



Critical Area Work Permit Checklist

ENVIRONMENTALLY CRITICAL AREAS

Lake Forest Park Municipal Code 16.16 regulates development in or near environmentally critical areas. Refer to specific critical areas information bulletins or read the code for more detailed information on specific critical areas and their requirements. Major and minor activities are defined in LFPMC 16.16.080- check one below:

- Minor Critical Area Permit
- Major Critical Area Permit

It is the applicant's responsibility to disclose the presence of critical areas to the Planning Department.

Critical Areas are defined as:	
Wetlands	Streams
Fish and wildlife habitat conservation areas	Areas with a critical recharging effect on aquifers (CARA)
Steep-slope hazard areas	Erosion hazard areas
Landslide hazard areas	Seismic hazard areas

All buffers associated with critical areas are included in the definition of critical areas.

Along with your application, please provide **(2) hard copies and (1) electronic copy** of the following components:

N/A

- APPLICATION FORM** *See Attachment A*
- SITE PLAN -1"=20' Scale Including:** *See Attachment B*
 - All existing structures on the site, and an indication of whether they will be removed or retained
 - Existing and/or proposed property lines of the site
 - Proposed access to each proposed lot on the site, including vehicular, emergency and utility access
 - Existing and proposed easements and rights-of-way across the site
 - The location of all property lines abutting or connecting to the site, and the owners of adjacent land
 - Location of all public and/or private utility service lines, including water, sewer, storm, and underground telephone or cable service lines
- N/A** Identification of the source of water supply for each lot, including water line and fire hydrant locations
- N/A** Identification of the method of sanitary sewage disposal, including sewer lines
- N/A** Location of existing and proposed stormwater control/conveyance on or across the site

No water, sewer or stormwater involvement

- All environmentally critical areas and their buffers, and /or building setbacks
- The location, ownership, width and name, where applicable, of all existing and proposed access drives, streets, public ways, easements, or other rights-of-way and watercourses within the plat and within two hundred feet of the plat
- Name, address, telephone number and official seal of the licensed professional engineer
- Contour lines in areas to be developed shall be at two-foot intervals, or as specified by the city engineer. Five-foot intervals may be used in areas not to be developed. (see WAC 332-130-145)
- All contour lines shall be extended into adjacent property at least 100 feet to show the topographical relationship of adjacent property to the proposed development **Grading not proposed.**
- Typical cross-sections of the proposed grading
- A legend identifying all existing and proposed boundary lines, drainage facilities, utilities, roadway sections, erosion control facilities, grading, critical areas, buffers, and other required items specified above
- Topographical information must be created within one year of submittal date
- Provide detailed studies, as required
- Indicate the presence or absence of fish and wildlife habitat (see page 2)
- Critical area studies shall incorporate the best available science and include a Statement of Qualification

- GRADING AND EXCAVATION PLAN- 1"=20' Scale Including:** *See Attachment B*

In addition to the above, you must provide the following information (some plans may be required to be prepared by professional engineer licensed in the State of Washington):

- Topographical map with contour lines at five (5) foot intervals
- Designate areas involving land clearing, filling, land cuts or excavation

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- Identify the amount of excavation, fill, and removal of material in cubic yards
- Locate all significant trees (6" diameter or greater) and identify type and size
- Designate those trees to be removed and those to be protected
- Identify areas to be revegetated and/or restored. Provide plant types and methods

EROSION CONTROL PLAN (IF APPLICABLE)- 1"=20' N/A

Scale Including: **See Attachment C (TESC Plan)**

This may include erosion and sedimentation control, vegetation management plan, landscape plan, restoration plan, etc. (some plans may be required to be prepared by a licensed professional engineer in the State of Washington):

- Locate areas that erosion and sedimentation control devices are to be installed
- Include details for silt fence or any other mechanisms
- Identify areas to be revegetated or restored, types of vegetation and timing for implementation

No drainage improvements proposed.

N/A DRAINAGE PLAN-1"=20' Scale Including:

- This should be prepared by a professional engineer licensed in the State of Washington
- Drainage requirements, systems and techniques must comply with the King County Surface Water Design Manual, as adopted by the City of Lake Forest Park.

N/A MITIGATION & MONITORING PLAN- 1"=20' Scale Including: **No mitigation or monitoring required.**

Mitigation of impacts to critical areas shall be conducted according to an approved mitigation plan that describes:

- Existing functions and values of the affected critical areas
- The nature and extent of impacts to those areas
- Proposed mitigation measures to offset those impacts
- Plant materials and other habitat features to be installed

It should also include:

- A drawing that illustrates the compensatory mitigation elements

The applicant shall submit a monitoring and maintenance program prepared by a qualified professional that shall, at a minimum, include the following:

- N/A** The goals and objectives for the mitigation plan
- N/A** The criteria for assessing the mitigation As well as a monitoring plan that includes:
- N/A** A contingency plan
- N/A** A signed copy of the written contract with a qualified professional who will perform the monitoring program, which incorporates the terms of the monitoring program

TREES AND ON-SITE VEGETATION (LFPMC

16.14). 1"=20' Scale Including:

- N/A** Tree Inventory. A tree inventory prepared by a qualified arborist that includes the following information, at minimum, for all on-site significant trees and any off-site significant trees that may be impacted by proposed development: information on tree species, diameter at breast height, critical root zone, interior critical root zone, condition (health), risk level, existing and proposed canopy coverage.

- N/A** A scaled (1"=20') site plan detailing the location of property lines, critical areas and buffers, critical and interior critical root zones of all trees, existing and proposed utilities, 2 foot contours, and existing and proposed structures

- N/A** Arborist Report. An arborist report to include, at minimum, trees in the vicinity of construction that could be impacted by the proposed development activity, trees to be removed and protected, tree protection fence location, timeline for tree protection activities, list of protection measures and conditions to be taken during all development activities to ensure code compliance during development activities.

- N/A** Trees proposed for removal shall provide a report from a certified Arborist consistent with applicable portions of LFPMC 16.14.

CRITICAL AREA REPORT (SEE BELOW FOR SPECIFIC TYPE) See Attachment D

Critical area studies must be in writing and:

- Identify and characterize the critical area(s) as part of a larger development proposal site
- Assess all hazards posed by the development proposal to any critical areas or critical area buffers on or adjacent to the proposed site

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Lake Forest Park, WA 98155
206-368-5440

- Propose adequate mitigation, maintenance, monitoring and contingency plans and bonding measures, if necessary
- Provide a to-scale map of the development proposal site

No FWHCA
mapped in
the vicinity.

N/A **FISH & WILDLIFE HABITAT CONSERVATION AREAS**

If the presence of fish & wildlife habitat has been noted, a critical area work study for a fish & wildlife habitat area is required and must include:

- Identification of any fish and wildlife habitat conservation areas and assessment of potential project impacts to the area
- A discussion of any federal, state, or local special management recommendations, including Washington Department of Fish and Wildlife habitat management recommendations, that have been developed for species or habitats located on or adjacent to the project area
- A discussion of any ongoing management practices that will protect habitat after the project site has been developed, including any proposed monitoring, maintenance, and adaptive management programs
- When appropriate, because of the type of habitat or species present or the project area conditions, the Planning Director may also require the habitat management plan to include an evaluation by the Washington Department of Fish and Wildlife or other qualified professional regarding the applicant's analysis and the effectiveness of any proposed mitigating measures or programs, to include any recommendations as appropriate
- Such other information that is required in the judgment of the Planning Director

N/A **WETLANDS** No activities proposed in wetlands or buffers.

If the presence of wetland habitat has been noted, a critical area work study for wetland areas is required and must include:

- A wetlands delineation and categorization report from a qualified professional that classifies the wetland area, and depicts its location and buffer graphically. The report shall contain information on proposed project impacts, performance standards, and mitigation and monitoring (if required). See LFPMC 16.16.110)

N/A **STREAMS** No streams in vicinity.

If the presence of stream habitat has been noted, a critical area work study for stream areas is required and must include:

- A stream delineation and categorization report from a qualified professional that classifies the stream area, and depicts its location and buffer graphically. The report shall contain information on proposed project impacts, performance standards, and mitigation and monitoring (if required). See LFPMC 16.16.110)
- GEOTECHNICAL** See Attachment E for Geotech Report
If the presence of geological critical habitat has been noted, a critical area work study for geological areas is required and must include:
 - A geotechnical report from a Washington State licensed geotechnical engineer that classifies the critical area pursuant to LFPMC 16.16.040 (G), (J), (W), and/or LFPMC 16.16.300. The report shall also discuss and analyze the proposed project impacts, analyze each specific alteration criteria, and discuss mitigation and monitoring provisions

N/A **AQUIFER RECHARGE AREAS** No activities proposed in CARAs

If the presence of aquifer recharge habitat has been noted, a critical area report for aquifer recharge areas is required and must include:

- A critical area report that designates and provides development standards for all aquifer recharge areas per LFPMC 16.16.410-420.

- (2) sets of the names and mailing addresses in written and electronic format of the owners and residents of adjacent property within 300 feet along with pre-stamped, addressed envelopes

The Planning Director may require information from the applicant in addition to the critical area study as necessary to ensure compliance with Environmentally Critical Area code

The envelopes for adjacent properties will be delivered to the LFP Planning Department. Electronic format of names and mailing addresses is attached to the email that accompanied this submittal.

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Access to Information

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<http://www.cityoflfp.com/>

Paper copies of all of the above are available at City Hall:
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206-368-5440

Sound Transit Major Critical Area Permit Application Attachments

Attachment A Application Form

Attachment B Site Plans

Attachment C TESC Plan

Attachment D Critical Areas Report

Attachment E Geotech Report

**ATTACHMENT A: CRITICAL AREA WORK PERMIT FORM
AND SIGNED AUTHORIZATION OF APPLICATION**

Critical Area Work Permit Application



17425 Ballinger Way NE
Lake Forest Park, WA 98155
206-368-5440

Permit # *Staff use*

Project Description:		
Property Owner:		
Project Address:		
Phone:		Email:

Authorized Agent:		
Address:		
Phone:		Fax:

General Contractor:		
Address:		
Contact:		
Phone:		Fax:
State License #:		Exp:
City License #:		Exp:

PERMIT APPLICATION FEES

Fees must be paid at time of application

Major Permit -----	\$550	
Tree-Related -----	\$125	
Public Notice Signage Fee		\$ 200
\$25 addtl. Signage fee if property abuts 2 streets		

Minor Permit*-----	\$85	
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*For projects performed only by light equipment
and authorized by an exception listed in [LFPMC 16.16.230](#) or setback
exceptions of [16.16.240](#)

Drainage Review Fee	
Projects with an engineering plan -----	\$300
Projects w/o an engineering plan -----	\$600
	SUBTOTAL
Technology Fee 5% of Subtotal	
	TOTAL DUE

<i>Staff use</i>	<i>Date Stamp</i>
	<i>Paid Stamp</i>

<p>Describe the nature of the proposal. Indicate as much specific information as possible. What is proposed? How much are you proposing? How long will the work take? How will the use of the property be changed? Future plans?</p>
<p>Work activities will involve borehole drilling for geotechnical investigations to inform project design. A drill rig using hollow stem auger will be used and soil sampling will occur to the depth explored. Disturbance will be minimized to less than 300 square feet. Excavation quantity of the location will be under 75 cubic feet. Work activities at BH-78 will be west of SR 522 between the intersections of 39th Ave NE and NE 165th Street on the privately owned residential parcel (7740100075). Work will take 4 to 8 hours to complete. The boring will occur at the top of a slope toward the house. The locations will be accessed through the parcel from 39th Avenue NE. The property will not change and disturbed work areas will be restored to the condition prior to work. The drilling contractor will be under the supervision of a geotechnical engineer or geologist.</p>
<p>What is/are the environmentally critical areas on or near the site? (steep slopes, erosion hazard, landslide hazard, wetland, stream corridor, seismic hazard, flood hazard, shorelines)</p>
<p>Work at BH-78 will occur within a mapped environmentally critical area for erosion soil hazards, as shown on the detailed Site Plan (Attachment B).</p>
<p>Describe the character of the site. Is the site sloped or flat? Is the site wooded and vegetated, cleared or landscaped? What is the current use of the site? Describe the surrounding areas (undeveloped, residential, commercial)</p>
<p>The work area is sloped and vegetated with brush (no trees). The boring will be accessed along the existing path on the north side of the property and inside of the eastern property fence. The surrounding area is residential.</p>
<p>How close to environmentally critical areas will the work be being done?</p>
<p>The work will be done within a mapped ECA for erosion hazards as shown on the detailed Site Plan (Attachment B).</p>
<p>How will the proposal impact the environmentally critical areas on or off site?</p>
<p>The work activities at BH-78 will not have permanent impacts to the ECA. No trees are present in the work area vicinity and minor vegetation removal to ground level will be minimized within the work area. No grubbing is needed.</p>
<p>Describe any mitigating factors. How do you propose to accommodate drainage? How do you propose to reduce erosion? Are there any measures for reducing impacts, such as erosion control, drainage retention, revegetation, restoration, noise, etc.?</p>
<p>Work will be completed to minimize work area disturbance. Temporary erosion control measures will be implemented in accordance with the Stormwater Management Program (LFP 2020). See TESC Plan, (Attachment C), for detailed measures. Plywood sheets or plastic mats may be used as necessary to minimize ground disturbance. Use of limited temporary erosion control measures (e.g., straw waddles and silt fences) will be employed, as appropriate. Work areas will be restored to the existing condition and any ruts will be repaired, as necessary. The borehole will be backfilled in accordance with Department of Ecology requirements.</p>

Is the site within 200 feet of the shoreline of Lake Washington?
No

Authorization of Application



17425 Ballinger Way NE
Lake Forest Park, WA 98155
206-368-5440

Permit #

Staff Use

I, Tracey Budden, Brady Anderson, being the property owner of the below described parcel of land, hereby authorize Sound Transit to act as my agent and on my behalf for the purpose of making application to the City of Lake Forest Park for the following described action:

Proposed action includes drilling of one borehole (BH-78) with a limited-access drill rig using a hollow stem auger. Boreholes will be up to 50 feet in depth and 4 to 8 inches in diameter.

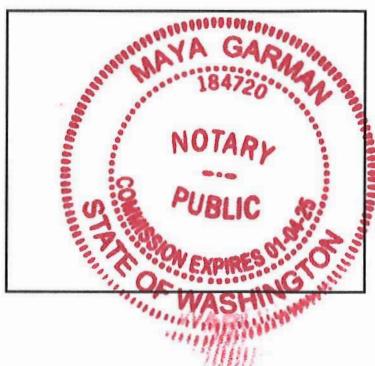
Property Description:

Legal description: LOT 15, BLOCK 1, SHERIDAN HEIGHTS, AS PER PLAT RECORDED IN VOLUME 33 OF PLATS, PAGE 33, RECORDS OF KING COUNTY, WASHINGTON.

Tax Parcel Number: 7740100075Address: 16294 39TH AVE NE, Lake Forest Park, WA 98155Signature: Tracey Budden, Brady AndersonDate: 10/19/2022State of Washington)
) ss

County of King)

On this day personally appeared before me, Tracey Budden and Brady Anderson Known to be the individual described in and who executed the within and foregoing instrument, and acknowledged that he/she signed the same as a free and voluntary act and deed, for the uses and purpose therein mentioned.

Given under my hand and official seal this 19 day of Oct 2022

Notary Public in and for the State of Washington

Signature: Maya GarmanMy appointment expires: 1/4/2025

Release / Hold Harmless Agreement

I, the undersigned, his/her heirs and assigns, in consideration for City processing the application agrees to release, indemnify, defend and hold the City of Lake Forest Park harmless from any and all damages and/or claims for damages, including reasonable attorney's fees, arising from any action or inaction as based in whole or in part upon false, misleading or incomplete information furnished by the applicant, his agents or employees.

The undersigned acknowledges that this application is for a permit from the City of Lake Forest Park; that any permit issued by the City as a result of this application establishes only that the applicant's project complies with City ordinances and regulations; and that other State and Federal laws and regulations, particularly the Endangered Species Act, U.S.C. 16.31, et. seq., may apply to this project. The undersigned further acknowledges and accepts responsibility for complying with such other laws and regulations and agrees to release the City of Lake Forest Park, indemnify and defend it from any claim, damages, injuries, or judgments, including reasonable attorney's fees, arising from or related to violations of such other laws or regulations.

Qualified Professional Requirements

For each section of this application that was required to be prepared by a professional, please include a Statement of Qualification along with this application.

Permission to Enter Subject Property

I, the undersigned, grant his/her or its permission for public officials and staff of the City of Lake Forest Park to enter the subject property for the purpose of inspection and posting attendant to this application.

Date: Dangelsi Fox

Signature of Applicant,
Owner, or Representative: 2/16/2023

Sound Transit, Applicant

Questions?

For more information, please contact the Planning Department
aplanner@cityoflfp.com
206-957-2837

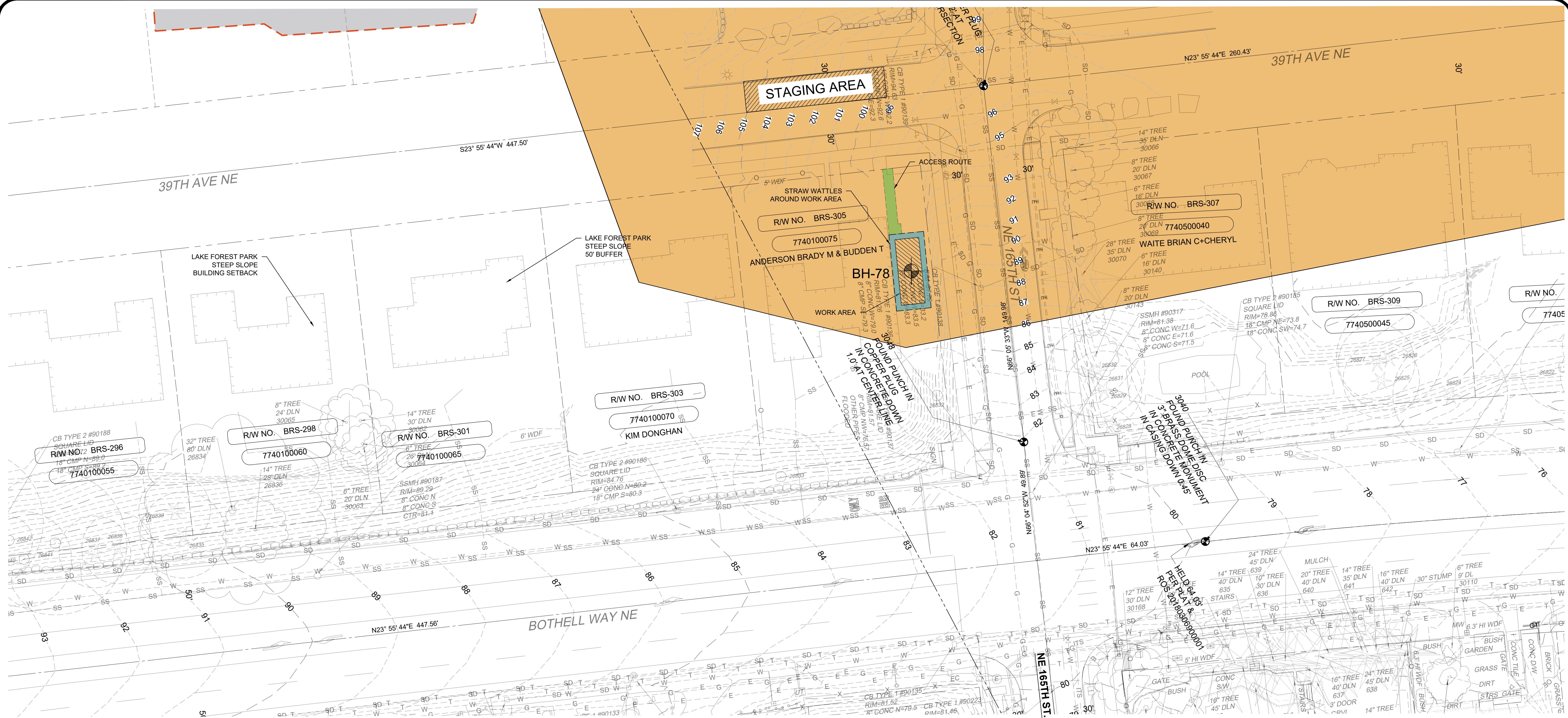
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SEE SIGNED AUTHORIZATION OF
APPLICATION FORM

ATTACHMENT B: DETAILED SITE PLAN


LEGEND:

- BH-78** PROPOSED BOREHOLE DESIGNATION AND APPROXIMATE LOCATION
- WORK AREA
- ACCESS ROUTE
- MAPPED LANDSLIDE HAZARD AREA w/ 50-FOOT BUFFER
- MAPPED EROSION HAZARD AREA
- SLOPES GREATER THAN 40% IN LAKE FOREST PARK
- 50-FOOT BUFFER / 15-FOOT SETBACK FROM MAPPED SLOPES GREATER THAN 40% IN LAKE FOREST PARK
- STRAW WATTLES AND SILT FENCE
- EASEMENT LINE
- EXISTING ROW / PROPERTY LINE
- EXISTING STREAM BUFFER
- EXISTING STREAM
- CREEK / STREAM BUFFER

- SLOPE AND DRAINAGE EASEMENT
- EXISTING BUILDING
- EXISTING STORM
- EXISTING SANITARY SEWER
- EXISTING WATER
- EXISTING ELECTRICAL (BURIED)
- EXISTING TELEPHONE (BURIED)
- EXISTING TELEPHONE (OVERHEAD)
- EXISTING TELEPHONE POLE
- STORM/SEWER MANHOLE
- EXISTING POWER POLE



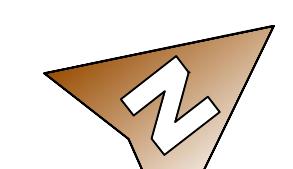
HWAGEOSCIENCES INC.
DBE/MWBE
21312 30th Dr. SE, Suite 110
Bothell, WA 98021
425-774-0106

BASE MAP PROVIDED BY: JACOBS

F:\HWAGeoscience\522 BRT (LFP) SITE\SR-522 BRT (LFP) SITES 10.28.2022.DWG <BH-78> Plotted: 11/10/2022 10:49 AM

NOTES:

1. BORING LOCATED WITHIN A MAPPED EROSION HAZARD AREA.
2. ALL STRUCTURES SHOWN ARE TO REMAIN.
3. EXCAVATION QUANTITY OF BORING BH-78 IS 40 CUBIC FEET.
4. TEMPORARY EROSION AND SEDIMENT CONTROL BMP'S TO CONSIST OF STRAW WATTLES PLACED AROUND WORK AREA.
5. NO IMPACT TO TREES OR CRITICAL ROOT ZONES.



0 10 20 30 40

SCALE: 1" = 20'

SR 522 / NE 145th St. Bus Rapid Transit
KING COUNTY, WASHINGTON

**CRITICAL AREA
SITE PLAN
(BH-78)**

DRAWN BY:

CF

FIGURE NO.:

BH-78

CHECK BY:

SKS/JLG

PROJECT NO.:

2021-133-21

**ATTACHMENT C: TEMPORARY EROSION AND
SEDIMENT CONTROL PLAN**

ATTACHMENT C – TEMPORARY EROSION AND SEDIMENT CONTROL PLAN

This Temporary Erosion and Sediment Control (TESC) plan has been developed to support the planned geotechnical boring program. Soil from the drilling activities will be collected in bags or hard plastic liners and taken off site for analysis. Soil cuttings produced through drill activities will be drummed and transported off site. Care will be used by drillers and site personnel to prevent tracking soil outside of the work zone. Soil will be immediately swept if it is tracked out onto the paved ROW. Each site will be restored to the extent possible to the pre-drilled condition at the completion of each boring.

Detailed elements describing the temporary Best Management Practices (BMPs) selected for erosion and sediment control during drilling are presented below.

TESC Element #1: Establish Construction Access

The access to the boring locations for this project will be from existing paved roadways. If applicable, plywood or plastic mats will be used to access drilling locations if soil is wet or soft to reduce rutting and ground disturbance. There is a potential for soil on the drill rig to be tracked onto road surfaces. The drilling crews will immediately sweep the roadway to prevent soil from migrating off site.

PHYSICAL BMPs:

- Stabilize construction entrance and roads (temporary mats)
- Street cleaning

TESC Element #2: Establish Construction Limits

To protect adjacent improvements and to reduce the area of soil exposed during drilling, the limits of work areas will be clearly identified with cones or high visibility markers prior to moving the drill rig into position.

PHYSICAL BMPs:

- Flag work area limits (cones and/or high visibility markers)

TESC Element #3: Control Flow Rates

Not applicable because runoff will not increase above normal conditions. Any drilling water or mud will be contained during drilling activities and transported off-site for disposal.

TESC Element #4: Install Sediment Controls

Install applicable sediment control BMPs prior to drilling. Sediment-laden runoff is not allowed to discharge from the work area without passing through BMPs. Silt fence, straw wattles, and/or filter berms will be deployed downslope of work areas, as appropriate.

PHYSICAL BMPs:

- Silt fence
- Straw wattles
- Street cleaning
- Preserving natural vegetation
- Filter berm (gravel, wood chips, or compost)

TESC Element #5: Stabilize Soils and Surface Restoration

Exposed soils will be stabilized with the application of effective BMPs to prevent erosion from wind, raindrops, and flowing water. Selected soil stabilization measures must be appropriate for the time of year, site conditions, and estimated duration of use. On sites with existing vegetation, the vegetation will be retained in an undisturbed state to the maximum extent possible. No trees will be removed, although branches or brush (such as blackberry vines) may be trimmed. Any disturbed areas will be restored to their original condition. Seeding and mulching may be used to stabilize disturbed areas once work has been completed.

PHYSICAL BMPs:

- Preserve vegetation
- Dust control
- Plastic sheeting
- Seeding and planting
- Rake disturbed areas and repair ruts, as necessary.
- Spread topsoil and seed with a native upland seed mix, as needed.
- Cover disturbed and seeded areas with compost or mulch, as needed.

TESC Element #6: Protect Drain Inlets

Runoff is not expected to reach the roadway from vegetated areas. Work areas will be kept clean during drilling activities. If necessary, check dams or straw wattles will be used to provide secondary containment around work areas.

PHYSICAL BMPs:

- Check dams
- Straw wattles

TESC Element #7: Control Pollutants

All pollutants, including waste materials and drilling debris that occur during drilling, will be handled and disposed of in a manner that is consistent with practices that do not cause contamination of stormwater, surface water or groundwater. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well-organized, and free of debris.

A spill response kit will be located on the drill rig or supply truck for rapid and easy access. Any equipment leaks from a fuel tank, equipment seal, or hydraulic line will be contained within a spill pad placed beneath potential leak sources. The spill response kit will include plastic sheeting, absorbent pads, kitty litter, and shovels. The contractor will be prepared to excavate and remove impacted soil if a spill occurs.

Maintenance and repair of drilling equipment and vehicles will be performed to the extent practical at off-site locations. Maintenance and repair at on-site locations must be conducted using spill prevention measures such as drip pans, temporary impermeable liners, absorbent pads, and other appropriate methods. Contaminated surfaces will be cleaned immediately following any discharge or spill incident. Emergency repairs may be performed on-site using temporary plastic placed beneath, and if raining, over the vehicle.

PHYSICAL BMPs:

- All vehicles, equipment, and petroleum product storage/dispensing areas will be inspected regularly to detect any leaks or spills, and to identify maintenance needs to prevent leaks or spills.

TESC Element #8: Control Dewatering

Not applicable because no dewatering will occur during drilling. Water needed for drilling will be recirculated and collected in drums and transported off-site for permitted disposal.

TESC Element #9: Maintain BMPs

All temporary and permanent erosion and sediment control BMPs will be maintained for the duration of the drilling at each work area. The driller and field inspector will inspect the containment daily, and make repairs as needed. Maintenance and repair will be conducted in accordance with each particular BMP specification.

All temporary erosion and sediment control BMPs will be removed within 30 days after the final site stabilization is achieved or after the temporary BMPs are no longer needed. Disturbed soil resulting from removal of BMPs or vegetation will be permanently stabilized.

TESC Element #10: Project Management

Temporary erosion and sediment control BMPs for this project have been designed based on the following principles:

- Confine the work area to the improved ROW or road surface, when possible.
- Preserve vegetation and minimize disturbance and compaction of native soil.
- Emphasize erosion control rather than sediment control.
- Minimize the extent and duration of the area exposed.

Property Access Plan – Critical Areas

- The TESC plans will be kept on-site or within reasonable access to the site.

**ATTACHMENT D: CRITICAL AREAS
REPORT**

To: Steve Bennett, Director of Community Development, City of Lake Forest Park
From: Sound Transit
Date: February 10, 2023
Subject: Geotechnical Investigation and Exploration - SR 522/145th Bus-Rapid Transit

Sound Transit proposes to conduct geotechnical site investigation fieldwork to support the SR 522/145th Bus-Rapid Transit project design activities. Proposed fieldwork includes one geotechnical borehole in the City of Lake Forest Park (LFP) that are within a mapped Environmentally Critical Area (LFP Municipal Code [LFPMC] 16.16). LFP regulates the following critical areas per LFPMC 16.16: wetlands; streams; critical aquifer recharge areas; fish and wildlife habitat conservation areas; frequently flooded areas; and geologically hazardous areas such as erosion hazard areas, landslide hazard areas, seismic hazard areas, and steep slope hazard areas.

The proposed boring location addressed in this package (**BH-78**) is intended to support final design. The work location is on private parcel number 7740100075. The purpose of this technical memorandum is to describe any alterations to critical areas resulting from these fieldwork activities. Work activities will not permanently impact critical areas or associated buffers. Temporary vegetation impacts will be minor and limited to minor brush removal.

WORK ACTIVITIES AND EQUIPMENT

At the proposed boring location, soil samples will be obtained using Standard Penetration Tests at 2.5- or 5- foot intervals to the depth explored. A drill rig with a hollow-stem auger will be utilized for the boring about 4 to 8 inches in diameter to a target depth between 10 to 90 feet. The site access and work area preparation for the borehole location are summarized in the following sections.

Boring BH-78

One borehole— BH-78 (see Site Plan, Attachment B)—will require moderate preparation of the site for a work area and access. The work area will be centered around the borehole location, with an approximate disturbance area of less than 300 square feet. Site-specific equipment, access and work area preparation activities for the borehole location are outlined below and are further detailed in the Site Plan(Attachment B):

- BH-78 will be drilled west of SR 522 between the intersections of 39th Avenue NE and NE 165th Street on the privately owned Parcel No. 7740100075 adjacent to the SR 522 ROW. The surrounding area is moderately vegetated with brush and no trees are in the work area vicinity. The proposed boring is adjacent to the house on the northern end of the property. BH-78 is located in an erosion hazard area.

CRITICAL AREAS STUDY

In accordance with LFPMC 16.16.230.A, work activities such as this geotechnical investigation require a Critical Areas Work Permit. Authorization of work under this permit is allowed if there is no construction of new access roads and if excavation activities are limited to no more than 10 cubic yards of material. The work in critical areas requires that impacts to critical areas and buffers be minimized and disturbed areas be immediately restored. Major permits, as defined in LFPMC 16.16.080, require a critical areas study. Per LFPMC 16.16.110, critical areas studies are to identify and characterize critical areas or buffers on or adjacent to the proposed work and to demonstrate that all reasonable efforts have been made to avoid, minimize, and restore temporary impacts.

This critical areas study was prepared under the direction of Emily Drew, who exceeds the requirements for a qualified professional as defined by LFPMC 16.16.040. Emily Drew is a trained wetlands professional and a WSDOT-certified biological assessment writer. She has 25 years of experience, including 8 years of permitting work in wetlands and streams.

Wetlands

LFP defines wetlands in LFPMC 16.16.040 as follows:

Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Methodology and Findings

As part of the State Environmental Policy Act (SEPA) process, David Evans and Associates, Inc. (DEA) biologists conducted a desktop analysis and a wetland reconnaissance and formal delineation in 2019 and 2020, documented in the Ecosystems Technical Report (DEA 2021). Wetlands were rated based on the Washington State Department of Ecology's (Ecology) 2014 wetland rating system (Hruby 2014).

In the LFP jurisdiction, four Category III wetlands within 300 feet of the project's corridor or project elements were identified, formally delineated and rated. Buffers were mapped around the wetland boundaries based on their Ecology ratings and LFPMC 16.16.320. These wetlands are Category III under the Ecology 2014 rating system; LFP regulates 105-foot standard buffers around Category III wetlands.

Wetlands Impact Avoidance and Minimization

No impacts to wetlands or wetland buffers are proposed as a result of BH-78.

Streams

LFP defines streams in LFPMC 16.16.040 as follows:

An area where open surface water produces a defined channel or bed, not including irrigation ditches, canals, storm or surface water runoff devices, or other entirely artificial watercourses, unless they are used by salmonids or are used to convey a watercourse naturally occurring prior to construction. A channel or bed

need not contain water year-round, provided there is evidence of at least intermittent flow during years of normal rainfall.

Methodology and Findings

As part of the SEPA process, DEA biologists conducted a desktop analysis and a stream reconnaissance in 2019 and 2020 (DEA 2021). During the reconnaissance, information was collected about the condition of instream and riparian habitats and the ordinary high water mark of stream reaches that occurred within the study area were identified.

BH-78 is not located within a stream buffer or stream.

Critical Aquifer Recharge Areas

LFP regulates designated critical aquifer recharge areas, which are defined as those areas within the 10-year, time-of-travel zones for Group A public water supply wells. These areas are identified in LFP's critical aquifer recharge area map (LFPMC 16.16.050). These areas are also visible in King County's iMap GIS database (n.d.) on LFP water district data. BH-78 is not proposed in a critical aquifer recharge area and therefore will not adversely affect recharging of the aquifer or cause contaminants to enter the aquifer, consistent with LFPMC 16.16.420.

Frequently Flooded Areas

LFP regulates flood hazard areas under LFPMC 16.20. Based on King County's iMap database (n.d.), a regulated floodplain is present along McAleer Creek and Lyons Creek in the project corridor. BH-78 is not located within these mapped floodplains.

Fish and Wildlife Conservation Areas

LFP defines fish and wildlife habitat conservation areas in LFPMC 16.16.040 as follows:

An area that is managed for maintaining populations of species in suitable habitats within their natural geographic distribution so that the habitat available is sufficient to support viable populations over the long term and isolated subpopulations are not created, as defined in WAC 365-190-130 and RCW 36.70A.030. Fish and wildlife habitat conservation areas also include nonaquatic areas that serve a critical role in sustaining needed habitats and species for the functional integrity of the ecosystem, and which, if altered, may reduce the likelihood that the species will persist over the long term. These areas may include, but are not limited to, rare or vulnerable ecological systems, communities, and habitat or habitat elements including seasonal ranges, breeding habitat, winter range, and movement corridors; and areas with high relative population density or species richness.

Methodology and Findings

The Ecosystems Technical Report (DEA 2021) prepared for the SEPA effort included analysis of fish and wildlife habitat. The report identified that most of the project corridor in Lake Forest Park is developed. There are forested patches in specific areas, such as the buffers of Bsche'tla Creek, McAleer Creek, and Lyon Creek. Forested area is also present along 41st Avenue NE along the Burke-Gilman Trail. Fish habitat is also present in these creeks. The City of Lake Forest Park does not identify any specific habitats or species of local importance.

BH-78 is not located in a fish and wildlife habitat conservation area.

Geologic Hazard Areas

LFP defines **erosion hazard areas** in LFPMC 16.16.040.G as follows:

An area with soil characteristics that, according to the USDA Soil Conservation Service Soil Classification System, may experience severe to very severe erosion hazard, including slopes greater than 15 percent with erodible soils that are exposed. Any activity which exposes erodible soils to rainfall or running water will create erosion hazard conditions on slopes greater than 15 percent. Soils which are particularly susceptible to erosion include fill constructed of virtually all soil types, loose sandy native soils such as Vashon recessional outwash (Qvr), Esperance sand (Qe), Vashon till (weathered Qvt), and the dense fine-grained clay (Qcl). Improper fill methods, especially near flowing water, can produce an erosion hazard in areas not identified as hazard areas.

LFP defines **steep slope hazard areas** in LFPMC 16.16.040.W as follows:

Slopes that are not composed of consolidated rock with slope gradients of 40 percent or greater within a vertical elevation change of at least 10 feet.

LFP defines **landslide hazard areas** as in LFPMC 16.16.040.J as follows:

Slopes that are potentially subject to landslides. All landslide hazard areas are classified as: "Class I": a slope that is less than 15 percent and is considered relatively stable; "Class II": a slope that is greater than 15 percent and is underlain by permeable soils that are relatively stable in their natural state but may become unstable if slope configurations or draining conditions are modified; "Class III": a slope that is greater than 15 percent and is underlain by impermeable soils, and may be characterized by springs or seeping groundwater during the wet season.

"Landslide hazard areas" include Class II and Class III if any of the following are present: a. Any area that has shown movement during the Holocene epoch (from 10,000 years ago to present) or which is underlain by significant waste debris of that epoch; or b. An area potentially unstable as a result of rapid stream incision, stream bank erosion or undercutting; or c. Any area located on an alluvial fan or delta potentially subject to inundation by debris flows; or d. Any area with a slope of 40 percent or greater and with a vertical relief of 10 or more feet except any area composed of consolidated rock.

LFP regulates the following buffer areas around geological hazard areas:

- **Steep slope hazard areas** are to have a minimum buffer established at a horizontal distance of 50 feet from the top, toe, and sides of any slope 40 percent or greater. The buffer may be reduced to a minimum of 25 feet "when a qualified professional demonstrates to the planning director's satisfaction that the reduction will adequately protect the proposed development, adjacent developments, uses and the steep slope hazard area" (LFPMC 16.16.310).

- **Landslide hazard areas** are to have a minimum buffer of 50 feet from all edges of the area. These can be reduced to a minimum of 25 feet “when a qualified professional demonstrates to the planning director’s satisfaction that the reduction will adequately protect the proposed development, adjacent developments, and uses and the landslide hazard area” (LFFMC 16.16.290).

Methodology and Findings

Jacobs reviewed the following sources to determine the presence of geologically hazardous areas within the Lake Forest Park project area:

- LFP GIS data (n.d.)
- Ecosystems Technical Report (DEA 2021)
- U.S. Department of Agriculture, Natural Resources Conservation Service soils data (n.d.)

BH-78 meets the definition of an erosion hazard area.

Geologic Hazard Areas Avoidance and Minimization of Impacts

Erosion hazard areas will be temporarily altered by limited vegetation removal and drilling of a 4- to 8-inch-wide borehole up to 10 to 90 feet deep.

- **Erosion Hazard Areas:** Work proposed at BH-78 will have temporary impacts to vegetation but will not have temporary or permanent impacts to erosion soils.
- **Steep Slope Hazard Areas:** BH-78 is not located in a geological hazard area for steep slopes.
- **Landslide Hazard Areas:** BH-78 is not located in a geologic hazard area for landslide hazards.

Geologic Hazard Areas Impact Avoidance and Minimization

Avoidance is not possible because BH-78 is required for project design. Impacts to vegetation in the geologic hazard areas will be minimized as follows:

- A licensed engineering geologist will observe the operation.
- Vegetation removal and ground disturbance will be limited to the work area using light equipment.
- No trees will be removed.
- Any disturbed areas will be reseeded with native upland species.

Consistency with Applicable Geologic Hazard Areas Code Requirements

The applicable standards for development are described below in *italics*, followed by underlined text, describing how the Project would meet these standards.

Erosion Hazard Areas: LFFMC 16.16.280 outlines specific standards related to the alteration of erosion hazard areas.

A. Clearing is allowed between April 1st and September 30th.

Clearing work for the geotechnical borings will occur within this required time frame.

B. Development proposals shall include a temporary erosion control plan approved by the planning director.

Temporary erosion control measures will be implemented in accordance with the 2020 Stormwater Management Program for LFP.

I. Erosion control measures including but not limited to hydroseeding shall be required.

Use of limited temporary erosion control measures, such as straw waddles and silt fences, will be employed if sediment migration is anticipated due to proposed work. Any disturbed area will be reseeded with native upland species.

J. All development proposals shall include an erosion control plan consistent with this chapter and other adopted requirements prior to plan approval.

Plans for temporary erosion control are included in the TESC.

L. The use of pesticides, herbicides, fertilizers and hazardous substances in erosion hazard areas shall be prohibited unless demonstrated to the satisfaction of the planning director that special circumstances require their use. (Ord. 1150 § 1, 2017; Ord. 930 § 2, 2005)

Pesticides, herbicides, and fertilizers will not be used as part of the proposed work. Soil cuttings, drilling fluids, and other materials generated while drilling will be placed in drums and transported offsite for disposal. Although the spread of drilling fluids and cuttings beyond the work area are not anticipated, materials and equipment required for containment will be kept on hand to minimize the spread of the drill fluids and cuttings, if a spill occurred. The proposed work activities will not increase peak surface water flows or sedimentation to adjacent properties.

CONCLUSION

BH-78 is within an erosion hazard area. No permanent impacts to geologic hazard areas are anticipated. There is no tree removal or grubbing proposed in critical areas and associated buffers. Work will be completed to minimize work area disturbance and vegetation removal will use lightweight equipment whenever possible. In conclusion, the proposed geotechnical investigations will not impact critical areas.

REFERENCES

David Evans and Associates, Inc. (DEA). 2021. *Bus Rapid Transit SR522 Corridor Ecosystem Resources Technical Report*. Prepared for Sound Transit. March 2021.

Hruby, T. 2014. Washington State Wetland Rating System for Western Washington – 2014 Update. Publication #14-06-029. Olympia, WA: Washington State Department of Ecology.

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SR 522/145th BRT Project - Geotechnical Investigation and Exploration
February 10, 2023

U.S. Department of Agriculture, Natural Resources Conservation Service. n.d. Website.
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ATTACHMENT E: GEOTECHNICAL REPORT



November 1, 2022
HWA Project No. 2021-133-21

Jacobs
1100 112th Ave NE, Suite 500
Bellevue, WA 98004

Attn: **City of Lake Forest Park Community Development**
Subject: **CRITICAL AREA PERMIT JUSTIFICATION MEMORANDUM**
CUD #6 (NE 145th/SR 522 Road Improvements) 60% Design
Task Order Number: 007

HWA GeoSciences (HWA) has reviewed the following proposed alterations to steep slopes and landslide hazard areas for geotechnical investigations. Twelve proposed exploration borings and one pavement core location along the project route within the City of Lake Forest Park meet the definition of geologic hazard areas and are summarized in **Table 1**.

Table 1. Proposed drilling locations in geologic hazard areas

Borehole #	Geologic Hazard Area
BH-78	Erosion Hazard Area
BH-38, BH-44, BH-68	Steep Slope Hazard Area
C-13, BH-28, BH-29, BH-30, BH-31, BH-32, BH-33, BH-34, BH-35	Landslide Hazard Area

Alterations to Geologic Hazard Areas

The erosion hazard, landslide hazard, and steep slopes will be altered by limited vegetation removal and by drilling of 4 - 8 inch boreholes up to 50-90 feet in depth.

Erosion Hazard Areas: Work proposed at **BH-78** will have minor temporary impacts to vegetation but will not require removal of substantial amounts of vegetation and is considered extremely unlikely to result in temporary or permanent impacts to slope stability. Native vegetation will remain mostly intact and best management practices will be implemented as appropriate. Additionally, the work will occur after April 1, when clearing and grading operation are allowed by the City of Lake Forest Park as stated in the Lake Forest Park Municipal Code. HWA will be onsite at the time to monitor the work as it progresses and confirm that the work follows the recommendations for maintaining the stability of the work area and surrounding slopes.

Steep Slope Hazard Areas: Work proposed at **BH-38, BH-44, and BH-68** will have temporary impacts to vegetation but will not require removal of substantial amounts of vegetation and are considered extremely unlikely to result in temporary or permanent impacts to slope stability.

Tree impacts will be limited to minor branch trimming and ground cover will be trimmed to the surface as needed with no grubbing required. Out of an abundance of caution, **BH-68** has been included as falling within a Geologic Hazard Area. It was not identified as a steep slope hazard according to LFP hazard maps but, based on site reconnaissance, an existing retaining wall appears to meet the steep slope definition. Typically, retaining walls do not classify as a steep slope hazard.

Explorations in the steep slope hazard areas will require only temporary access to the exploration locations and HWA will be onsite to monitor the work as it progresses and confirm that the work follows the recommendations for maintaining the stability of the work areas and surrounding slopes.

Landslide Hazard Areas: Temporary or permanent impacts to landslide hazard areas are unlikely in the vicinity of **BH-30** and **BH-35** because they are in a paved parking lot. Likewise, the impact to the landslide hazard areas in the vicinity of **C-13, BH-28, BH-29, and BH-31** are unlikely because they are located in existing paved travel lanes or shoulders. Work proposed at **BH-32, BH-33 and BH-34** will have temporary impacts to vegetation but are unlikely to have temporary or permanent impacts to slope stability. Temporary impacts will include trimming of vegetation within work zones and for personnel access paths. Once the borings are completed, the impacts will be mitigated by installing erosion control jute netting over the exposed areas to stabilize them as the vegetation reestablishes itself on the slope.

Avoidance and Minimization of Impacts to Geologic Hazard Areas

- Avoidance is not possible because the boreholes are required in order to evaluate the stability of the slopes and design the proposed improvements. Impacts to vegetation in the geologic hazard areas will be minimized as follows:
 - Drill rigs and equipment will be lowered into the ravine adjacent to Bschet'la Creek from SR 522 using a crane and boom truck;
 - Clearing activity will be accomplished using light equipment and will not substantially impact the root structures of local vegetation;
 - Slope stability will be maintained by limiting vegetation removal and ground disturbance and limiting alteration of the slope to the minimum necessary for the borehole;
 - No trees will be removed, and slope alteration will be limited to the very small area of the borehole itself; and,
 - Any disturbed areas will be re-seeded with native upland species.

Considerations for Drilling on the Slope at Bsche'tla Creek

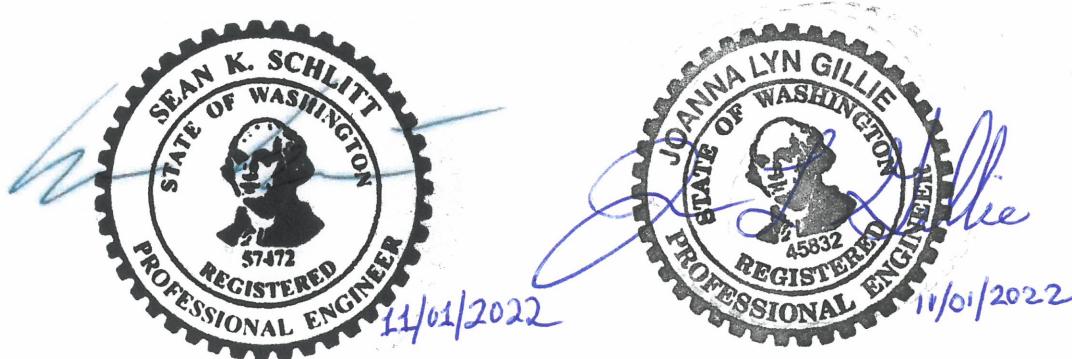
The slopes southeast of SR 522 between NE 153rd Street and NE 155th Street are adjacent to an area with documented slope instability in several geotechnical engineering studies as well as anecdotal observations of settlement of the soil around the structures by the owners and tenants of the property to the north of the site. The proposed alterations will consist of limited clearing and assembly of the drill rig on the slope with limited grading for the work pads; we conclude that it is unlikely that the proposed work will increase landslide hazard risk on the adjacent properties. We recommend that pre-exploration photo surveys be performed of the structures on the properties to the north and south of the property before the three borings (**BH-32, BH-33, and BH-34**) are drilled to document the existing conditions of the structures. These surveys should include taking pictures of the foundations, as well as exterior and interior walls, windows, and doorways to identify the presence/absence of pre-existing cracks, or differential settlement. Upon completion of the explorations, an additional phase of photo surveys will be performed to determine if the exploration work resulted in any impact on the properties.

Conclusion

The slope and landslide hazard alterations necessary for the proposed limited geotechnical investigations can be completed safely and are unlikely to result in an increase in hazard risk to the property or adjacent properties. Provided the explorations follow the work plan and are conducted in accordance with the critical area documentation for the work, the alterations will be in compliance with Lake Forest Park Municipal Code subsections 16.16.290.D.2A and 16.16.310.D.2. HWA will be onsite to monitor these operations and confirm that the work is performed in a manner consistent with the approved work plans.

Sincerely,

HWA GEOSCIENCES INC.



Sean Schlitt, P.E.
Geotechnical Engineer

JoLyn Gillie, P.E.
Geotechnical Engineer, Principal