23,25,26,13,12,11,10,9,8,24,28	10,012
Region 4	Loose Silty Sand and Silt	20,27,7	43.686
Region 5	Medium-Dense Silty Sand and Silt	36,33,31,16,21,22,23,15,17,30,34,28,24,20,27,35	368.1
Region 6	Wall Retain Height	27,7,32,33,36,35	8

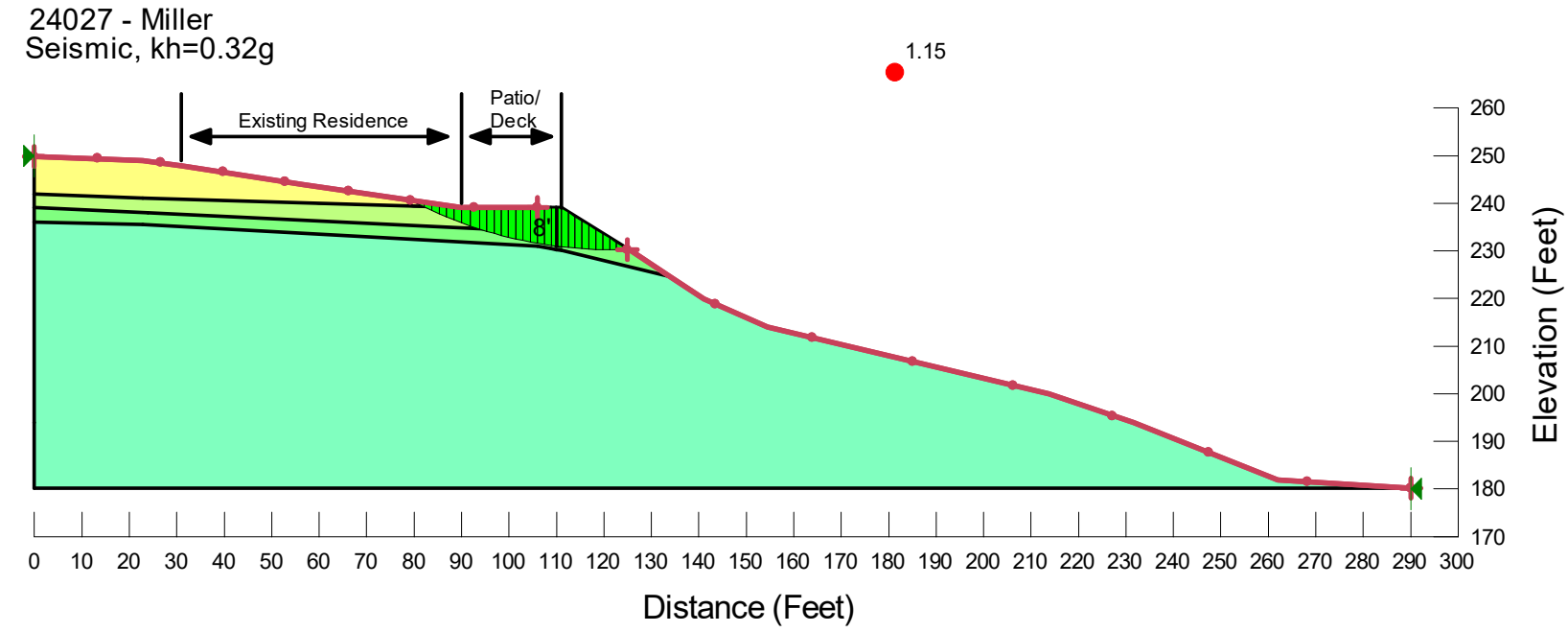
Current Slip Surface

Slip Surface: 664
F of S: 2.16
Volume: 317.02731 ft³
Weight: 39,809.589 lbs
Resisting Moment: 997,928.8 lbs-ft
Activating Moment: 462,219.61 lbs-ft
Resisting Force: 29,911.808 lbs
Activating Force: 13,856.401 lbs
F of S Rank (Analysis): 1 of 729 slip surfaces
F of S Rank (Query): 1 of 729 slip surfaces
Exit: (143.51326, 218.883) ft
Entry: (106, 239) ft
Radius: 29.144217 ft
Center: (134.16596, 246.48759) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	106.50865	237.44437	0	91.625389	52.899943	0
Slice 2	107.52595	234.73569	0	265.83342	153.479	0
Slice 3	108.5173	232.68563	0	398.18288	239.25241	0
Slice 4	109.5	230.99268	0	514.27077	309.00505	0
Slice 5	110.5	229.50017	0	699.35576	437.00598	250
Slice 6	111.60417	228.06374	0	637.16366	398.14405	250
Slice 7	112.8125	226.67279	0	717.04858	448.06168	250
Slice 8	114.02083	225.44336	0	788.82169	492.9105	250
Slice 9	115.22917	224.34823	0	855.60031	534.63841	250
Slice 10	116.4375	223.36817	0	919.41827	574.5163	250
Slice 11	117.64583	222.48899	0	981.55851	613.34583	250
Slice 12	118.85417	221.69989	0	1,042.7262	651.56762	250
Slice 13	120.0625	220.99247	0	1,103.1329	689.31396	250
Slice 14	121.27083	220.36007	0	1,162.5293	726.42894	250
Slice 15	122.47917	219.79734	0	1,220.2058	762.46922	250

Slice 16	123.6875	219.29994	0	1,274.9793	796.69546	250
Slice 17	124.89583	218.86434	0	1,325.1788	828.06361	250
Slice 18	126.1074	218.48678	0	1,365.7628	853.42332	250
Slice 19	127.3222	218.1652	0	1,393.7261	870.89675	250
Slice 20	128.537	217.89883	0	1,408.7837	880.30574	250
Slice 21	129.75179	217.68615	0	1,407.7364	879.65132	250
Slice 22	130.96659	217.52596	0	1,387.4482	866.97386	250
Slice 23	132.18139	217.41739	0	1,345.1653	840.55258	250
Slice 24	133.39619	217.35988	0	1,278.8828	799.13466	250
Slice 25	134.58662	217.35224	0	1,187.6597	742.13213	250
Slice 26	135.75269	217.39246	0	1,073.1249	670.56289	250
Slice 27	136.91876	217.47958	0	937.88538	586.05583	250
Slice 28	138.08483	217.61404	0	785.07145	490.56709	250
Slice 29	139.2509	217.79651	0	618.84703	386.69854	250
Slice 30	140.41697	218.0279	0	444.02299	277.45636	250
Slice 31	141.62831	218.32243	0	276.73938	172.92596	250
Slice 32	142.88494	218.68595	0	120.39016	75.22812	250


24027 - Miller
Seismic, kh=0.32g
1.15
Existing Residence
Patio/
Deck
8"
260
250
240
230
220
210
200
190
180
170
Elevation (Feet)
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300
Distance (Feet)
Materials
Fill
Loose Silty Sand and Silt
Medium-Dense Silty Sand and Silt
Dense/Hard Silt
Wall Retain Height
Fill
115 pcf
c=0 psf
phi=28 degrees
Loose Silty Sand and Silt
115 pcf
c=0 psf
phi=30 degrees
Medium-Dense Silty Sand and Silt
120 pcf
c=0 psf
phi=31 degrees
Dense/Hard Silt
130 pcf
c=250 psf
phi=32 degrees

Seismic

File Information

File Version: 8.15
Title: 24027 - Miller
Created By: Matt McGinnis
Last Edited By: Matt McGinnis
Revision Number: 35
Date: 2/16/2024
Time: 8:33:33 AM
Tool Version: 8.15.6.13446
File Name: 24027 AA' Existing.gsz
Directory: C:\Users\MattM\Geotech Consultants\Shared Documents - Documents\2024 Jobs\24027 Miller (MRM)\24027 Slope Stability\
Last Solved Date: 2/16/2024
Last Solved Time: 8:33:35 AM

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

Seismic

Kind: SLOPE/W
Method: Morgenstern-Price
Settings
- Side Function
  - Interslice force function option: Half-Sine
- PWP Conditions Source: (none)

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 1
- Resisting Side Maximum Convex Angle: 1 °
- Driving Side Maximum Convex Angle: 5 °
- Optimize Critical Slip Surface Location: No
- Tension Crack
  - Tension Crack Option: (none)

F of S Distribution

F of S Calculation Option: Constant

Advanced

Number of Slices: 30
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft
Search Method: Root Finder
Tolerable difference between starting and converged F of S: 3
Maximum iterations to calculate converged lambda: 20
Max Absolute Lambda: 2

Materials

Fill

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion': 0 psf
Phi': 28 °
Phi-B: 0 °

Loose Silty Sand and Silt

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion': 0 psf
Phi': 30 °
Phi-B: 0 °

Medium-Dense Silty Sand and Silt

Model: Mohr-Coulomb
Unit Weight: 120 pcf
Cohesion': 0 psf
Phi': 31 °
Phi-B: 0 °

Dense/Hard Silt

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion': 250 psf
Phi': 32 °
Phi-B: 0 °

Wall Retain Height

Model: High Strength
Unit Weight: 150 pcf

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (0, 250) ft
Left-Zone Right Coordinate: (106, 239) ft
Left-Zone Increment: 8
Right Projection: Range
Right-Zone Left Coordinate: (125, 230.31034) ft

Right-Zone Right Coordinate: (290, 180) ft
Right-Zone Increment: 8
Radius Increments: 8

Slip Surface Limits

Left Coordinate: (0, 250) ft
Right Coordinate: (290, 180) ft

Seismic Coefficients

Horz Seismic Coef.: 0.32

Points

	X (ft)	Y (ft)
Point 1	0	250
Point 2	23	249
Point 3	31	248
Point 4	56.5	244
Point 5	90	239
Point 6	106	239
Point 7	111	239
Point 8	141	220
Point 9	154.5	214
Point 10	213.75	200
Point 11	231.75	194
Point 12	262	182
Point 13	290	180
Point 14	23	241
Point 15	23	235.5
Point 16	106	234
Point 17	106	231
Point 18	106	212.5
Point 19	0	242
Point 20	125.5	230
Point 21	24	238
Point 22	0	239
Point 23	0	236
Point 24	134.00359	224.49317
Point 25	0	194
Point 26	0	180
Point 27	111	232.97436
Point 28	111	230
Point 29	109	239
Point 30	109	230.5
Point 31	109	233.38462
Point 32	110	239
Point 33	110	233.17949

Point 34	110	230.25
Point 35	111	231
Point 36	110	231

Regions

	Material	Points	Area (ft²)
Region 1	Fill	1,2,3,4,5,14,19	455.25
Region 2	Loose Silty Sand and Silt	6,5,14,19,22,21,16,31,33,32,29	404.14
Region 3	Dense/Hard Silt	34,30,17,15,23,25,26,13,12,11,10,9,8,24,28	10,012
Region 4	Loose Silty Sand and Silt	20,27,7	43.686
Region 5	Medium-Dense Silty Sand and Silt	36,33,31,16,21,22,23,15,17,30,34,28,24,20,27,35	368.1
Region 6	Wall Retain Height	27,7,32,33,36,35	8

Current Slip Surface

Slip Surface: 488
F of S: 1.15
Volume: 204.32416 ft³
Weight: 23,985.581 lbs
Resisting Moment: 1,227,639.1 lbs-ft
Activating Moment: 1,068,672.2 lbs-ft
Resisting Force: 13,168.879 lbs
Activating Force: 11,467.719 lbs
F of S Rank (Analysis): 2 of 729 slip surfaces
F of S Rank (Query): 2 of 729 slip surfaces
Exit: (125, 230.31034) ft
Entry: (79.425413, 240.5783) ft
Radius: 91.384452 ft
Center: (121.63094, 321.63267) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	80.096819	240.2357	0	21.843218	11.614245	0
Slice 2	81.439629	239.5643	0	62.190798	33.067434	0
Slice 3	82.899931	238.86632	0	99.466899	57.427241	0
Slice 4	84.477724	238.14608	0	135.51066	78.237118	0
Slice 5	86.055517	237.46157	0	167.15055	96.504417	0
Slice 6	87.63331	236.81194	0	195.45431	112.8456	0
Slice 7	89.211103	236.19638	0	221.46491	127.86283	0
Slice 8	90.944586	235.56026	0	260.10555	150.17201	0
Slice 9	92.833759	234.90984	0	312.77507	180.58077	0
Slice 10	94.542199	234.35909	0	366.77814	220.38254	0
Slice 11	96.069906	233.89945	0	416.30104	250.1389	0
Slice 12	97.597612	233.46867	0	469.29941	281.98353	0
Slice 13	99.125319	233.06635	0	526.45176	316.32413	0

Slice 14	100.65303	232.69208	0	588.01465	353.31485	0
Slice 15	102.18073	232.34551	0	653.68212	392.77184	0
Slice 16	103.70844	232.02634	0	722.46947	434.10345	0
Slice 17	105.23615	231.73425	0	792.65958	476.27793	0
Slice 18	106.75	231.47116	0	860.71138	517.16757	0
Slice 19	108.25	231.23636	0	923.77269	555.05863	0
Slice 20	109.5	231.05837	0	971.71241	583.86372	0
Slice 21	110.5	230.93004	0	1,274.2289	765.63396	0
Slice 22	111.72912	230.78921	0	985.57771	592.19483	0
Slice 23	113.18735	230.64208	0	907.96655	545.56134	0
Slice 24	114.64559	230.51852	0	816.78535	490.77415	0
Slice 25	116.10382	230.41844	0	714.11008	429.08062	0
Slice 26	117.56205	230.34176	0	602.69903	362.13811	0
Slice 27	119.02029	230.28843	0	485.58229	291.76727	0
Slice 28	120.47852	230.25839	0	365.656	219.70829	0
Slice 29	121.93676	230.25164	0	245.36795	147.43194	0
Slice 30	123.39499	230.26816	0	126.54932	76.038503	0
Slice 31	124.56205	230.29629	0	33.857948	19.547896	0

GEOTECH
CONSULTANTS, INC.

2401 10th Ave E
Seattle, Washington 98102
(425) 747-5618

July 15, 2024

JN 24027

Heidi and Andrew Miller
13121 Northeast 84th Street
Kirkland, Washington 98033

via email: hbrun78@hotmail.com and amiller@real-retail.net

Subject: **Addendum to Geotechnical Engineering Study – Bearing for Existing West Basement Wall**
Proposed Remodel of Existing Residence
9600 Southeast 7th Street
Bellevue, Washington

Reference: *Geotechnical Engineering Study*, same site and project; Geotech Consultants, Inc.; February 23, 2024.

Greetings:

This letter is an addendum to the above-referenced *Geotechnical Engineering Study*, and is intended to address our recent assessment of the bearing conditions below the existing west wall of the house's basement and crawl space areas.

On June 23, 2024 the undersigned Principal engineer revisited the subject property to assess conditions beneath the footings for the western foundation walls in both the southern half of the house, which contains a basement, and the northern half of the structure, which is underlain by a tall crawl space.

The test hole conducted in the basement portion of the structure revealed that the footing for the tall, western basement wall had been poured directly on dense, glacially-compressed silt. This soil is consistent with the hard silt encountered at a depth of approximately 10 feet in Boring 4, which was conducted near the southwest corner of the garage as a part of our *Study*. The foundations for the west side of the northern crawl space porticoes of the structure do not lie as far below the surrounding ground surface. Test holes conducted in front of the western foundations of the crawl space area found less competent weathered silt that was somewhat disturbed and contained organic fragments.

CONCLUSIONS

Based on the recent test holes, it is our professional opinion that the western basement wall in the south half of the house bears on competent, glacially-compressed soil that can support the loads from the remodeled structure. <u>This wall does not need to be underpinned with pipe piles.</u>

The remainder of the existing foundations, as well as any new ones that are constructed as a part of the remodel, will have to be supported on pipe piles or small wide-flange beams driven into the glacially-compressed silt. Recommendations for these deep foundations are presented in our above-referenced *Geotechnical Engineering Study*.

The remainder of the geotechnical conclusions, as well as the ***Critical Areas Discussion***, presented in our February 23, 2024 *Study* are still applicable to the project.

CONVENTIONAL FOUNDATIONS

An allowable bearing pressure of 4,000 pounds per square foot (psf) is appropriate for evaluation of the footing that supports the western wall of the basement. A one-third increase in this design bearing pressure can be used when considering short-term wind or seismic loads.

Lateral loads due to wind or seismic forces may be resisted by friction between the foundation and the bearing soil, or by passive earth pressure acting on the vertical, embedded portions of the foundation. For the latter condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level, well-compacted fill. We recommend using the following ultimate values for the foundation's resistance to lateral loading:

PARAMETER	ULTIMATE VALUE
Coefficient of Friction	0.40
Passive Earth Pressure	300 pcf

Where: pcf is Pounds per Cubic Foot, and Passive Earth Pressure is computed using the Equivalent Fluid Density.

The above ultimate values for passive earth pressure and coefficient of friction do not include a safety factor.

Please contact us if you have any questions regarding this letter.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

7/15/2024
Marc R. McGinnis, P.E.
Principal

cc: **Gelotte Hommas Drivdahl Architecture** – David Grubb
via email: davidg@ghdarch.com

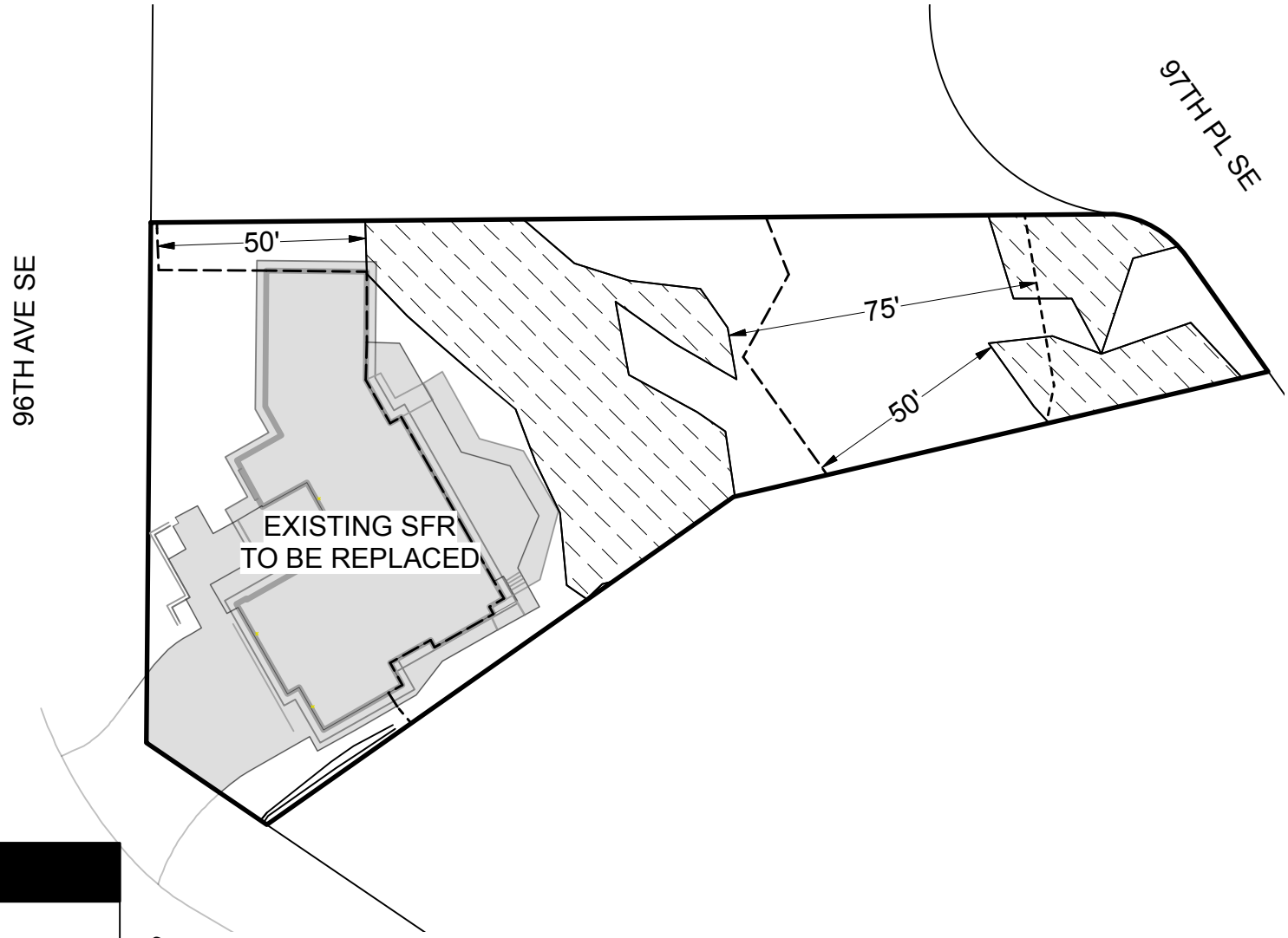
MRM:kg

APPENDIX B:
CRITICAL AREAS REPORT – EXISTING CONDITIONS MAP (SHEET 1/2)

CRITICAL AREAS REPORT - EXISTING CONDITIONS MAP

MILLER RESIDENCE

PORTION OF SECTION 31, TOWNSHIP 25N, RANGE 5E, W.M.



Scale 1" = 40'

0 20 40 60 80

LEGEND

- STEEP SLOPES ≥40%
- TOP OF SLOPE BUFFER
- TOE OF SLOPE STRUCTURE SETBACK
- EXISTING DEVELOPMENT

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

Existing Conditions Map
MILLER RESIDENCE
BELLEVUE, WA

Sheet 1/2
Andrew and Heidi Miller
9600 SE 7th Street
Bellevue, WA 98005

WRI #: 24161
Drawn by: JG
Revision 1: 08.27.2024