ENVIRONMENTAL CHECKLIST

for the proposed

University of Washington Softball Performance Facility Project

UNIVERSITY of WASHINGTON

September 2019

EA Engineering, Science, and Technology, Inc., PBC
GeoEngineers
Tree Solutions, Inc.
Shannon & Wilson

PREFACE

The purpose of this Environmental Checklist is to identify and evaluate probable environmental impacts that could result from ***The University of Washington Softball Performance Facility Project*** and to identify measures to mitigate those impacts. ***The University of Washington Softball Performance Facility Project*** would include the development of an approximately 7,500 gsf indoor practice facility building for the University's softball program.

The State Environmental Policy Act (SEPA)[1] requires that all governmental agencies consider the environmental impacts of a proposal before the proposal is decided upon. This Environmental Checklist has been prepared in compliance with the State Environmental Policy Act; the SEPA Rules, effective April 4, 1984, as amended (Chapter 197-11, Washington Administrative Code), which implements SEPA.

This document is intended to serve as SEPA review for, site preparation work, building construction, and operation of the proposed development comprising the ***University of Washington Softball Performance Facility Project***. Analysis associated with the proposed project contained in this Environmental Checklist is based on schematic plans for the project. While not construction-level detail, the schematic plans accurately represent the eventual size, location and configuration of the proposed project and is considered adequate for analysis and disclosure of environmental impacts.

This Environmental Checklist is organized into three major sections. *Section A* of the Checklist (beginning on page 1) provides background information concerning the *Proposed Action* (e.g., purpose, proponent/contact person, project description, project location, etc.). *Section B* (beginning on page 9) contains the analysis of environmental impacts that could result from implementation of the proposed project, based on review of major environmental parameters. This section also identifies possible mitigation measures. *Section C* (page 34) contains the signature of the proponent, confirming the completeness of this Environmental Checklist.

Project-relevant analyses that served as a basis for this Environmental Checklist include: *Geotechnical Engineering Report* (GeoEngineers, 2019); *Greenhouse Gas Emissions Worksheet* (EA, 2019); *Tree Inventory and Assessment* (Tree Solutions, 2019); and, *Nesting Bird Survey* (Shannon & Wilson, 2019).

[1] Chapter 43.21C. RCW

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PURPOSE

The State Environmental Policy Act (SEPA), Chapter 43.21 RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. The purpose of this checklist is to provide information to help identify impacts from the proposal (and to reduce or avoid impacts, if possible) and to help the University of Washington to make a SEPA threshold determination.

A. BACKGROUND

1. Name of Proposed Project:

University of Washington Softball Performance Facility Project

2. Name of Applicant:

University of Washington

3. Address and Phone Number of Applicant and Contact Person:

Applicant
University of Washington
Facilities, Asset Management
Box 352205
Seattle, WA 98195-2205

Contact
Julie Blakeslee
Environmental and Land Use Planner
University of Washington
Facilities, Asset Management
Box 352205
Seattle, WA 98195-2205
206-543-5200

4. Date Checklist Prepared

The Checklist was prepared on September 26, 2019 by the University of Washington as the lead agency under the authority of WAC 478-324

5. Agency Requesting Checklist

University of Washington
Facilities, Asset Management
Box 352205
Seattle, WA 98195-2205

6. Proposed Timing or Schedule (including phasing, if applicable):

Construction of the proposed ***University of Washington Softball Performance Facility Project*** is anticipated to begin in Spring 2020 and is anticipated to last approximately six to seven months.

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

No future plans for further development of the project site are proposed.

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

The following environmental review documents were prepared for the University of Washington 2018 Seattle Campus Master Plan:

- University of Washington 2018 Seattle Campus Master Plan Draft EIS (2016)
- University of Washington 2018 Seattle Campus Master Plan Final EIS (2017)

The following environmental review information was prepared in support of the proposed project:

- *Geotechnical Engineering Report* (GeoEngineers, 2019);
- *Greenhouse Gas Emission Worksheet* (EA Engineering, 2019);
- *Arborist Report* (Tree Solutions, Inc., 2019); and,
- *Nesting Bird Survey* (Shannon & Wilson, 2019).

These reports are included as appendices to this Checklist.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain:

There are no known other applications that are pending approval for the ***University of Washington Softball Performance Facility Project*** site.

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

University of Washington

- Project approval, design approval, authorization to prepare contract documents, and authorization to Call-for-Bids.

City of Seattle

- *Department of Construction and Inspections*

  Permits/approvals associated with the proposed project, including:
  - Master Use Permit
  - Grading/Shoring Permit
  - Building Permit
  - Mechanical Permits
  - Electrical and Fire Alarm Permits
  - Drainage and Side Sewer Permit
  - Comprehensive Drainage Control Plan and Construction Stormwater Control Plan Approval

11. Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

Existing Site Conditions

The proposed ***University of Washington Softball Performance Facility Project*** is located in the East Campus area which is the athletic center of the campus and home to numerous University athletic facilities. The project site is immediately adjacent to the Nordstrom Tennis Center and Dempsey Indoor Center, and across from Snohomish Lane S from Husky Stadium (see **Figure 1** for a vicinity map of the site). The existing site gradually slopes from south (Snohomish Lane S) to the north (adjacent to the Nordstrom Tennis Center) and is generally comprised of trees, shrubs, grass and other vegetation, and a portion of Snohomish Lane S (see **Figure 2** for an aerial map of the project site).

Proposed Project

The proposed ***University of Washington Softball Performance Facility Project*** is intended to create a new all-season indoor training facility for the University's Softball Program that would provide enhanced opportunities for practice and training in close proximity to the existing Softball Stadium and locker rooms. The Softball Program does not currently have a dedicated indoor training facility and currently shares the Dempsey Indoor Center with several other athletic programs on campus.

The proposed one-story building would be approximately 22 feet tall and contain approximately 7,500 square feet of building space (see **Figure 3** for a site plan). The facility would include space for three batting and pitching practice lanes to allow for indoor practice and training opportunities. Equipment storage areas, restrooms and seating/viewing area would also be provided within the building (see **Figure 4** for a floor plan of the proposed facility). The building would primarily be constructed of insulated metal panel and glass.

University of Washington Softball Performance Facility Project
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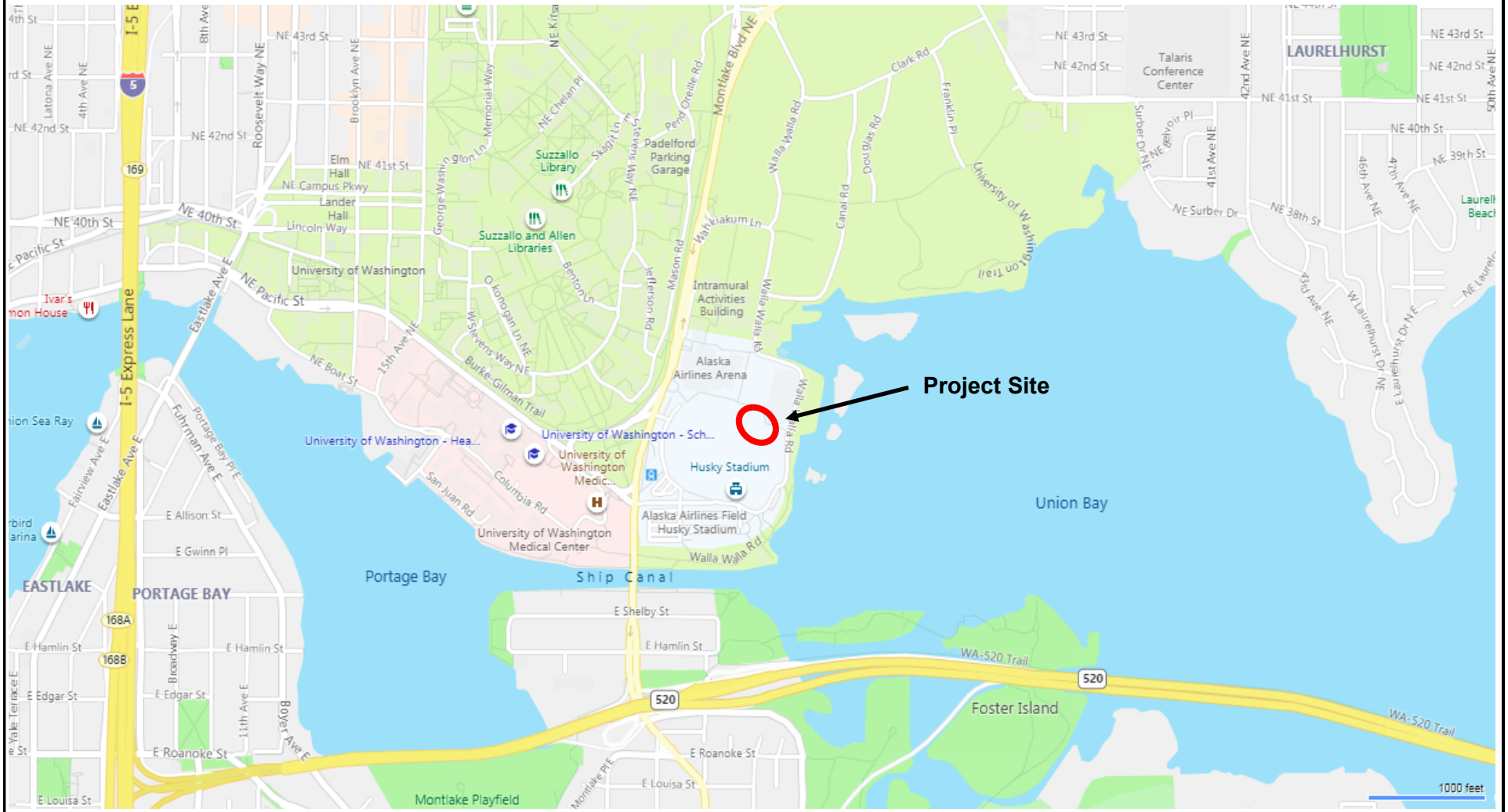

Source: Bing Maps and EA Engineering, 2019

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Figure 1

Vicinity Map

University of Washington Softball Performance Facility Project
Environmental Checklist

Note: This figure is not to scale.

North

Source: Google Earth and EA Engineering, 2019

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Figure 2

Aerial Map

University of Washington Softball Performance Facility Project
Environmental Checklist

Note: This figure is not to scale.

North

Source: SRG, 2019

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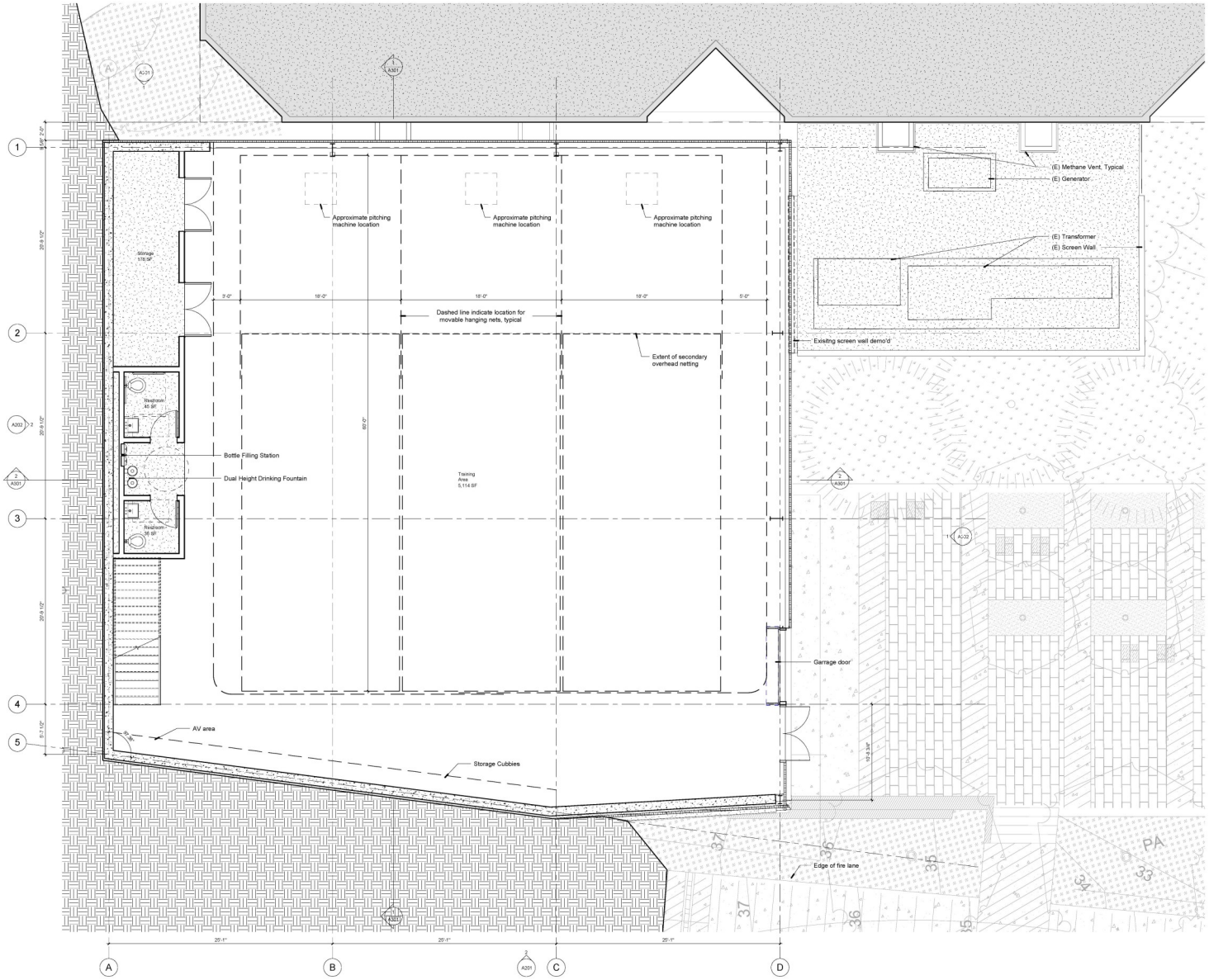
Figure 3

Site Plan

University of Washington Softball Performance Facility Project
Environmental Checklist



Note: This figure is not to scale.

North

Source: SRG, 2019

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Figure 4

Floor Plan

As part of the project, the portion of Snohomish Lane S within the project site would be shifted to the south. The roadway/walkway would continue to provide access through the site area and connect with Walla Walla Road NE and would be improved to be compliant with ADA accessibility standards.

Approximately 24 trees would be removed from the site as part of the project, including 22 trees that are six inches or more in diameter. As part of the project, new replacement trees would be provided at a ratio of two new trees for every one tree removed that is six inches or greater in diameter. A total of 44 new trees would be planted as part of the project. Approximately 22 new trees would be planted on the site as part of the proposed project construction and 22 trees would be planted within the overall University campus as part of campus-wide planting initiatives. New landscaping would be provided on the site. The proposed landscape design would be approved by the University of Washington Landscape Advisory Committee. This committee includes experts in planning, botany, landscape architecture, urban design, horticulture, art, architectural history and grounds maintenance. Project tree replacement would be anticipated to meet or exceed City of Seattle tree replacement requirements and would be in accordance with the University's Tree Management Plan.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any. If a proposal would occur over a range of area, provide the range or boundaries of the site(s).

The proposed ***University of Washington Softball Performance Facility Project*** site is located in the south portion of the East Campus area. The site is generally bounded by the Nordstrom Tennis Center to the north, the Dempsey Indoor Center to the east, Snohomish Lane South to the south, and a paved plaza area and Alaska Airlines Arena to the west (see **Figures 1** and **2**).

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one):
Flat, rolling, hilly, steep slopes, mountainous,
other:_____

The ***University of Washington Softball Performance Facility Project*** site gradually slopes from the south and west edges of the site to the north and east.

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

According to the City of Seattle's Environmentally Critical Areas (ECA) Maps, there are no steep slope hazard areas located on the site. The site generally slopes from an elevation of 42 feet at the southeast corner of the site to an elevation of 32 feet on the northeast corner of the site. The steepest slope on the site is located on the western portion of the site and is approximately 20 percent.

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

As part of the geotechnical report for the project, two borings were drilled within the site area. Soils encountered within the borings generally consisted of top soil/sod (two inches), fill (approximately 18 feet), Lacustrine Deposits (approximately 15 to 30 feet) and Glacial Till (encountered approximately 33 to 48 feet below the ground surface). According to the City of Seattle's Environmentally Critical Areas (ECA) Maps, the site is listed as a peat-settlement prone area; however, geotechnical investigations on the site encountered only minor amounts of peat. See **Appendix A** for the Geotechnical Report.

The proposed project site does not contain agricultural land areas of commercial significance.

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

There are no indications or history of unstable soils on the site or adjacent to the site. According to the City of Seattle ECA Maps, there are no steep slope areas, potential slide areas or liquefaction-prone areas on the site or adjacent to the site (*City of Seattle, 2019*).

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

Approximately 17,700 square feet of grading would be required as part of the proposed project, including excavation and fill. Any soil removed from the site would be transported to an approved location. The source of fill is unknown at this time but would also be from an approved source.

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

Temporary erosion is possible in conjunction with any construction activity. Site work would expose soils on the site, but the implementation of a Temporary Erosion Sedimentation Control (TESC) plan that is consistent with City of Seattle standards and the implementation of best management practices (BMPs) during construction would mitigate any potential impacts.

Once the project is operational, no erosion is anticipated.

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

The proposed site is primarily comprised of existing trees and vegetation, and a portion of the existing Snohomish Lane S. Impervious surface on the site is generally comprised of the portion of Snohomish Lane S and includes approximately 4,375 square feet (approximately 22 percent).

With the completion of the project, impervious surfaces would primarily consist of the proposed building facility, paved walkways and a portion of Snohomish Lane S. Approximately 14,800 square feet of the site (approximately 73 percent) would be covered with impervious surfaces.

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

The mitigation of erosion impacts are addressed in individual permit reviews under the *Grading and Drainage control codes* (*SMC* 22.170), and in critical area locations by the *Seattle Critical Areas ordinance* (*SMC* 25.09), which prescribed best management practices for excavation and grading on critical areas. The 2018 Seattle Campus Master Plan EIS identifies the site areas as having a high potential for earth-related impacts. General methods to address impacts to earth are identified in Section 3.1.1 and Section 3.1.3 of the Final EIS, including the implementation of TESC measures.

The site is identified on the City of Seattle ECA maps as within a peat-settlement prone area. However, geotechnical investigations encountered only minor amounts of peat on site and recommended that deep foundations consisting of small six- to eight-inch diameter driven steel pipe piles could be utilized to mitigate potential settlement issues due to minor peat and lacustrine deposits (see **Appendix A**).

Recommendations are also provided in the Geotechnical Report regarding the site location within a methane buffer. The report recommends placing a perforated pipe within a gravel layer below the floor slabs and venting the pipe outside of the building. Methane vapor mitigation should also include placing a 30-mil polyvinyl chloride (PVC) liner beneath the floor slab to act as a methane and water vapor barrier (see **Appendix A**).

Pursuant to the Overview Policy at *SMC* 25.05.665, no further mitigation is warranted.

2. Air

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

During construction, the ***University of Washington Softball Performance Facility Project*** could result in temporary increases in localized air emissions associated with particulates and construction-related vehicles. It is anticipated that the primary source of temporary, localized increases in air quality emissions would result from particulates associated with demolition of a paved surface, on-site excavation and site preparation. While the potential for increased, air quality emissions could occur throughout the construction process, the timeframe of greatest potential impact would be at the outset of the project in conjunction with the site preparation and excavation/grading activities. However, as described above under the Earth discussion, minimal amounts of excavation would be required for the project and air quality emission impacts are not anticipated to be significant.

Temporary, localized emissions associated with carbon monoxide and hydrocarbons would result from diesel and gasoline-powered construction equipment operating on-site, construction traffic accessing the project site, and construction worker traffic. However, emissions from these vehicles and equipment would be small and temporary and are not anticipated to result in a significant impact.

Upon completion of the project, the primary source of emissions would be from emissions from operation of the buildings and from vehicles travelling to and from the site. Operation of the project would result in building emissions that would be typical of other University projects and

the project operations is not anticipated to generate new vehicle trips. As a result, significant adverse air quality impacts would not be anticipated.

Another consideration with regard to air quality and climate relates to Greenhouse Gas Emissions (GHG). In order to evaluate climate change impacts of the proposed project relative to the requirements of the City of Seattle, a Greenhouse Gas Emissions Worksheet has been prepared **(Appendix C** of this Environmental Checklist). This Worksheet estimates the emissions from the following sources: embodied emissions; energy-related emissions; and, transportation-related emissions. In total, the estimated lifespan emissions for the proposed project would approximate 6,915 $MTCO_2e$[1]. Based on an assumed building life of 62.5 years,[2] the proposed building addition would be estimated to generate approximately 111 $MTCO_2e$ annually.

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

The primary off-site source of emissions in the site vicinity is vehicle traffic on surrounding roadways, including Montlake Boulevard NE. Emissions for existing buildings in the vicinity (Alaska Airlines Area, Nordstrom Tennis Center, Dempsey Indoor Center, and Husky Stadium) also contribute to emissions in the vicinity of the site. There are no known offsite sources of air emissions or odors that would affect the proposed project.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for air quality impacts.

Short term impacts to air quality arising for construction, (fugitive dust and airborne particulates) are mitigated by adherence to *Puget Sound Clean Air Agency regulations PSCAA - Reg 1 - Section 9.15* (*1-9 Emission Standards*), *PSCAA – Reg 3 – Article 4 (Asbestos Control Standards)*, the *Seattle Stormwater Drainage Code 22.800*, and *Grading Code 22.170* and the best management practices for controlling erosion described above from the Seattle Municipal Code.

Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

1 $MTCO_2e$ is defined as Metric Ton Carbon Dioxide Equivalent and is a standard measure of amount of CO2 emissions reduced or sequestered.

2 According to the Greenhouse Gas Emissions Worksheet, 62.5 years is the assumed building life for educational buildings.

3. Water

a. Surface:

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

There is no surface water body on or in the immediate vicinity of the ***University of Washington Softball Performance Facility Project*** site. The nearest surface water body is Union Bay, which is located approximately 500 feet to the east of the project site (see **Figure 1**).

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

The proposed project will not require any work over, in, or adjacent (within 200 feet) to any water body.

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

No fill or dredge material would be placed in or removed from any surface water body as a result of the proposed project.

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

The proposed project would not require any surface water withdrawals or diversions.

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

The proposed project site does not lie within a 100-year floodplain and is not identified as a flood prone area on the City of Seattle Environmentally Critical Areas map (*City of Seattle, 2019)*.

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

There would be no discharge of waste materials to surface waters.

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Groundwater investigations were also completed as part of the soil borings for the geotechnical report (**Appendix A**). Groundwater was encountered at depths of approximately 16 to 20 feet below the ground surface. No groundwater would be withdrawn or water discharged to ground water as part of the proposed project.

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

Waste material would not be discharged into the ground from septic tanks or other sources as a result of the proposed project.

c. Water Runoff (including storm water):

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

The existing site is generally comprised of trees, shrubs, grass, other vegetation, and a portion of Snohomish Lane S. There are no existing structures on the site that currently generate stormwater runoff. The primary source of stormwater within the site area is Snohomish Lane S and existing stormwater management facilities are located as a part of this roadway to manage stormwater.

With the proposed project, stormwater from the site would be designed in accordance with the *City of Seattle Stormwater and Drainage Code, SMC* Title 22 and similar to the rest of campus, stormwater would ultimately discharge to the City of Seattle dedicated storm drainage system which drains to the Ship Canal/Portage Bay area of Lake Washington. An approximately 840-square foot bioretention planter would also be provided to the south of the site to provide stormwater management.

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

The existing and proposed stormwater management system for the site would continue to ensure that waste materials would not enter ground or surface waters as a result of the proposed project.

3) **Does the proposal alter or otherwise affect drainage patterns in *the vicinity of the site? If so, describe.***

The proposed project would not alter or otherwise affect drainage patterns in the site vicinity.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for stormwater impacts. Stormwater for the proposed project site would discharge to the City of Seattle dedicated storm drainage system which ultimately drains to the Ship Canal/Portage Bay area of Lake Washington. The existing on-site system at UW is estimated to have adequate capacity for the proposed Softball Performance Facility. Additionally, the UW campus has undergone Salmon Safe Certification for instating campus wide improvements and measures to protect water quality in nearby receiving waters. The certification process is extensive and relies on existing management policies, practices and actions. The Salmon Safe process provides a prepared comprehensive assessment of the overall management policies and planning related to habitat and water quality protection within the campus.

Additionally all existing local regulations under the *Stormwater and Drainage Code, SMC Title 22*, apply. Pursuant to the Overview Policy at SMC *25.05.665*, no further mitigation is warranted.

4. Plants

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

X deciduous tree:
__evergreen tree:
X shrubs
X grass
__ pasture
__ crop or grain
__ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
__ water plants: water lily, eelgrass, milfoil, other
_ other types of vegetation

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

Approximately 50 trees are located within the project site area, including Vine Maple, Tulip Tree, Higan Cherry, Alder, Black Locust, Dawn Redwood, Magnolia and Red Oak. Existing trees within the site area range in size from approximately 4 inches in diameter to approximately 22 inches in diameter. None of the existing trees meet the City of Seattle's definition of an Exceptional Tree (City of Seattle Director's Rule 16-2008). However, a large grouping of Dawn Redwood trees on the site do qualify as a Tree Grove as defined by Director's Rule 16-2008.

Approximately 24 trees would be removed from the site as part of the proposed project, including 22 trees that are six inches or more in diameter. The trees to be removed that are greater than six inches in diameter include 12 Tulip Trees, 11 Dawn Redwood trees (including those that comprise the existing Tree Grove), and one Vine maple.

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

No known threatened or endangered species are located on or proximate to the project site.

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

As part of the project, new replacement trees would be provided at a ratio of two new trees for every one tree removed that is six inches or greater in diameter. A total of 44 new trees would be planted as part of the project. Approximately 22 new trees would be planted on the site as part of the proposed project construction activities and 22 trees would be planted within the overall University campus as part of campus-wide planting initiatives. New landscaping would also be provided on the site.

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for plant impacts. The proposed landscape design would be approved by the University of Washington Landscape Advisory Committee. This committee includes experts in planning, botany, landscape architecture, urban design, horticulture, art, architectural history and grounds maintenance.

Project tree replacement would be anticipated to meet or exceed City of Seattle tree replacement requirements and would be in accordance with the University's Tree Management Plan.

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

Noxious weeds or invasive species that could be present in the vicinity of the site include giant hogweed, English Ivy and Himalayan blackberry.

5. Animals

a. Circle (underlined) any birds and animals that have been observed on or near the site or are known to be on or near the site:

birds: **songbirds,** hawk, heron, eagle**, other: seagulls, pigeons,**
mammals: deer, bear, elk, beaver**, other: squirrels, raccoons, rats, mice**
fish: bass, salmon, trout, herring, shellfish**, other: None.**

Birds and small mammals tolerant of urban conditions may use and may be present on and near the ***University of Washington Softball Performance Facility Project*** site. Mammals likely to be present in the site vicinity include: raccoon, eastern gray squirrel, mouse, rat, and opossum.

Birds common to the area include: European starling, house sparrow, rock dove, American crow, seagull, western gull, Canada goose, American robin, and house finch. An avian wildlife survey was also conducted for the project site and vicinity to determine whether the site contains any bald eagle, blue heron or other bird nests. Based on observations during site visits, no active nesting was observed. Remnants of one large stick nest was observed on the northern edge of the survey area but the nest appear to be destroyed and was likely an osprey nest based on its location (Shannon & Wilson, 2019).

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

The following are listed threatened or endangered species that could affected by development on the site or surrounding vicinity based on data from the U.S. Fish and Wildlife Service: marbled murrelet, streaked horned lark, yellow-billed cuckoo, bull trout, grey wolf and north american wolverine[3]. However, it should be noted that none of these species have been observed at the site and due to the urban location of the site, it is unlikely that these animals are present on or near the site.

[3] U.S. Fish and Wildlife Service. IPaC. https://ecos.fws.gov/ipac/location/index. Accessed May 2019.

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

The entire Puget Sound area is within the Pacific Flyway, which is a major north-south flyway for migratory birds in America—extending from Alaska to Patagonia. Every year, migratory birds travel some or all of this distance both in spring and in fall, following food sources, heading to breeding grounds, or travelling to overwintering sites.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for wildlife impacts. As described under section 3.d, the UW campus has undergone Salmon Safe certification for installing campus-wide improvements and measures to protect water quality in nearby receiving waters. In addition, the 2018 Seattle Campus Master Plan contains an extensive open space element (section 1V, p. 54) which was analyzed in the 2018 Seattle Campus Master Plan Final EIS (Section 3.11). These preserved open space areas provide mitigation for encroachment of development on campus into areas which may provide habitat for native wildlife.

It is recommended that any tree removal occur outside of the nesting season for most birds (early February to mid-August). If tree removal occurs during the nesting season, it is recommended that a biologist visit the site prior to removal to check the trees for active nests. Pursuant to the Overview Policy at *SMC* 25.05.665, no further mitigation is warranted.

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

Invasive species known to be located in King County include European starling, house sparrow and eastern gray squirrel.

6. Energy and Natural Resources

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

Electricity and natural gas are the primary source of energy that would serve the proposed ***University of Washington Softball Performance Facility Project*** and would generally be utilized for lighting, electronics, and heating.

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

The proposed project would not affect the use of solar energy by adjacent properties.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for energy impacts. The proposed development would conform to the applicable provisions of the State of Washington Energy Code and the City of the Seattle Energy Code.

The University has an adopted a policy to require LEED certification for all new buildings and the proposed project is intended to qualify for LEED Silver status with the potential for LEED Gold. Additionally, all projects on campus are required to adhere to the Seattle Energy Code, which is an adopted and amended version of the International Energy Conservation Code.

Pursuant to the Overview Policy at *SMC* 25.05.665, no further mitigation is warranted.

7. Environmental Health

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

As with any construction project, accidental spills of hazardous materials from equipment or vehicles could occur during the construction of the ***University of Washington Softball Performance Facility Project***; however, a spill prevention plan would minimize the potential of an accidental release of hazardous materials into the environment.

According to the City of Seattle ECA Maps, the project site is located within the 1,000-foot methane buffer area of an abandoned landfill. Geotechnical investigations on the site did not identify any landfill materials or methane, but preventative measures such as methane barriers and a vent pipe system would be implemented into the construction of the proposed building (see **Appendix A** for details).

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

No known sources of potential contamination are present on the site

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

No known hazardous chemicals or conditions are present on the site that would affect the project.

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

During construction, gasoline and other petroleum-based products would be used for the operation of construction vehicles and equipment.

During the operation, chemicals that would be used on the site would be limited to cleaning supplies and would be stored in an appropriate and safe location.

4) Describe special emergency services that might be required.

No special emergency services are anticipated to be required as a result of the project. As is typical of urban development, it is possible that normal fire, medical, and other emergency services may, on occasion, be needed from the City of Seattle.

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

Washington State occupational health and safety standards and local fire code requirements ensuring the use of toxic or flammable materials is adequately addressed in the campus setting. Measures to prevent the potential accumulation of methane gas would also be provided as part of construction, such as methane barriers and a vent pipe system (see **Appendix A** for details). Pursuant to the Overview Policy at *SMC* 25.05.665, no further mitigation is warranted.

b. Noise

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

Traffic noise associated with adjacent roadways and parking areas (Snohomish Lane, Montlake Boulevard, Parking Lot E9), as well as activity associated with surrounding facilities (Husky Stadium, Alaska Airlines Area, Nordstrom Tennis Center, Dempsey Indoor Center, and the Softball Stadium) are the primary source of noise in the vicinity of the project site. Existing noise in the site vicinity is not anticipated to adversely affect the proposed ***University of Washington Softball Performance Facility Project***.

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

Short-Term Noise

Temporary construction-related noise would occur as a result of on-site construction activities associated with the project. The proposed project would comply with provisions of Seattle's Noise Code (SMC, Chapter 25.08) as it relates to construction-related noise to reduce noise impacts during construction.

Long-Term Noise

The proposed ***University of Washington Softball Performance Facility Project*** would likely result in a potential minor increase in noise from human voices and service vehicles travelling to and from the site. The potential increase in noise is anticipated to be minor and as a result, no significant noise impacts would be anticipated.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a medium potential for noise impacts. Short term noise impacts deriving from construction projects are mitigated primarily through the adoption of construction noise control best practice, typically including limiting hours of construction. Measures such as the following are considered appropriate mitigation for this project:

- In accordance with City of Seattle regulations, construction activities would be limited to applicable noise levels per the City's noise regulations covering construction noise (*Seattle Municipal Code 25.08.425*).

- Given the level of existing environmental noise in the vicinity and the anticipated level of post-construction noise, no measures would be necessary to reduce or control post-construction noise impacts from the proposed project.

Permanent onsite operations at the UW Campus are regulated by *Seattle Municipal Code Chapter 25.08* regarding maximal noise levels. Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

The site of the proposed ***University of Washington Softball Performance Facility Project*** is located in the south portion of the East Campus area (see **Figure 2** for an aerial photo of the site and **Figure 3** for the site plan of the project). The proposed site area contains no existing buildings and is generally comprised of existing trees and vegetation.

The area surrounding the site is generally characterized by University athletic facility uses. To the north of the site is the Nordstrom Tennis Center (home of the men's and women's tennis programs), an associated utility area, and Parking Lot E9. Further to the north is the Conibear Shellhouse (home of the men's and women's rowing programs), University Tennis Courts, Parking Lot E8, and the Intermural Activities Building (student athletic facility).

The area to the east of the site includes the Dempsey Indoor Center, which is utilized by several athletic programs at the University, including the track and football programs. Further to the east is Walla Walla Road NE and Union Bay.

To the south of the site is Snohomish Lane S, Husky Stadium and Husky Softball Stadium. Further to the south is an outdoor practice field utilized by the football program, Parking Lot E12, and the Waterfront Activities Center which provides opportunities for boat rentals by students, staff and the public.

The area to the west of the site includes a plaza area associated with the north entrance to Husky Stadium, the Pavilion Pool, Alaska Airlines Arena (home of the men's and women's basketball programs, and the women's volleyball program), and the Graves Annex. Further to the west is Montlake Boulevard, the Burke Gilman Trail, and the Central Campus area.

Similar to other uses in the site vicinity, the site would be utilized for athletic use purposes and would not be anticipated to affect existing buildings and uses that are adjacent to the site.

Policies and standards under the 2019 Seattle Campus Master Plan related to minimizing potential impacts would be followed under the proposed project. Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

b. Has the site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

The project site has no recent history of use as a working farmland or forest land.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

The project site is located in an urban area and would not affect or be affected by working farm or forest land; no working farm or forest land is located in the vicinity of this urban site.

c. Describe any structures on the site.

There are no existing structures on the ***University of Washington Softball Performance Facility Project*** site. The Nordstrom Tennis Center and associated utility area would be located immediately adjacent to the proposed building.

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

No structures would be demolished as a result of the proposed project.

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

The site is currently zoned as Major Institution Overlay with a 37-foot height limit (MIO-37) established pursuant to the *2019 Seattle Campus Master Plan*.

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

The current comprehensive plan designation for the site is Major Institution. (*City of Seattle, 2018*).

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

The project site is not located within the City's designated shoreline master program boundary.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

According to the City of Seattle Environmentally Critical Areas Map, the project site (and surrounding site vicinity) is located within the methane buffer of a former abandoned landfill, as well as a peat settlement-prone area (refer to Section 1, Earth, for additional information on earth conditions). However, geotechnical investigations identified only minor amounts of peat-settlement prone soils and no landfill materials or methane were present (see **Appendix A**). No other environmentally critical areas are located on or adjacent to the project site (*City of Seattle, 2019*).

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

The proposed ***University of Washington Softball Performance Facility Project*** would not provide any residential opportunities. Development of the project would create new practice and training areas for the current softball program and would not be anticipated to result in any new employees.

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

The proposed project would not displace any people.

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

No displacement impacts would occur and no mitigation measures are necessary.

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

The 2018 Seattle Campus Master Plan EIS identifies the site areas as having a low potential for land use impacts. The site is designated as

"Major Institution" under the City of Seattle Comprehensive Plan. Under the *1998 City-University Agreement*, the City of Seattle required the University of Washington to develop a conceptual Master Plan for its Seattle campus. The 2019 Seattle Campus Master Plan, developed pursuant to the Agreement and adopted by the University and the Seattle City Council, governs future development within the Major Institution Overlay zone. Pursuant to the Overview Policy at *SMC* 25.05.665, no further mitigation is warranted.

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

The project site is not located near agricultural or forest lands and no mitigation measures are necessary.

9. Housing

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

No housing units would be provided as part of the ***University of Washington Softball Performance Facility Project***.

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

No housing presently exists on the site and none would be eliminated.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for housing impacts. As noted above, the site is located with the Major Institution Overlay zone under the 2019 Seattle Campus Master Plan. Adherence to the 2019 Seattle Campus Master Plan is de facto compliance with the Seattle Comprehensive Plan policies and Map. Pursuant to the Overview Policy at *SMC* 25.05.665, no further mitigation is warranted.

10. Aesthetics

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

The height of the proposed building would be approximately 22 feet, which would be below the 37-foot height limit that is identified by the existing zoning and in the 2019 Seattle Campus Master Plan.

The exterior building materials for the proposed ***University of Washington Softball Performance Facility Project*** would primarily include metal and glass. The design of the building would be intended to be complementary of the existing campus and surrounding buildings in the site vicinity.

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

Views of the site are generally limited due to the presence of existing buildings surrounding the project site area. The proposed ***University of Washington Softball Performance Facility Project*** would be most visible from east and west ends of the Snohomish Lane S. The building would be located immediately adjacent to the Nordstrom Tennis Center and Dempsey Indoor Center, and across Snohomish Lane S from Husky Stadium. The building would generally appear as a continuation of athletic facility development in the site area.

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

The 2018 Seattle Campus Master Plan EIS identifies the site areas as having a low potential for aesthetics impacts. The 2019 Seattle Campus Master Plan contains adopted policies and development standards for the whole of the Campus. Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

11. Light and Glare

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

Short-Term Light and Glare

At times during the construction process, area lighting of the project site (to meet safety requirements) may be necessary, which would be noticeable proximate to the project site. In general, however, light and glare from construction of the proposed project are not anticipated to adversely affect adjacent land uses.

Long-Term Light and Glare

Under the proposed ***University of Washington Softball Performance Facility Project***, there would be an increase in light and glare with the proposed building; however, light and glare on the site would remain similar to the existing conditions and would not be noticeable from surrounding areas due to the presence of existing building (e.g., Nordstrom Tennis Center, Dempsey Indoor Center, Husky Stadium and Alaska Airlines Areas). Exterior building lighting would be designed to focus light on the site and minimize impacts to adjacent properties.

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

Light and glare associated with the proposed project would not be expected to cause a safety hazard or interfere with views.

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

No off-site sources of light or glare are anticipated to affect the proposed project.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for light and glare impacts. The proposed Softball Performance Facility is designed to be consistent with the University's existing internal design review process which considers the effect of architectural glazing, lighting, landscape designs to ensure that impacts from light and glare are adequately mitigated. Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

12. Recreation

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

There are several University athletic/recreational facilities in the vicinity (approximately 0.5 miles) of the ***University of Washington Softball Performance Facility Project*** site, including:

- The Nordstrom Tennis Center is located immediately to the north of the site;
- The Dempsey Indoor Center is located immediately to the east of the site;
- Husky Stadium is located immediately to the south of the site;

- Husky Softball Stadium is located immediately to the southeast of the site;
- The Pavilion Pool and Alaska Airlines Arena are located immediately to the west;
- The Intermural Activities (IMA) Building, Tennis Courts, IMA Sports Fields, Chaffey Field (Baseball), Husky Soccer Field, Husky Track, and the Golf Driving Range are all located further to the north of the site (within 0.5 miles).

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

The project would not displace any existing recreational uses.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for park and recreation impacts. The University Campus is open to the public during normal daylight hours and provides an extensive network of public trails and open space. The City of Seattle Comprehensive Plan relies upon the UW campus as an element of the City's public open space inventory. The 2019 Seattle Campus Master Plan identifies and categorizes open space areas on campus.

Pursuant to the Overview Policy at *SMC 25.05.665*, no further mitigation is warranted.

13. Historic and Cultural Preservation

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

There are no structures on the ***University of Washington Softball Performance Facility Project*** site.

There are no buildings in the immediate vicinity of the project site that are listed on national, state or local historic registers. According to the Washington State Department Archaeology and Historic Preservation's (DAHP) Washington Information System for Architectural and Archaeological Records Data (WISAARD), the closest eligible buildings/structures is the Graves Building located to the northwest of the site (constructed in 1963 and determined eligible in 2013).

Husky Stadium and Alaska Airlines Arena (Hec Edmundson Pavilion) are also located to the south and west of the site respectively, and are over 45 years old. However, both of these buildings were determined to be not eligible for listing in 2013 due to substantial alterations that have occurred to the buildings since they were originally constructed. The Pavilion Pool was also deemed ineligible in 2018.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

The project site is not located within the designated City of Seattle Government Meander Line Buffer, with properties located within that area required to prepare an archaeological investigation as part of the SEPA and MUP processes. The cultural resources sensitivity analysis conducted for the 2018 Seattle Campus Master Plan EIS indicates that the site area has a low potential to encounter sensitive cultural resource conditions and standard best practices and code compliance would be adequate.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

The DAHP website, WISAARD and the City of Seattle Department of Neighborhoods Landmarks Map and List were consulted to identify any potential historic or cultural sites in the surrounding area, as well as the potential for encountering archaeological resources in the area. Additional, the cultural resources sensitivity analysis in the 2018 Seattle Campus Master Plan EIS indicates that the site has a low potential for sensitive cultural resource conditions.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for historic and cultural resources impacts. Mitigation measures were identified in the 2018 Seattle Campus Master Plan Final EIS and would be applicable for this project, including:

- The University of Washington's existing site selection and internal design review processes (architectural, landscape, environmental review, and Board or Regents) would continue to

review and authorize major building projects in terms of siting, scale, and the use of compatible materials relative to recognized historic structures.

- The University of Washington would continue to follow the Historic Resources Addendum (HRA) process for all proposed projects that include exterior alterations to buildings over 50 years old, or are located adjacent to buildings or features over 50 years old. The HRA is intended to insure that important elements of the campus, its historic character and value, environmental considerations and landscape context are valued.

Pursuant to the Overview Policy at *SMC* 25.05.665, no further mitigation is warranted.

14. Transportation

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

The ***University of Washington Softball Performance Facility Project*** site is located immediately north of Snohomish Lane S which is an internal campus roadway that connects with Walla Walla Road NE to the east. Montlake Boulevard NE is located approximately 700 feet to the west of the site

No changes to site access or parking are proposed.

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

The University of Washington Link Light Rail station is located approximately 900 feet to the southwest of the ***University of Washington Softball Performance Facility Project*** site and provides service to Capitol Hill, Downtown Seattle and SeaTac Airport. King County Metro Transit (Metro) provides bus service in the vicinity of the site. Numerous transit routes have stops within the Montlake Triangle area approximately 1,000 feet to the west of the site, including Route 43, 44, 45, 71, 73, 167, 197, 271, 277, 373, 540, 541, 542, 556 and 586.

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

The total number of parking spaces on campus is set by the 2019 Seattle Campus Master Plan. No individual project provides parking for itself. Pursuant to the Council Adopted 2019 Seattle Campus Master Plan, parking is provided on a campus-wide basis. Pursuant to the Overview Policy at SMC 25.05.665, no further mitigation is warranted.

Parking Lot E9 is located immediately northwest of the site and includes approximately 54 parking spaces (including two ADA spaces). No additions or eliminations of parking spaces is proposed. The proposed project is not anticipated to generate an increased demand for parking due to the fact that students and employees that would utilize the facility are already traveling to campus.

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

As part of the project, the portion of Snohomish Lane S within the project area would be shifted to the south. The roadway/walkway would be improved to be compliant with ADA accessibility standards. No other improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities are anticipated.

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

The project would not use or occur in the immediate vicinity of water or air transportation. As noted above, the University of Washington Link Light Rail Station is located to the southwest of the site is utilized by University students and employees.

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

Construction of the proposed project would temporarily generate some additional vehicle trips associated with construction workers and equipment/vehicles travelling to and from the site during the construction process. Construction activities would be in compliance with applicable University of Washington and City of Seattle regulations, which would

include preparation of a Construction Management Plan to minimize potential construction-related transportation issues.

The proposed project is not anticipated to generate increased demand vehicle trips to the site or the overall University campus due to the fact that the project would be utilized by students and employees that are already traveling to campus currently.

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

There are no agricultural or forest product uses in the immediate site vicinity and the project would not interfere with, affect or be affected by the movement of agricultural or forest products.

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

Pursuant to the 2019 Seattle Campus Master Plan, the UW operates the U-Pass program which is a comprehensive regional transportation mitigation and monitoring program with a goal of reducing SOV use. This program is outlined in Chapter 8 of the 2019 Seattle Campus Master Plan and serves as mitigation for traffic generated by the UW.

Construction activities would occur in compliance with applicable University of Washington and City of Seattle regulations, and would include the preparation of a Construction Management Plan to control and minimize potential construction-related transportation issues.

This project would also fall under the University's Transportation Management Plan (TMP), including elements such as parking pricing and the U-Pass Program to help discourage single-occupancy vehicle trips and encourage transit use, carpooling and other alternative modes of transportation.

Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

15. Public Services

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

The ***University of Washington Softball Performance Facility Project*** is not anticipated to generate a significant increase in the need for public services. To the extent that emergency service providers

have planned for gradual increases in service demands, no significant impacts are anticipated.

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

The 2018 Seattle Campus Master Plan EIS identifies the site area as having a low potential for public service impacts. General methods to address impacts to public services are identified in Section 3.14.3 of the EIS, including all development constructed in accordance with applicable Seattle Fire Code requirements; review of development projects for life/safety and security issues; and, UWPD could increase its staff capacity and operations, if necessary, to meet security needs for the campus. Pursuant to the Overview Policy at *SMC* *25.05.665*, no further mitigation is warranted.

16. Utilities

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

All utilities are currently available at the site, including electricity, natural gas, water, sanitary sewer, telephone, cable/internet services, and refuse service.

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

Domestic water and fire service for the proposed ***University of Washington Softball Performance Facility Project*** would connect to the existing 10-inch water line located to the southwest of the proposed building. Sanitary sewer service would connect with the existing lines located within Snohomish Lane S. Electrical service would connect with an existing electrical vault located on the site.

C. SIGNATURES

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

Signature:

Name of Signee:

Julie Blakeslee

Position and Agency/Organization:

SEPA Responsible Official

Date:

September 26, 2019

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APPENDIX A

Geotechnical Report

Geotechnical Engineering Services

University of Washington
Softball Performance Center
Seattle, Washington

for
University of Washington

September 13, 2019

GeoEngineers

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Redmond, Washington 98052
425.861.6000

Geotechnical Engineering Services

University of Washington
Softball Performance Center
Seattle, Washington

File No. 0183-132-00

September 13, 2019

Prepared for:

University of Washington
Capital Planning & Development
Facilities Services Administration Building
UW Box 352205, Seattle, WA 98105

Attention: Anna Daeuble

Prepared by:

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Colton W. McInelly, EIT
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Robert C. Metcalfe, PE, LEG
Principal

CWM:RCM:nld

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APPENDICES

1.0 INTRODUCTION

This report presents the results of GeoEngineers, Inc.'s (GeoEngineers) geotechnical engineering services for the proposed University of Washington (UW) Softball Performance Center. The proposed Softball Performance Center is located on the south side of the Nordstrom Tennis Center, near the southwest corner. The location of the site and general configuration of the proposed building is shown on the Vicinity Map and Site Plan, Figures 1 and 2, respectively.

GeoEngineers previously provided geotechnical engineering services for the original conceptual location for the building when it was planned under the canopy of the northeast corner of Alaska Airlines Field at Husky Stadium. We understand the UW and the project team selected Layout Option No. 3, which in near the southwest corner of the Nordstrom Tennis Center. This report presents our recommendations for the Option 3 building layout.

1.1. Project Description

Layout Option No. 3 for the Softball performance Center shows the footprint of the building directly south of the Nordstrom Tennis Center near the southwest corner. The project site is bounded by the Nordstrom Tennis Center to the north and Snohomish Lane South to the south and west, and hardscape/landscape to the east. We understand that the project will consist of a premanufactured steel frame building that will be used for pitching and batting practice, and other team activities. The building will be constructed with a 6-inch gap between it and the Nordstrom Tennis Center wall to the north. Cast-in-place concrete retaining walls up to about 10 feet high will be needed along the west and southwest side of the building. The floor of the building will be constructed at about Elevation 33.5 feet and will consist of concrete slab-on-grade in some areas, but the main floor may consist of a synthetic turf system underlain by a gravel subgrade.

1.2. Purpose and Scope

The purpose of our services is to evaluate soil and groundwater conditions as a basis for developing design criteria for the geotechnical aspects of the UW Softball Performance Center project. Field explorations and laboratory testing were performed to identify and evaluate subsurface conditions at the site to develop engineering recommendations for use in design of the project. Our services were performed in general accordance with our contract with the UW for Project No. 205714 dated July 11, 2018, and our additional services proposal dated June 7, 2019.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1. Field Explorations

Subsurface conditions were evaluated through a field exploration program that consisted of drilling and sampling two hollow-stem auger borings. The borings were completed within the vicinity of the Option 3 building footprint using limited access, track-mounted drilling equipment. The approximate locations of the borings are shown on Figure 2.

The borings, designated B-1-19 and B-2-19, were advanced to depths of about 42 and 52 feet below the ground surface (bgs), respectively. Locations of the borings were determined in the field by measuring from

physical features on site to the desired locations. Appendix A includes logs of the borings (Figures A-2 and A-3) and details of the subsurface borings performed.

2.2. Laboratory Testing

Soil samples obtained from the borings were transported to our laboratory and evaluated to confirm or modify field classifications, as well as to evaluate engineering properties of the soil. Representative samples were selected for laboratory testing consisting of moisture content, percent passing the U.S. No. 200 sieve (%F) and sieve analyses. The tests were performed in general accordance with test methods of the ASTM International (ASTM) or other applicable procedures. A brief discussion of the laboratory tests and test results is included in Appendix B, Laboratory Testing.

2.3. Previous Site Evaluations

The logs of selected explorations from previous site evaluations in the project vicinity were reviewed, including the logs from the original Softball Performance Center location under the canopy of Husky Stadium. The logs of the explorations from previous projects referenced for this study are presented in Appendix C.

3.0 SITE DESCRIPTION

3.1. Geologic Map

We reviewed the Geologic Map of Seattle – A Progress Report (Troost, et al. 2005). The soils across most of the campus are mapped as glacial till, which generally consists of dense to very dense silty sand with gravel, cobbles and occasional boulders deposited below glaciers. Glacial till commonly includes an upper medium dense weathered zone.

The lower slope on the east side of the campus in the vicinity of the forest reach is mapped as pre-Fraser deposits, which generally consists of very dense interbedded sand, gravel, silt, and widely sorted sediment that was deposited prior to the last glaciation and subsequently consolidated by glaciers.

The area east of Montlake Boulevard, and a majority of the area that Husky Stadium currently occupies, is mapped as peat and landfill deposits. The soft peat was deposited in the shallow water at the north end of Union Bay and these soils were exposed when the level of Lake Washington was dropped after the completion of the Ballard Locks. The Montlake (Ravenna) landfill was operated in this area from about 1926 to 1966, and landfill materials were placed on top of the soft peat deposits.

3.2. Surface Conditions

The site is currently occupied by a landscaped slope consisting of grass, trees, and shrubs directly south of the Nordstrom Tennis Center as well as a portion of Snohomish Lane South. The ground surface slopes down moderately from Elevation 42 feet on the southeast corner of the site, to Elevation 32 feet on the northeast corner of the site, adjacent to the Nordstrom Tennis Center transformer.

3.3. Subsurface Soil Conditions

The two borings for the project were drilled in the grass covered landscape area and through the brick pavement area of Snohomish Lane South. In general, the soils encountered in the borings consisted of the following.

- **Topsoil/Sod/Brick Surfacing:** Approximately 2 inches of sod and topsoil was observed boring B-1-19. The 2-inch-thick brick was underlain by 3 inches of sand base in boring B-2-19, which was completed on Snohomish Lane South.
- **Fill:** Approximately 18 feet of fill was observed below the topsoil in both of the borings. The fill is associated with the construction of the Nordstrom Tennis Center and Husky Stadium. The fill generally consists of brown/gray loose to medium dense silty fine to medium sand with gravel, occasional cobbles and organic matter. The contact between the fill and the underlying looser lacustrine deposits is somewhat difficult to distinguish.
- **Lacustrine Deposits:** Approximately 15 to 30 feet of lacustrine deposits were encountered in the completed borings. The lacustrine deposits generally consist of loose to medium dense silty fine to medium sand and medium stiff to stiff sandy silt. Occasional gravel and interbedded silt lenses were encountered in numerous samples within the deposits. Interbedded peat layers were encountered in B-2-19 at depths of 40 and 45 feet bgs, and scattered wood debris was encountered in samples throughout the deposits. The lacustrine deposits are generally wet.
- **Glacial Till:** Very dense/hard glacial till (weathered or unweathered) was encountered beneath the lacustrine deposits in each boring to the full depth explored. The very dense/hard glacial till was encountered about 33 to 48 feet bgs in borings B-1-19 and B-2-19, respectively. The glacial till generally consists of gray silty fine to medium sand or sandy silt with variable gravel content and occasional cobbles.

Groundwater Conditions

Groundwater was encountered at depths of about 20 and 16 feet bgs in borings B-1-19 and B-2-19, respectively. Dense glacial till is relatively impermeable and water that infiltrates through the ground surface and fill typically flows down gradient into the lacustrine deposits that overlie the dense till soils.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1. Summary

- A summary of the primary geotechnical considerations is provided below. The summary is prepared for introductory purposes only and should be used in conjunction with the complete recommendations presented in this report. The site is located within two environmentally critical areas (ECA) based on the City of Seattle GIS website: peat settlement prone area and abandoned landfill buffer area.
- The site is designated Site Class F, per the 2015 International Building Code (IBC), because of the presence of liquefiable soils. However, because the building period is anticipated to be less than ½ second, the exception in Section 20.3 of American Society of Civil Engineers (ASCE) 7-10 applies for determining site class. As a result, the site is best designated as Site Class D based on the standard penetration test (SPT) blowcounts obtained in the completed borings.

- The building foundations can be supported on conventional spread footings bearing on at least 2 feet of properly compacted structural fill assuming that estimated liquefaction induced settlement can be tolerated by the structure, and the structure is designed for life safety and in accordance with the IBC. Footings supported on the properly compacted structural fill may be designed using a maximum allowable bearing pressure of 2,000 pounds per square foot (psf). The allowable bearing pressure may be increased by one-third for short duration loads such as wind or seismic events.
- If shallow foundations do not achieve required building performance criteria due to settlement concerns, deep foundations consisting of driven steel pipe piles and/or drilled augercast piles connected with grade beams may be used to support the building. The piles should be embedded at least 10 feet into the underlying very dense/hard glacial till or until practical refusal criteria is met to develop capacity. Pile lengths will likely be on the order of 40 to 60 feet.
- Excavations for the building may be on the order of 8 to 10 feet high. We anticipate that temporary open cut slopes inclined at 1.5H:1V (horizontal to vertical) may be used provided the adjacent Nordstrom Tennis Center building is adequately supported and not undermined. If site constraints do not allow temporary open cut slopes, then temporary shoring will be needed.
- Imported gravel borrow should be used as structural fill under all building elements, especially in wet weather conditions.

Our specific geotechnical recommendations are presented in the following sections of this report.

4.2. Environmentally Critical Areas

Based on review of ECA maps on the City of Seattle GIS website, the site is located in peat settlement prone and abandoned landfill buffer ECAs.

The peat settlement prone ECA is associated with historic peat deposits from Lake Washington. Based on our borings and other borings adjacent to the project site, minor amounts of peat are present within the lacustrine deposits below the proposed building. In our opinion, deep foundations consisting of piles may be used for the project to mitigate potential settlement issues due to the peat and lacustrine deposits.

The site is located within 1,000 feet of the Montlake landfill, which is an abandoned methane-producing landfill. Seattle Municipal Code 25.09.220 requires evaluation of methane gas accumulation. Our recommendations with regard to landfill gas (including methane) mitigation are discussed in more detail in the "Landfill Gas Collection" section of the report.

4.3. Earthquake Engineering

We evaluated the site for seismic hazards including liquefaction, lateral spreading, fault rupture and earthquake induced landsliding.

4.3.1. 2015 IBC Seismic Design Information

For the UW Softball Performance Center, we recommend the IBC 2015 parameters for site class, short-period spectral response acceleration (S_S), 1-second period spectral response acceleration (S_1), and seismic coefficients F_A and F_V presented in Table 1.

TABLE 1. IBC SEISMIC PARAMETERS

2015 IBC Parameter	Recommended Value
Site Class	D
Short Period Spectral Response Acceleration, S_S (percent g)	128.9
1-Second Period Spectral Response Acceleration, S_1 (percent g)	49.8
Seismic Coefficient, F_A	1.0
Seismic Coefficient, F_V	1.5

4.3.2. Liquefaction Potential

Liquefaction refers to the condition by which vibration or shaking of the ground, usually from earthquake forces, results in the development of excess pore pressures in saturated soils with subsequent loss of strength in the deposit of soil so affected. In general, soils that are susceptible to liquefaction include very loose to medium dense, clean to silty sands that are below the water table.

The evaluation of liquefaction potential depends on numerous site parameters, including soil grain size, soil density, site geometry, static stresses and the design ground acceleration. Typically, the liquefaction potential of a site is evaluated by comparing the cyclic shear stress ratio (the ratio of the cyclic shear stress to the initial effective overburden stress) induced by an earthquake to the cyclic shear stress ratio required to cause liquefaction. We evaluated the earthquake-induced cyclic shear stress ratio at this site using an empirical relationship developed by researchers for this purpose.

Analysis of SPT data from the borings indicates that there is a potential for liquefaction in sand layers within the lacustrine deposits. We estimate that the factor of safety is less than 1 for isolated layers of sand located at depths ranging from 15 to 45 feet bgs.

Liquefaction-induced free-field ground settlement of the potentially liquefiable zones for each boring is estimated to be on the order of 4 to 8 inches and 8 to 16 inches for borings B-1-19 and B-2-19, respectively, for the design-level earthquake. The magnitude of liquefaction-induced ground settlement will vary as a function of the characteristics of the earthquake (earthquake magnitude, location, duration and intensity) and the soil and groundwater conditions.

It is our opinion that the use of piles to support the building foundations will effectively mitigate the risk of liquefaction-induced settlement to the structure, provided the piles are embedded in the underlying very dense/hard glacial till. We understand that the floor system will be designed to be sacrificial, therefore estimated liquefaction settlement of the floor system is not a concern.

4.3.3. Lateral Spreading

Ground rupture from lateral spreading is associated with liquefaction. Lateral spreading involves lateral displacements of large volumes of liquefied soil, and can occur on near-level ground as blocks of surface soils displace relative to adjacent blocks.

Preliminary analyses were performed to assess lateral spreading potential due to liquefiable soils during the design level earthquake. Lateral spreading analyses were performed based on bathymetry data shown

in a nautical chart developed by the National Oceanic and Atmospheric Administration (NOAA). The chart provides rough bathymetry data in Union Bay. The building is located approximately 500 feet west of Union Bay. Based on our analyses, ground rupture due to lateral spreading is unlikely at the site.

4.3.4. Ground Rupture

Ground rupture from lateral spreading is associated with liquefaction. Lateral spreading involves lateral displacements of large volumes of liquefied soil, and can occur on near-level ground as blocks of surface soils displace relative to adjacent blocks. In our opinion, ground rupture resulting from lateral spreading at the site is low if the building will be pile supported.

Because of the thickness of the Quaternary sediments below the site, which are commonly more than 1,000 feet thick, the potential for surface fault rupture is considered remote.

4.3.5. Landslides

Because of the new below-grade retaining walls that will be installed on site for the building and the removal of a large amount of soil on the slope for the building, it is our opinion that landsliding as a result of strong ground shaking is unlikely at this site.

4.4. Foundation Systems

Unsuitable soils consisting of fill and lacustrine deposits exist below the planned building. Based on the borings completed for the site, we anticipate that competent dense glacial till is present approximately 33 to 48 feet below existing site grades. Estimated liquefaction induced settlement (4 to 8 inches and 8 to 16 inches for borings B-1-19 and B-2-19, respectively) from the design level earthquake will impact the proposed building, but can be mitigated using deep foundations. However, provided that the building is designed for life safety and in accordance with the IBC, the building may be designed to withstand a design level earthquake without catastrophic failure and liquefaction settlement may be tolerated. If it is determined that the structure can tolerate anticipated liquefaction induced settlement and maintain life safety, the structure may be built on conventional shallow foundations. Pile foundations should be used if estimated liquefaction induced settlement is not tolerable.

We understand that typical static column loads will be less than 1,000 psf. We also understand that the current intent is to design a sacrificial slab-on-grade for the building. The following recommendations for the building foundations are based on the subsurface conditions observed in the explorations.

4.4.1. Conventional Shallow Foundations

We recommend that the proposed building foundations be supported on conventional spread footings bearing on at least 2 feet of properly compacted structural fill. For shallow foundation support we recommend widths of at least 18 and 24 inches, respectively, for continuous wall and isolated column footings supporting the proposed building. Exterior footings should be founded at least 18 inches below lowest adjacent finished grade. Interior footings should be founded at least 12 inches below bottom of slab or adjacent finished grade.

Footings supported on structural fill may be designed using an allowable bearing pressure of 2,000 psf. The allowable bearing pressures may be increase by one-third for short duration loads such as wind or seismic events.

The overexcavated foundation areas should be backfilled with imported gravel borrow or crushed rock. Two feet of existing soil should be removed from below building foundations to accomplish this, the exposed subgrade should then be compacted to the extent practical, and then two feet of properly compacted structural fill should be placed. The structural fill should extend at least two feet beyond the edges of the foundations.

Deep foundations should be utilized if it is determined that the liquefaction induced settlement is not tolerable for shallow foundations.

4.4.1.1. Foundation Settlement

We estimate that the post-construction settlement of footings founded on 2 feet of properly compacted structural fill, as recommended above, will be less than 1 inch. Differential settlement between comparably loaded column footings or along a 30-foot section of continuous wall footing should be less than ½ inch. We expect most of the footing settlements will occur as loads are applied. Loose or disturbed soils not removed from footing excavations prior to placing concrete will result in additional settlement.

As mentioned in the "Liquefaction Potential" section above, liquefaction-induced free-field ground settlement of the potentially liquefiable zones for each boring is estimated to be on the order of 4 to 8 inches and 8 to 16 inches for borings B-1-19 and B-2-19, respectively, for the design-level earthquake.

4.4.1.2. Lateral Resistance

Lateral loads can be resisted by passive resistance on the sides of the footings and by friction on the base of the footings. Passive resistance should be evaluated using an equivalent fluid density of 200 pounds per cubic foot (pcf) where footings are poured neat against native soil or are surrounded by structural fill compacted to at least 95 percent of maximum dry density (MDD), as recommended. Resistance to passive pressure should be calculated from the bottom of adjacent floor slabs and paving or below a depth of 1 foot where the adjacent area is unpaved, as appropriate. Frictional resistance can be evaluated using 0.35 for the coefficient of base friction against footings. The above values incorporate a factor of safety of about 1.5.

If soils adjacent to footings are disturbed during construction, the disturbed soils must be recompacted, otherwise the lateral passive resistance value must be reduced.

4.4.1.3. Construction Considerations

Immediately prior to placing concrete, all debris and loose soils that accumulated in the footing excavations during forming and steel placement must be removed. Debris or loose soils not removed from the footing excavations will result in increased settlement.

If wet weather construction is planned, we recommend that all footing subgrades be protected using a lean concrete mud mat. The mud mat should be placed the same day that the footing subgrade is excavated and approved for foundation support.

We recommend that all completed footing excavations, as well as the overexcavated/backfill areas, be observed by a representative of our firm prior to placing mud mat, reinforcing steel, and structural concrete. Our representative will confirm that the bearing surface has been prepared in a manner consistent with our recommendations and that the subsurface conditions are as expected.

4.4.2. Deep Foundations

Deep foundations are appropriate if it is determined that the liquefaction induced settlement is not tolerable for the building. Deep foundations should extend through the unsuitable soils and be embedded in the underlying dense to very dense glacial till. We recommend using 6- to 8-inch-diameter driven steel pipe piles or 12-, 16- and 18-inch augercast piles depending on the required loads and uplift requirements. We understand that the current intent is to design a sacrificial slab-on-grade, therefore pile support is not necessary beneath the slab-on-grade.

4.4.2.1. Driven Steel Pipe Piles

Six- or eight-inch-diameter driven steel pipe piles may be used for support of the building. The pipe pile spacing should be determined by the project structural engineer. The pipe piles should be connected with a grade beam to help transfer loads between adjacent piles.

Steel pipe piles should be installed using a pneumatic impact equipment capable of penetrating a sufficient depth to develop the design loads. McDowell Northwest Pile King of Kent, Washington has equipment capable of installing this type of pile. The pipe piles should be driven at least 10 feet into the very dense/hard glacial to develop the required axial capacity. Preliminary pile tip elevations are estimated to be at about Elevation 0 feet at boring B-1-19 and Elevation -22 feet at boring B-2-19. We recommend that a static load test be completed on at least one pipe pile for each diameter to verify actual capacity.

Typical refusal criteria for 6-inch steel pipe piles consists of less than 1 inch of penetration after 6 seconds with a 3,000-pound hammer (TB-830X) or after 5 seconds with a 4,700-pound hammer (BXR-50). Refusal criteria for 8-inch steel pipe piles consists of less than 1 inch of penetration after 10 seconds with a 3,000-pound hammer (TB-830X) or after 8 seconds with a 4,700-pound hammer (BXR-50). Axial and uplift capacities are present in the "Axial Capacity" section of this report.

Higher noise levels and vibrations during pile driving to install the steel pipe piles should be evaluated with respect to other campus operations that may be sensitive to these impacts during foundation construction. Augercast piles will have lower installation impacts with respect to noise and vibrations, and should be considered in lieu of steel pipe piles, if needed.

4.4.2.2. Augercast Piles

Augercast piles (12-inch-, 16-inch- or 18-inch-diameter) may also be used for foundation support. Augercast piles are constructed using a continuous-flight, hollow-stem auger attached to a set of leads supported by a crane or installed with a fixed-mast drill rig. The first step in the pile casting process consists of drilling the auger into the ground to the specified tip elevation of the pile. Grout is then pumped through the hollow stem during steady withdrawal of the auger, replacing the soils on the flights of the auger. The final step is to install a steel reinforcing cage and typically a center bar into the column of fresh grout. One benefit of using augercast piles is that the auger provides support for the soils during the pile installation process, thus eliminating the need for temporary casing or drilling fluid.

Installation of augercast piles produces nominal noise and ground vibrations, which may be beneficial given the proximity of the Nordstrom Tennis Center.

4.4.2.3. Construction Considerations

The augercast piles should be installed using a continuous-flight, hollow-stem auger. Given the distinct contrast in stiffness between the lacustrine deposits and the underlying glacial till, and the need to develop pile capacity from these soils, it is important that the piles achieve a consistent embedment into the glacial

till. In order to confirm that the piles are consistently embedded into the glacial till, we recommend that the contractor use drilling equipment instrumented to measure and display crowd speed, crowd force, and/or drill pressure during augercast pile installation.

These measurements can be used as an indication of the transition from softer lacustrine deposits to denser glacial till, which can be used to estimate pile embedment in the glacial till. Production piles located in close proximity to one of the geotechnical borings completed for this project should be installed at the beginning of pile construction to calibrate the typical resistance measured for the lacustrine deposits and the glacial till. This process will provide the required information to determine whether the piles have been installed to an appropriate length and may eliminate the need for static pile load testing. This approach has been used successfully on previous projects in Seattle that GeoEngineers provided construction observation for.

As is standard practice, the pile grout must be pumped under pressure through the hollow stem as the auger is withdrawn. Maintenance of adequate grout pressure at the auger tip is critical to reduce the potential for encroachment of adjacent native soils into the grout column. The rate of withdrawal of the auger must remain constant throughout the installation of the piles in order to reduce the potential for necking of the piles. Failure to maintain a constant rate of withdrawal of the auger should result in immediate rejection of that pile. Reinforcing steel for bending and uplift should be placed in the fresh grout column as soon as possible after withdrawal of the auger. Centering devices should be used to provide concrete cover around the reinforcing steel.

The contractor should adhere to a waiting period of at least 12 hours between the installation of piles spaced closer than 8 feet, center-to-center. This waiting period is necessary to avoid disturbing the curing concrete in previously cast piles.

Grout pumps must be fitted with a volume-measuring device and pressure gauge so that the volume of grout placed in each pile and the pressure head maintained during pumping can be observed. A minimum grout line pressure of 100 pounds per square inch (psi) should be maintained. The rate of auger withdrawal should be controlled during grouting such that the volume of grout pumped is equal to at least 115 percent of the theoretical pile volume. A minimum head of 10 feet of grout should be maintained above the auger tip during withdrawal of the auger to maintain a full column of grout and to prevent hole collapse.

The geotechnical engineer of record should observe the drilling operations, monitor grout injection procedures, record the volume of grout placed in each pile relative to the calculated volume of the hole, and evaluate the adequacy of individual pile installations.

4.4.2.4. Axial Capacity

Axial pile load capacity at this site will primarily be developed from end bearing in the very dense/hard glacial till with some additional capacity attributed to side frictional resistance. Uplift pile capacity will also be developed from side frictional resistance in these soils. Recommended maximum allowable axial capacities for driven steel pipe piles and augercast piles are presented in Table 2. Augercast and steel pipe piles should be embedded at least 10 feet into the dense to very dense glacial till to develop the required axial capacity. Achieving 10 feet of embedment with steel pipe piles may be difficult.

TABLE 2. AUGERCAST AND DRIVEN PIPE PILE ALLOWABLE AXIAL CAPACITIES

Pile Type	Allowable Axial Capacity (kips)	Allowable Uplift Capacity (kips)
6-inch Steel Pipe	30	5
8-inch Steel Pipe	45	10
12-inch Augercast	90	70
16-inch Augercast	145	90
18-inch Augercast	175	105

Allowable pile capacities were evaluated based on Allowable Stress Design (ASD), and are for combined dead plus long-term live loads and may be increased by one-third when considering design loads of short duration such as seismic forces. The allowable capacities are based on the strength of the supporting soils and include a factor of safety of 3 for end bearing and 2 for shaft friction. The capacities apply to single piles. If piles are spaced at least three pile diameters on center, as recommended, no reduction of axial capacity for group action is needed, in our opinion.

The structural characteristics of pile materials and structural connections may impose limitations on pile capacities and should be evaluated by the structural engineer.

4.4.2.5. Lateral Capacity

Lateral loads can be resisted by passive soil pressure on the vertical piles and by the passive soil pressures on the pile cap. Because of the potential separation between the pile-supported foundation components and the underlying soil from settlement, base friction along the bottom of the pile cap should not be included in calculations for lateral capacity.

We evaluated the lateral pile capacity for 12-, 16- and 18-inch augercast piles and 6- to 8-inch driven steel pipe piles using LPILE v2016 by Ensoft, Inc. We evaluated pile shear and bending moments by controlling lateral deflections at the top of the pile. LPILE runs were completed for deflections of ¼, ½, 1, and 2 inches. Plots from LPILE of deflection vs depth, shear force vs depth and bending moment vs depth for the five pile sizes are provided in Figures 3 through 17. The recommended design parameters for the primary soil units are summarized in Table 3. The structural engineer may use the recommended design LPILE soil parameters to evaluate lateral pile capacities for other loading conditions or pile sizes.

TABLE 3. LATERAL PILE DESIGN PARAMETERS

Soil Unit	Approximate Depth to Bottom of Soil Unit (ft)	LPILE Soil Model	Effective Unit Weight (pcf)	Friction Angle (degrees)	LPILE Soil Modulus, k (pci)	Undrained Cohesion (psf)	E50
Fill	15	Sand (Reese)	120	30	60	-	-
Lacustrine Deposits	48	Sand (Reese)	57.6	28	25	-	-
Glacial Till	100	Sand (Reese)	130	40	200	-	-

Notes:
pci – pounds per cubic inch

Piles spaced closer than eight pile diameters apart will experience group effects that will result in a lower lateral load capacity for trailing rows of piles with respect to leading rows of piles for an equivalent deflection. We recommend that the lateral load capacity for trailing piles in a pile group spaced three pile diameters apart be reduced by a factor of 0.6. Reductions of the lateral load capacity for trailing piles at spacings greater than three pile diameters but less than eight pile diameters apart can be linearly interpolated.

We recommend that the passive soil pressure acting on the pile cap be estimated using an equivalent fluid density of 200 pcf where the soil adjacent to the foundation consists of adequately compacted structural fill. This passive resistance value includes a factor of safety of 1.5 and assumes a minimum lateral deflection of 1 inch to fully develop the passive resistance. Deflections that are less than 1 inch will not fully mobilize the passive resistance in the soil.

4.4.2.6. Pile Settlement

We estimate that the post-construction settlement of pile foundations, designed and installed as recommended, will be on the order of ½-inch or less. Maximum differential settlement should be less than about one-half the post-construction settlement. Most of this settlement will occur rapidly as loads are applied.

4.4.2.7. Nordstrom Tennis Center Pile Spacing

We understand that the Nordstrom Tennis Center is supported on piles and that piles for the proposed Softball Performance Center building may be located close to the existing Nordstrom Tennis Center piles. New piles constructed for the Softball Performance Center Building should maintain a distance that is equal to 3 pile diameters of the Nordstrom Tennis Center piles. Provided this distance is achieved, the new pile capacities will not be affected by the existing piles. GeoEngineers can evaluate the affect on the pile capacities if spaced closer than the distance noted above.

4.5. Landfill Gas Collection

Provisions should be made under the floor slabs in contact with the soil to vent potential accumulations of landfill gas (which includes methane). We recommend placing a perforated pipe within a gravel layer below the floor slabs and venting the pipes outside the building. Methane vapor mitigation should also include placing a 30-mil polyvinyl chloride (PVC) liner beneath the floor slab system to act as a methane and water vapor barrier.

4.5.1. Methane Barrier

We recommend that the methane barrier consist of a 30-mil PVC geomembrane. The geomembrane should be installed by an approved and experienced contractor. All seams and penetrations must be sealed/welded in accordance with the manufacturer's recommendations. All tears or punctures must be repaired in accordance with the manufacturers' requirements. Equipment traffic and foot traffic on top of the installed barrier must be kept to a minimum. Cushion geotextiles should also be used to protect the geomembrane from potential damage below and above the barrier. The contractor must not drive any form stakes through the barrier or otherwise damage the barrier during construction.

The geomembrane should be installed in such a manner as to provide an impermeable seal at all pipe penetrations or discontinuities, such as interior and exterior foundations, grade beams, column risers and utility pipes, which penetrate the barrier. On subgrade surfaces, all sharp points and projections must be

removed to limit rips, tears and punctures of the geomembrane. If damage is identified during geomembrane installation, it must be repaired immediately. The geomembrane installation should be constructed in accordance with the manufacturer's recommendations.

Geomembrane integrity testing should also be completed in accordance with the manufacturer/installer approved quality assurance manual. Where punctures, tears and/or unsatisfactory welded seams are identified, appropriate repairs should be made until no evidence of potential leaks are detected. These repairs should be documented and approved by the owner's representative. The engineer should observe the installer's quality assurance/quality control (QA/QC) program during construction.

4.5.2. Vent Pipe System

For planning purposes, we recommend a perforated vent pipe be installed along the central east-west axis of the building. The perforated pipe should be placed within a 6-inch-layer of clean crushed gravel with negligible sand or silt in conformance with Section 9-03.1(4)C, Grading No. 67 of the 2018 Washington State Department of Transportation (WSDOT) Standard Specifications. This layer will act as a capillary break and methane collection layer. We recommend that two lateral perforated vent pipes extend to the north from the main east-west vent pipe and connect to the two Nordstrom Tennis Center vent pipes beyond the exterior building wall. The methane pipes should then vent vapors to the atmosphere by extending vertical riser pipes within the 6-inch gap between the two buildings to a point above the top of the tennis center building. The vent pipes should be designed such that precipitation or animals cannot enter the pipe.

The perforated pipes used under the building should consist of 4-inch-diameter, machine slotted PVC pipe, or an approved equal. Solid wall (blank) PVC pipe should be used in below-grade pipe runs that extend outside the building footprint. GeoEngineers can assist with the layout and design of the methane venting and geomembrane, if needed.

4.6. Footing Drains

We recommend that perimeter footing drains be installed around the building. The perimeter drains should be installed at the base of the exterior footings as shown on Figure 18, Wall Drainage and Backfill. The perimeter drains should be provided with cleanouts and should consist of at least 4-inch-diameter perforated pipe placed on a 3-inch bed of, and surrounded by, 6 inches of drainage material enclosed in a non-woven geotextile fabric such as Mirafi 140N (or approved equivalent) to prevent fine soil from migrating into the drain material. We recommend against using flexible tubing for footing drainpipes. The perimeter drains should be sloped to drain by gravity, if practicable, to a suitable discharge point, preferably a storm drain. We recommend that the cleanouts be covered and be placed in flush mounted utility boxes. Water collected in roof downspout lines must not be routed to the footing drain lines.

4.7. Slab-on-Grade Floor

We understand that the current intent is to design a sacrificial slab-on-grade, therefore connections to pile supported grade beams will not be required for the slab. We recommend that an appropriate capillary break and vapor retarder be installed below the floor slabs to reduce the risk of moisture migration through the floor slab where moisture intrusion is not desirable.

We recommend that concrete slabs-on-grade be constructed on a gravel layer to provide uniform support and drainage, and to act as a capillary break. Prior to placing the gravel layer, the subgrade should be proof

rolled as described below in the earthwork section of this report. If necessary, the subgrade should be recompacted to a firm condition.

The gravel layer below slabs-on-grade should consist of 4 inches of clean crushed rock, with a maximum particle size of 1 inch and negligible sand or silt. If prevention of moisture migration through the slab is essential, a vapor retarder such as heavy plastic sheeting should be installed between the slab and the gravel layer. It may also be prudent to apply a sealer to the slab to further retard the migration of moisture through the floor. We recommend that the plastic sheet be placed over the capillary break layer.

The static settlement of the slab depends on the loading of the slab. Assuming that the slab has a bearing pressure of 200 psf or less, we estimate it will settle less than 2 inches.

4.7.1. Underslab Drainage

We understand the slab of the proposed softball building will be located at about Elevation 33.5 feet. Groundwater could accumulate below the slab-on-grade floor system because the building will be cut into the existing slopes to the west and south. To mitigate potential seepage and build-up of hydrostatic pressure below the slab, we recommend that the slab be provided with underdrainage to collect and discharge groundwater from below the floor system. This can be accomplished by using the methane collection pipe described in the "Landfill Gas Collection" section also as an underslab drain pipe. We recommend that the east end of the methane/drain pipe be connected to the perimeter footing drain pipe. The invert of the underdrain pipe should be higher than the invert of the footing drain pipe where they meet.

The collector pipe should be sloped to drain and discharge into the storm water collection system to convey the water off site. The pipe should also incorporate cleanouts, if possible. The cleanouts could be extended through the foundation walls to be accessible from the outside, or could be placed in flush mounted access boxes cast into the floor slab.

4.8. Below-Grade Walls and Retaining Walls

The following recommendations should be used for the design of below-grade walls that are intended to act as retaining walls and for other retaining structures that are used to achieve grade changes.

4.8.1. Permanent Below-Grade Walls

Lateral earth pressures for design of below-grade walls and retaining structures should be evaluated using an equivalent fluid density of 35 pcf provided that the walls will not be restrained against rotation when backfill is placed. If the walls will be restrained from rotation, we recommend using an equivalent fluid density of 55 pcf. Walls are assumed to be restrained if top movement during backfilling is less than H/1000, where H is the wall height. These lateral soil pressures assume that the ground surface behind the wall is horizontal. For unrestrained walls with backfill sloping up at 2H:1V, the design lateral earth pressure should be increased to 55 pcf, while restrained walls with a 2H:1V sloping backfill should be designed using an equivalent fluid density of 75 pcf. These lateral soil pressures do not include the effects of surcharges such as floor loads, traffic loads or other surface loading. Surcharge effects should be included as appropriate. Potential impacts to adjacent structures should also be evaluated by the structural engineer. Below-grade walls for the softball building should also include seismic earth pressures. Seismic earth pressures should be included as a rectangular distribution determined using 8H in psf, where H is the wall height.

If vehicles can approach the tops of exterior walls to within half the height of the wall, a traffic surcharge should be added to the wall pressure. For car parking areas, the traffic surcharge can be approximated by the equivalent weight of an additional 1 foot of soil backfill (about 125 psf) behind the wall. For delivery truck parking areas and access driveway areas, the traffic surcharge can be approximated by the equivalent weight of an additional 2 feet (250 psf) of soil backfill behind the wall. These traffic surcharge loads can also be calculated based on a rectangular distributed load (equivalent fluid density) to the wall of 35 psf for car parking areas and 70 psf for truck parking areas. Positive drainage should be provided behind below-grade walls and retaining structures as discussed below.

These recommendations assume that any retaining walls at this project will be provided with backdrainage. The values for soil bearing, frictional resistance and passive resistance presented above for foundation design are applicable to retaining wall design. Walls located in level ground areas should be founded at a depth of 18 inches below the adjacent grade.

4.8.2. Backdrainage

To reduce the potential for hydrostatic water pressure buildup behind the retaining walls, we recommend that the walls be provided with backdrainage. Backdrainage can be achieved by using free draining material with perforated pipes to discharge the collected water as shown on Figure 18. The zone of free-draining material should be 2 feet wide and should extend from the base of the wall to within 2 feet of the ground surface. The free draining material should be covered with 1 foot of less permeable material, such as the on-site fill soil underlain by a geotextile separator such as Mirafi 140N. We recommend against using flexible tubing for wall backdrain pipe. The footing drain recommended above can be incorporated into the bottom of the backdrainage zone and used for this purpose.

The pipes should be laid with minimum slopes of one-quarter percent (if possible) and discharge into the stormwater collection system to convey the water off site. The pipe installations should include a cleanout riser with cover located at the upper end of each pipe run. The cleanouts could be placed in flush mounted access boxes. Roof downspouts must not discharge into the perforated pipes intended for providing wall back drainage.

4.8.3. Other Considerations

Exterior retaining systems used to achieve grade transitions or for landscaping, can be constructed using traditional structural systems such as reinforced concrete, mechanically stabilized earth (MSE) walls, or concrete masonry units (CMU) blocks. Alternatively, rockeries can be used for grade changes and landscaping purposes, if needed. We can provide additional design recommendations for reinforced soil and block facing structures, if requested.

4.9. Earthwork

Based on the subsurface soil conditions encountered in the borings, we expect that the soils at the site may be excavated using conventional heavy-duty construction equipment. Cobbles and debris were not observed in the fill material during our borings, however; fill can contain cobbles and debris. Accordingly, the contractor should be prepared to deal with cobbles and debris, if encountered. Wood was also observed in the native soils and within the fill; therefore, the contractor should also be prepared to deal with these materials.

The fill contains sufficient fines (material passing the U.S. standard No. 200 sieve) to be highly moisture-sensitive and susceptible to disturbance, especially when wet. Ideally, earthwork should be undertaken during extended periods of dry weather when the surficial soils will be less susceptible to disturbance and provide better support for construction equipment. Dry weather construction will help reduce earthwork costs and increase the potential for using the drier native soils as structural fill.

Trafficability on the site is not expected to be difficult during dry weather conditions. However, the native soils will be susceptible to disturbance from construction equipment during wet weather conditions and pumping and rutting of the exposed soils under equipment loads may occur.

4.9.1. Clearing and Site Preparation

All existing utilities should be removed from the building footprint and rerouted if needed.

Areas to be developed or graded should be cleared of surface and subsurface deleterious matter including any debris, shrubs, trees and associated stumps and roots. Graded areas should be stripped of organic soils. Based on the borings, we anticipate that approximately 2 inches of stripping is needed to remove the sod and topsoil in the grass covered areas.

The organic soils can be stockpiled and used later for landscaping purposes or may be spread over disturbed areas following completion of grading. If spread out, the organic strippings should be in a layer less than 1-foot-thick, should not be placed on slopes greater than 3H:1V and should be track-rolled to a uniformly compacted condition. Materials that cannot be used for landscaping or protection of disturbed areas should be removed from the project site.

4.9.2. Subgrade Preparation

Prior to placing new fills, pavement base course materials or gravel below on-grade floor slabs, subgrade areas should be proof rolled to locate any soft or pumping soils. Proof rolling can be completed using a piece of heavy tire-mounted equipment such as a loaded dump truck. During wet weather, the exposed subgrade areas should be probed to determine the extent of soft soils. If soft or pumping soils are observed, they should be removed and replaced with structural fill.

If deep pockets of soft or pumping soils are encountered outside the building area, it may be possible to limit the depth of overexcavation by placing a non-woven geotextile fabric such as TenCate Mirafi 500X (or equivalent) on the overexcavated subgrade prior to placing structural fill. The geotextile will provide additional support by bridging over the soft material and will help reduce fines contamination into the structural fill.

After completing the proof rolling, the subgrade areas should be recompacted to a firm and unyielding condition, if possible. The degree of compaction that can be achieved will depend on when the construction is performed. If the work is performed during dry weather conditions, we recommend that all subgrade areas be recompacted to at least 95 percent of the MDD in accordance with the ASTM D 1557 test procedure (modified Proctor). If the work is performed during wet weather conditions, it may not be possible to recompact the subgrade to 95 percent of the MDD. In this case, we recommend that the subgrade be compacted to the extent possible without causing undue heaving or pumping of the subgrade soils.

Subgrade disturbance or deterioration could occur if the subgrade is wet and cannot be dried. If the subgrade deteriorates during proof rolling or compaction, it may become necessary to modify the proof rolling or compaction criteria or methods.

4.9.3. Structural Fill

All fill, whether existing on-site fill soil or imported soil, that will support floor slabs, pavement areas or foundations, or be placed against retaining walls or in utility trenches should generally meet the criteria for structural fill presented below. The suitability of soil for use as structural fill depends on its gradation and moisture content.

4.9.3.1. Materials

Structural fill material quality varies depending upon its use as described below:

1. Structural fill placed below all structure and pavement elements and during wet weather conditions should consist of imported gravel borrow, as described in Section 9-03.14(1) of the 2018 WSDOT Standard Specifications or City of Seattle Mineral Aggregate Type 17, with the additional restriction that the fines content be limited to no more than 5 percent.
2. Structural fill placed to backfill utility trenches may consist of on-site suitable fill soils provided that the soils are conditioned for the required compaction. On-site fill soils may be suitable for use as structural fill during dry weather conditions in areas needing 90 percent compaction. The existing soil will require moisture conditioning prior to use as structural fill. If structural fill is placed during wet weather, the structural fill should consist of imported gravel borrow, as described above.
3. Structural fill placed immediately outside below-grade walls (drainage zone) should consist of washed gravel, such as Seattle Mineral Aggregate Type 5 or conform to Section 9-03.12(4) of the 2018 WSDOT Standard Specifications, as shown on Figure 18. Alternatively, Seattle Mineral Aggregate Type 26 may be used without a geotextile fabric in conjunction with a geocomposite wall drainage board.
4. Structural fill placed as crushed surfacing base course (CSBC) below pavements should conform to Section 9-03.9(3) of the 2018 WSDOT Standard Specifications or Seattle Mineral Aggregate Type 2.
5. Structural fill placed as capillary break below slabs should consist of 1-inch minus clean crushed rock with negligible sand or silt in conformance with Section 9-03.1(4)C, grading No. 67 of the 2018 WSDOT Standard Specifications.

4.9.3.2. Reuse of On-site Soils

The fill soils contain a high percentage of fines and will be sensitive to changes in moisture content and difficult to handle and compact during wet weather.

The fill soils are expected to be suitable for use as structural fill in areas requiring compaction to at least 95 percent of MDD (per ASTM D 1557), provided the work is accomplished during the normally dry season (June through September) and that the soil can be properly moisture conditioned. Imported structural fill consisting of sand and gravel (WSDOT gravel borrow) should be planned under all building floor slabs and foundation elements and as wall backfill, especially if construction occurs during wet weather.

The contractor should plan to cover and maintain all fill stockpiles with plastic sheeting if it will be used as structural fill. The reuse of on-site soils is highly dependent on the skill and cooperation of the contractor

and schedule, and we will work with the design team and contractor to maximize the reuse of on-site glacial soils during the wet and dry seasons.

4.9.3.3. Fill Placement and Compaction Criteria

Structural fill should be mechanically compacted to a firm, non-yielding condition. Structural fill should be placed in loose lifts not exceeding 12 inches in thickness when using heavy compaction equipment and not more than 6 inches when using hand operated compaction equipment. The actual thickness will be dependent on the structural fill material used and the type and size of compaction equipment. Each lift should be moisture conditioned to within about 2 percent of the optimum moisture content to achieve proper compaction to the specified density before placing subsequent lifts. Compaction of all structural fill at the site should be in accordance with the ASTM D 1557 (modified proctor) test method. Structural fill should be compacted to the following criteria:

1. Structural fill placed below floor slabs and foundations should be compacted to 95 percent of the MDD.
2. Structural fill placed behind below-grade walls should be compacted to between 90 to 92 percent of the MDD estimated in accordance with ASTM D 1557. Care should be taken when compacting fill near the face of below-grade walls to avoid over-compaction and hence overstressing the walls. Hand operated compactors should be used within 5 feet behind the wall. The upper 2 feet of fill below floor slab subgrade should also be compacted to at least 95 percent of the MDD. The contractor should keep all heavy construction equipment away from the top of retaining walls a distance equal to half the height of the wall, or at least 5 feet, whichever is greater.
3. Structural fill in new pavement and hardscape areas, including utility trench backfill, should be compacted to at least 90 percent of the MDD, except that the upper 2 feet of fill below final subgrade should be compacted to at least 95 percent of the MDD, see Figure 19, Compaction Criteria for Trench Backfill.
4. Non-structural fill, such as fill placed in landscape areas, should be compacted to at least 90 percent of the MDD.

4.9.3.4. Weather Considerations

Disturbance of near surface soils should be expected if earthwork is completed during periods of wet weather. During dry weather, the soils will: (1) be less susceptible to disturbance; (2) provide better support for construction equipment; and (3) be more likely to meet the required compaction criteria.

The wet weather season generally begins in October and continues through May in Western Washington; however, periods of wet weather may occur during any month of the year. For earthwork activities during wet weather, we recommend that the following steps be taken:

- The ground surface in and around the work area should be sloped so that surface water is directed away from the work area. The ground surface should be graded so that areas of ponded water do not develop. Measures should be taken by the contractor to prevent surface water from collecting in excavations and trenches. Measures should be implemented to remove surface water from the work area.
- Earthwork activities should not take place during periods of moderate to heavy precipitation.
- Slopes with exposed soils should be covered with plastic sheeting.

- The contractor should take necessary measures to prevent on-site soils and soils to be used as fill from becoming wet or unstable. These measures may include the use of plastic sheeting, sumps with pumps and grading. The site soils should not be left uncompacted and exposed to moisture. Sealing the surficial soils by rolling with a smooth-drum roller prior to periods of precipitation will help reduce the extent that these soils become wet or unstable.
- The contractor should cover all soil stockpiles that will be used as structural fill with plastic sheeting.
- Construction traffic should be restricted to specific areas of the site, preferably areas that are surfaced with the existing asphalt or working pad materials not susceptible to wet weather disturbance.
- Construction activities should be scheduled so that the length of time that soils are left exposed to moisture is reduced to the extent practical.

Routing of equipment on the fill subgrade soils during the wet weather months will be difficult and the subgrade will likely become highly disturbed and rutted. In addition, a significant amount of mud can be produced by routing equipment directly on the existing fill soils in wet weather. Therefore, to protect the subgrade soils and to provide an adequate wet weather working surface for the contractor's equipment and labor, we recommend that the contractor protect exposed subgrade soils with crushed rock or asphalt-treated base (ATB).

4.9.4. Permanent Cut and Fill Slopes

We recommend that permanent cut or fill slopes be constructed at inclinations of 2H:1V or flatter, and be blended into existing slopes with smooth transitions. To achieve uniform compaction, we recommend that fill slopes be overbuilt slightly and subsequently cut back to expose well compacted fill.

To reduce erosion, newly constructed slopes should be planted or hydroseeded shortly after completion of grading. Until the vegetation is established, some sloughing and raveling of the slopes should be expected. This may necessitate localized repairs and reseeding. Temporary covering, such as clear heavy plastic sheeting, jute fabric, or erosion control blankets (such as American Excelsior Curlex 1 or North American Green SC150) could be used to protect the slopes during periods of rainfall.

4.9.5. Utility Trenches

Trench excavation, pipe bedding, and trench backfilling should be completed using the general procedures described in the 2018 WSDOT Standard Specifications or other suitable procedures required by the City of Seattle or specified by the project civil engineer. The fill soils encountered at the site are generally of low corrosivity based on our experience in the Puget Sound area.

Utility trench backfill should consist of structural fill and should be placed in loose lifts not exceeding 12 inches in thickness when using heavy compaction equipment and not more than 6 inches when using hand operated compaction equipment such that adequate compaction can be achieved throughout the lift. Each lift must be compacted prior to placing the subsequent lift. Prior to compaction, the backfill should be moisture conditioned to within 2 percent of the optimum moisture content, if necessary. The backfill should be compacted in accordance with the criteria discussed above. Figure 19 illustrates recommended trench compaction criteria under pavement and non-structural areas.

4.9.6. Sedimentation and Erosion Control

In our opinion, the erosion potential of the on-site soils is low to moderate. Construction activities including stripping and grading will expose soils to the erosional effects of wind and water. The amount and potential impacts of erosion are partly related to the time of year that construction actually occurs. Wet weather construction will increase the amount and extent of erosion and potential sedimentation.

Erosion and sedimentation control measures may be implemented by using a combination of interceptor swales, straw bale barriers, silt fences and straw mulch for temporary erosion protection of exposed soils. All disturbed areas should be finish graded and seeded as soon as practicable to reduce the risk of erosion. Erosion and sedimentation control measures should be installed and maintained in accordance with the requirements of the City of Seattle.

4.10. Temporary Cut Slopes

For planning purposes, temporary unsupported cut slopes more than 4 feet high may be inclined at 1½H:1V maximum steepness in the existing fill and lacustrine deposits above the groundwater table. If significant seepage is present on the cut face, then the cut slopes may have to be flattened. However, temporary cuts should be discussed with the geotechnical engineer during final design development to evaluate suitable cut slope inclinations for the various portions of the excavation.

The above guidelines assume that surface loads such as traffic, construction equipment, stockpiles or building supplies will be kept away from the top of the cut slopes a sufficient distance so that the stability of the excavation is not affected. We recommend that this distance be at least 5 feet from the top of the cut for temporary cuts made at 1.5H:1V or flatter.

Temporary cut slopes should be planned such that they do not encroach on a 1H:1V influence line projected down from the edges of nearby or planned foundation elements, including adjacent Husky Stadium structures.

Water that enters the excavation must be collected and routed away from prepared subgrade areas. We expect that this may be accomplished by installing a system of drainage ditches and sumps along the toe of the cut slopes. Some sloughing and raveling of the cut slopes should be expected. Temporary covering, such as heavy plastic sheeting with appropriate ballast, should be used to protect these slopes during periods of wet weather. Surface water runoff from above cut slopes should be prevented from flowing over the slope face by using berms, drainage ditches, swales or other appropriate methods.

If temporary cut slopes experience excessive sloughing or raveling during construction, it may become necessary to modify the cut slopes to maintain safe working conditions. Slopes experiencing problems can be flattened, regraded to add intermediate slope benches, or additional dewatering can be provided if the poor slope performance is related to groundwater seepage.

4.11. Drainage Considerations

All paved and landscaped areas should be graded so that surface drainage is directed away from the building to appropriate catch basins.

Water collected in roof downspout lines must not be routed to the footing drain lines. Collected downspout water should be routed to appropriate discharge points in separate pipe systems.

4.12. Infiltration Considerations

Sieve analyses were performed on selected soil samples collected from explorations completed at the site. The soil samples typically consisted of fill overlying lacustrine deposits and glacial till at depth. The fill typically has about 10 to 20 percent fines (silt) while the underlying lacustrine deposits have a fines content ranging from 20 to 66 percent. Although groundwater was observed 16 to 20 feet below the existing ground surface, we anticipate that perched water zones will be encountered at higher elevations, and possibly above the floor slab elevation.

In our opinion, infiltration facilities should not be planned at this site because there is a high risk that such systems can impact the building floor slab and methane gas collection systems. The floor slab system and methane collection system should be protected from potential seepage to prevent the capillary break and methane venting system from being inundated from water. Bio detention planters near the building should include a geomembrane barrier to prevent stormwater from impacting the building walls, floor slab or methane collection system.

4.13. Pavement Subgrade Preparation

We recommend the subgrade soils in new pavement areas be prepared and evaluated as described in the "Earthwork" section of this report. We recommend all subgrade areas for new asphalt pavement or concrete paver sections be prepared by placing at least 12 inches of imported structural fill compacted to at least 95 percent of the MDD (ASTM D-1557).

If existing subgrade soils are loose or soft, it may be necessary to excavate localized areas and replace them with additional gravel borrow or gravel base material. Pavement subgrade conditions should be observed and proof-rolled during construction and prior to placing the subbase materials in order to evaluate the presence of unsuitable subgrade soils and the need for over-excavation.

4.14. Recommended Additional Geotechnical Services

Throughout this report, recommendations are provided where we consider additional geotechnical services to be appropriate. These additional services are summarized below:

- GeoEngineers can assist with the layout and design of the methane venting system and geomembrane gas barrier, if needed.
- Temporary shoring may be required depending on site constraints near the existing Nordstrom Tennis Center. As the building design evolves, we recommend that temporary open cut slopes be evaluated for use and that temporary shoring be used where temporary cut slopes are not suitable.
- GeoEngineers should be retained to review the project plans and specifications when complete to confirm that our design recommendations have been implemented as intended, and submit a review letter to the City of Seattle as required.
- During construction, GeoEngineers should observe temporary cut slopes, observe installation of deep foundations, observe overexcavation of unsuitable soils, observe installation of the geomembrane barrier and methane venting system, evaluate the suitability of floor slab subgrades, observe retaining wall backfill, observe installation of subsurface drainage measures, observe and test structural backfill, and provide a summary letter of our construction observation services. The purposes of GeoEngineers construction phase services are to confirm that the subsurface conditions are consistent with those

observed in the borings and other reasons described in Appendix D, Report Limitations and Guidelines for Use.

5.0 LIMITATIONS

We have prepared this report for use by the UW and members of the design team for use in design of this project.

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

Any electronic form, facsimile or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix D for additional information pertaining to use of this report.

6.0 REFERENCES

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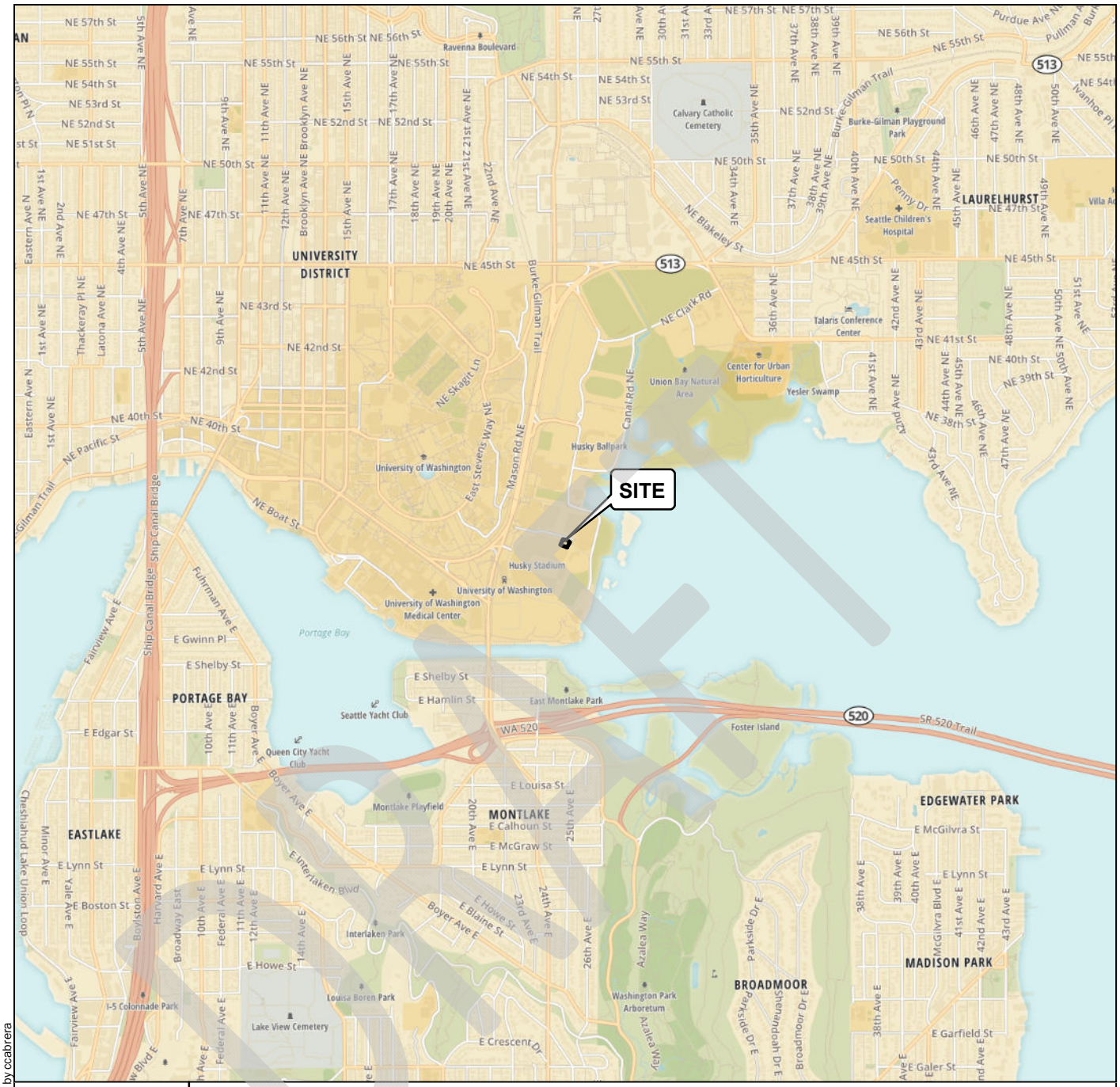

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Feet

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2016

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 1

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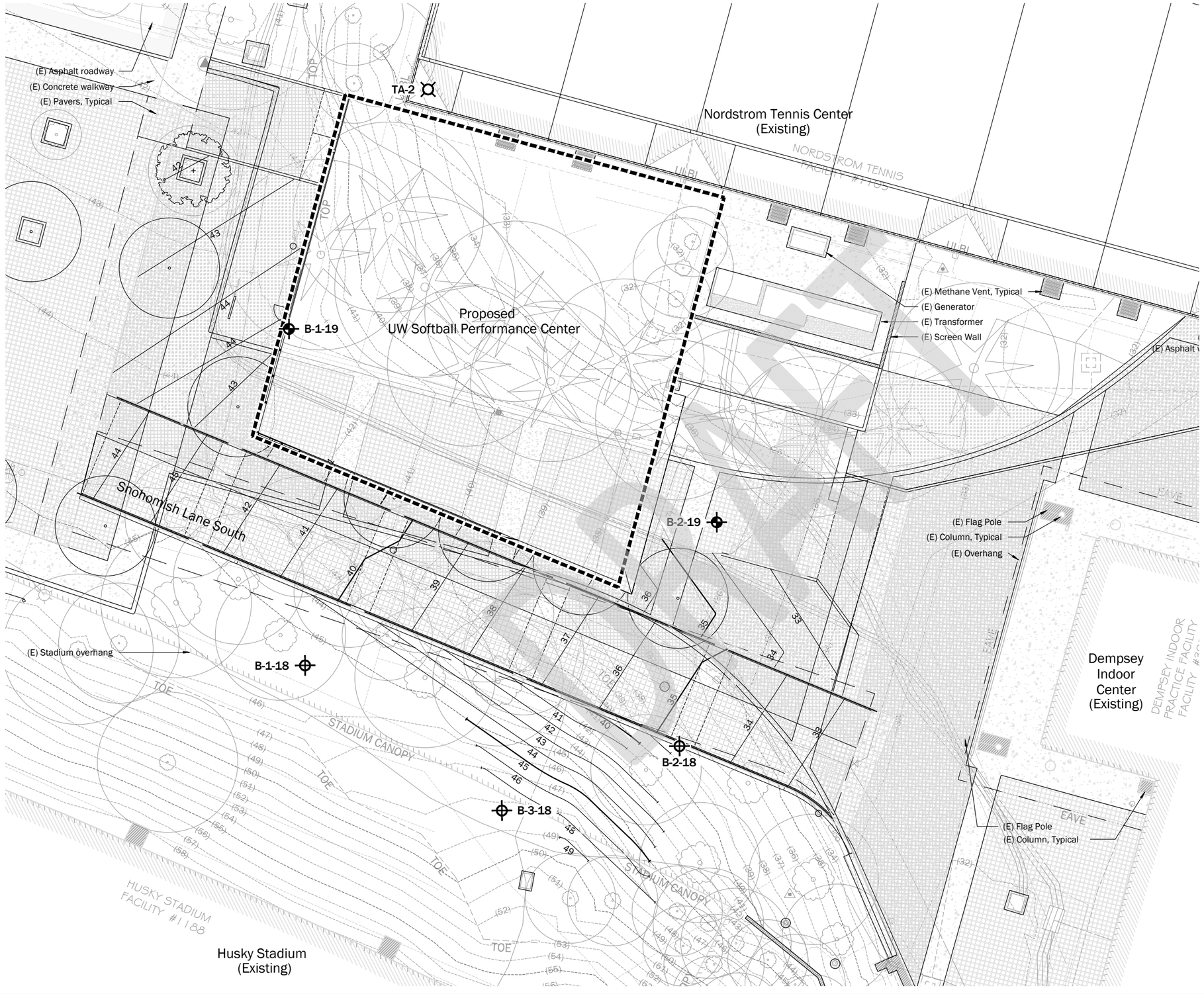

Legend

- Proposed Building Footprint
- B-1-19 — Boring by GeoEngineers, 2019
- B-1-18 — Boring by GeoEngineers, 2018
- TA-2 — Boring by Terra Associates, 1987

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base Survey provided by Bush, Roed & Hitchings, Inc., dated 05/15/19. Proposed feature from Proposed UW Softball Performance Center by SRG dated 07/26/2019.

Projection: WA State Plane, North Zone, NAD83, US Foot

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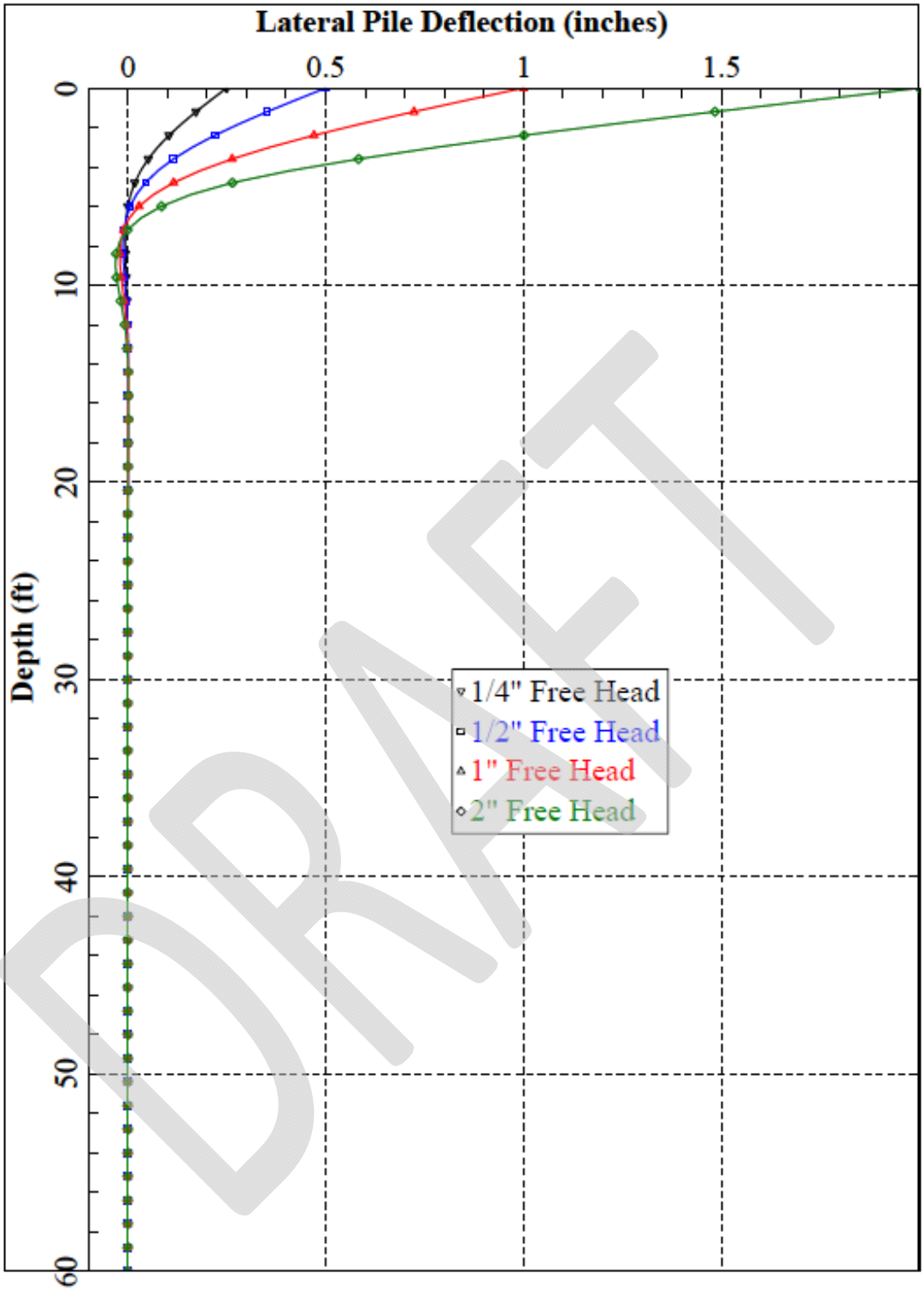
Site Plan

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 2



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

6-inch Steel Pipe Pile
Deflection vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 3

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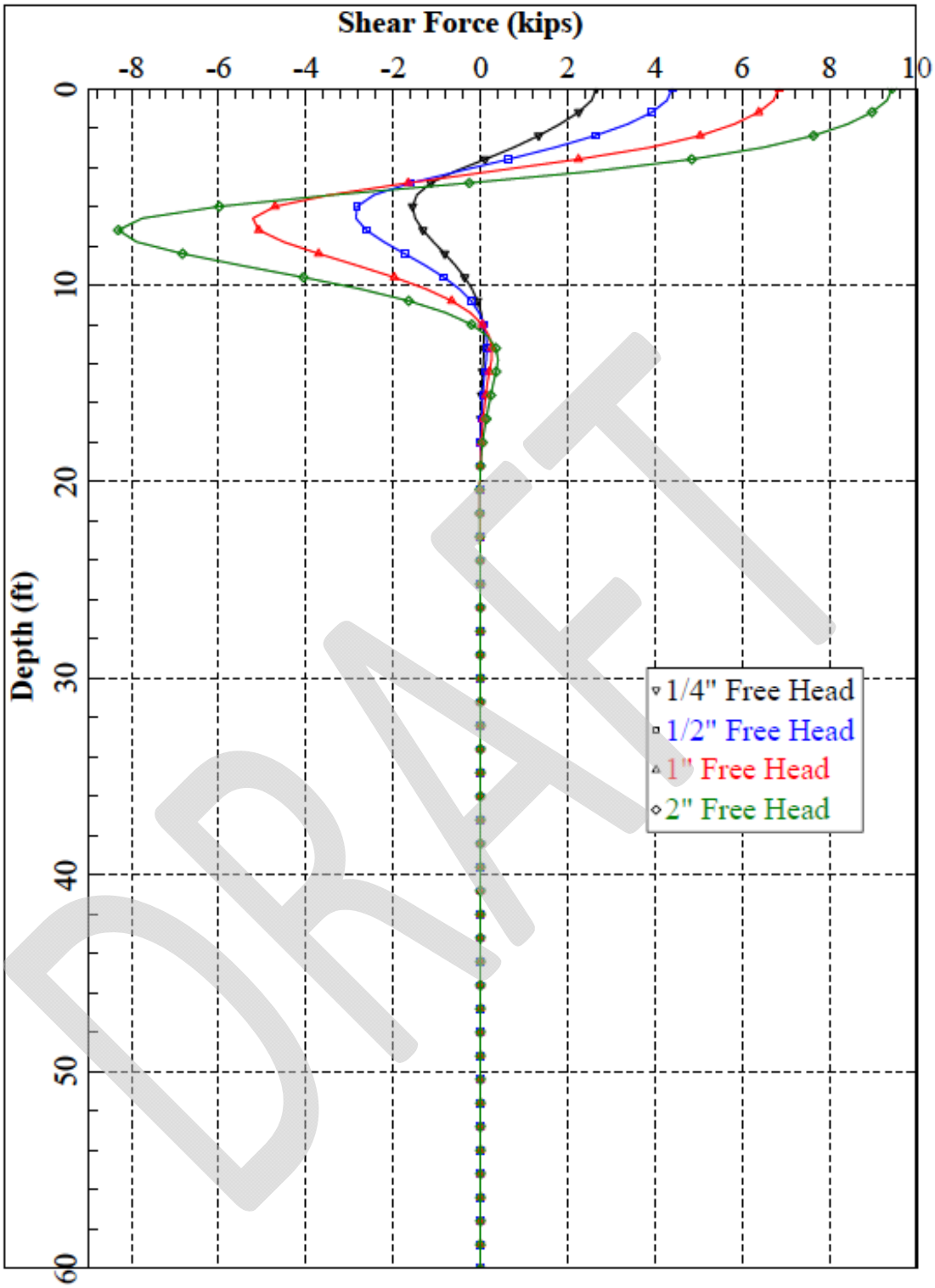


Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

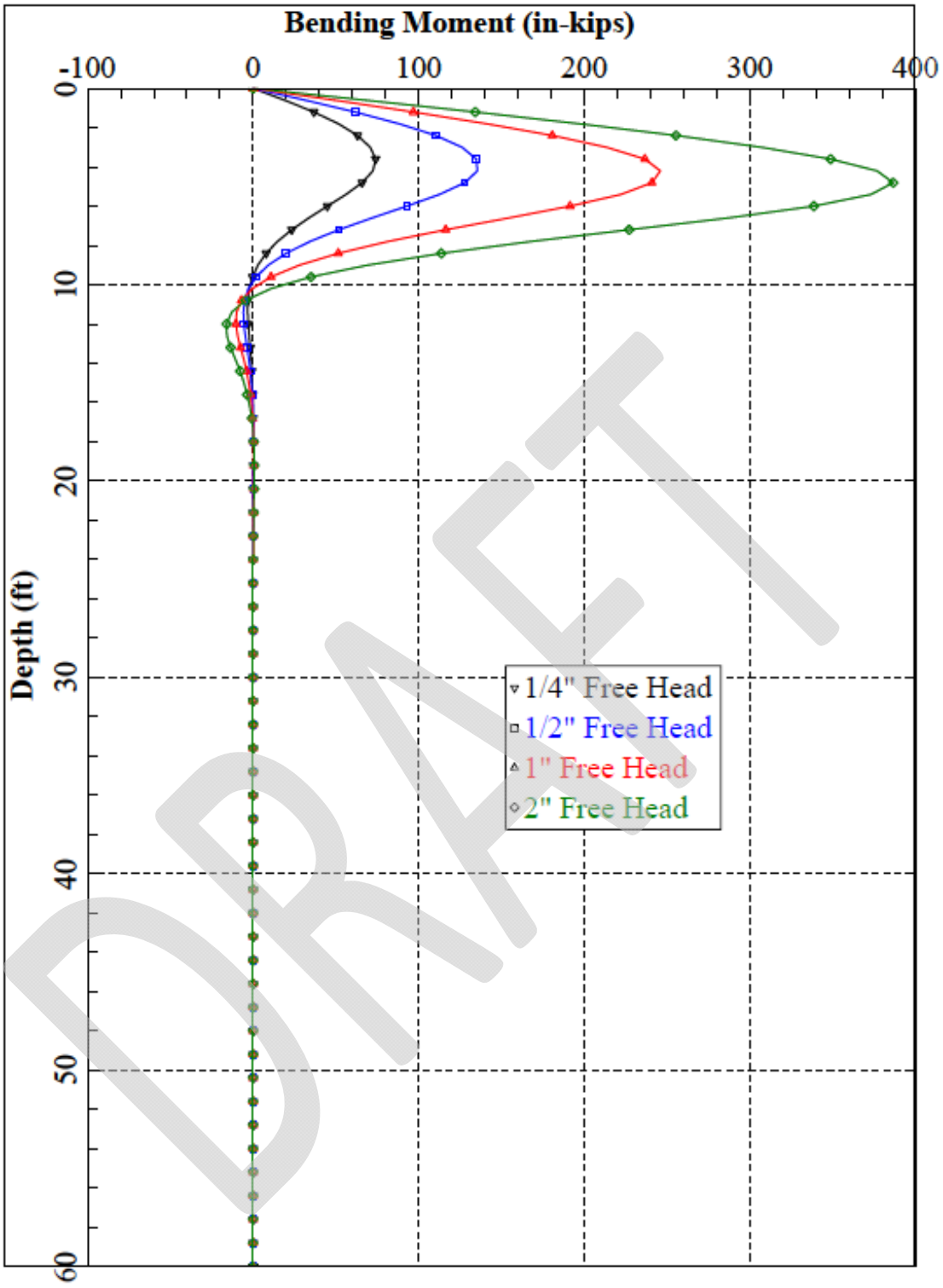
6-inch Steel Pipe Pile
Shear vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 4

0183-132-00 Date Exported: 9/5/19



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

6-inch Steel Pipe Pile
Moment vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 5

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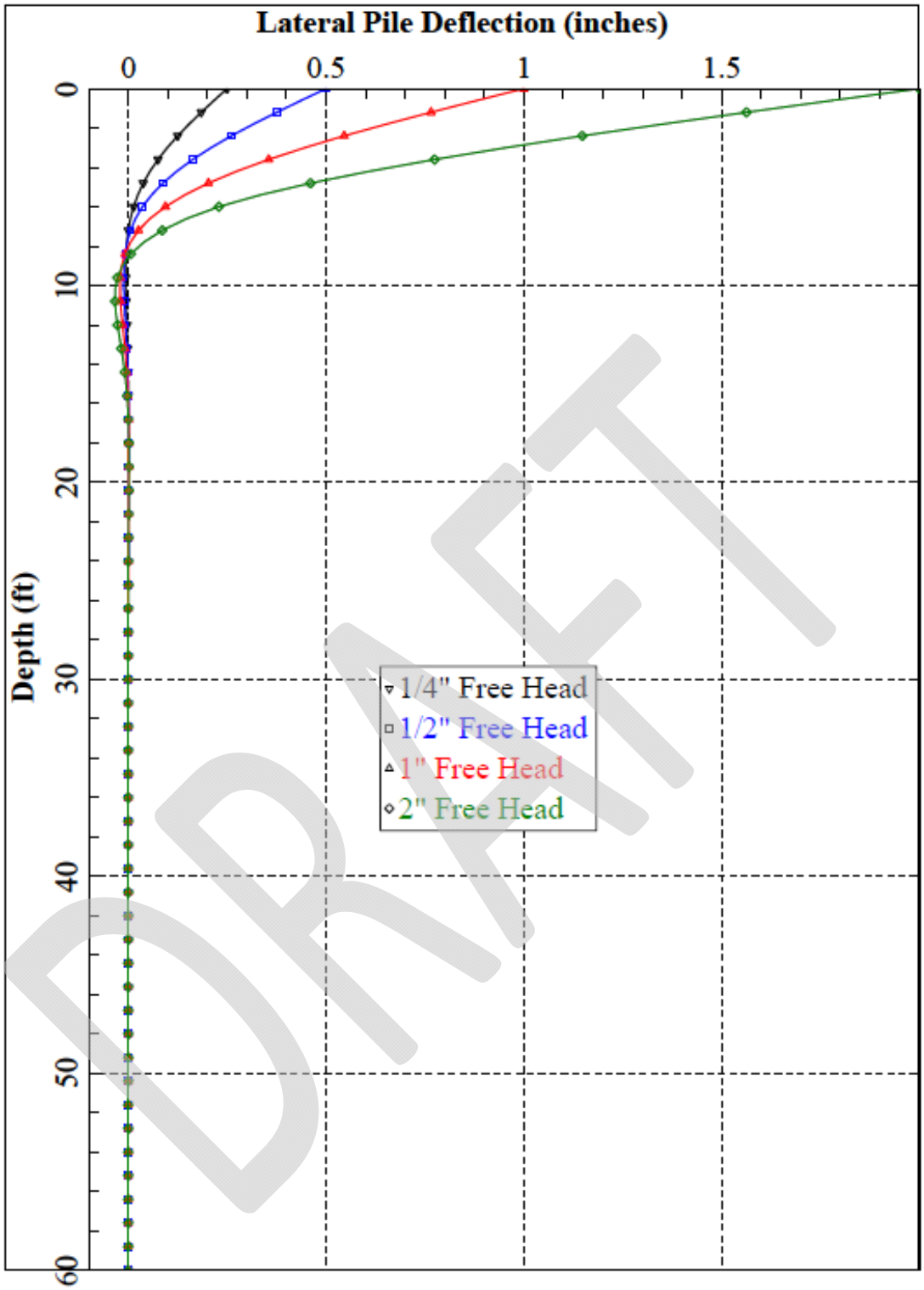


Notes:

1. Lateral pile capacities were evaluated using LPILE v2016
2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

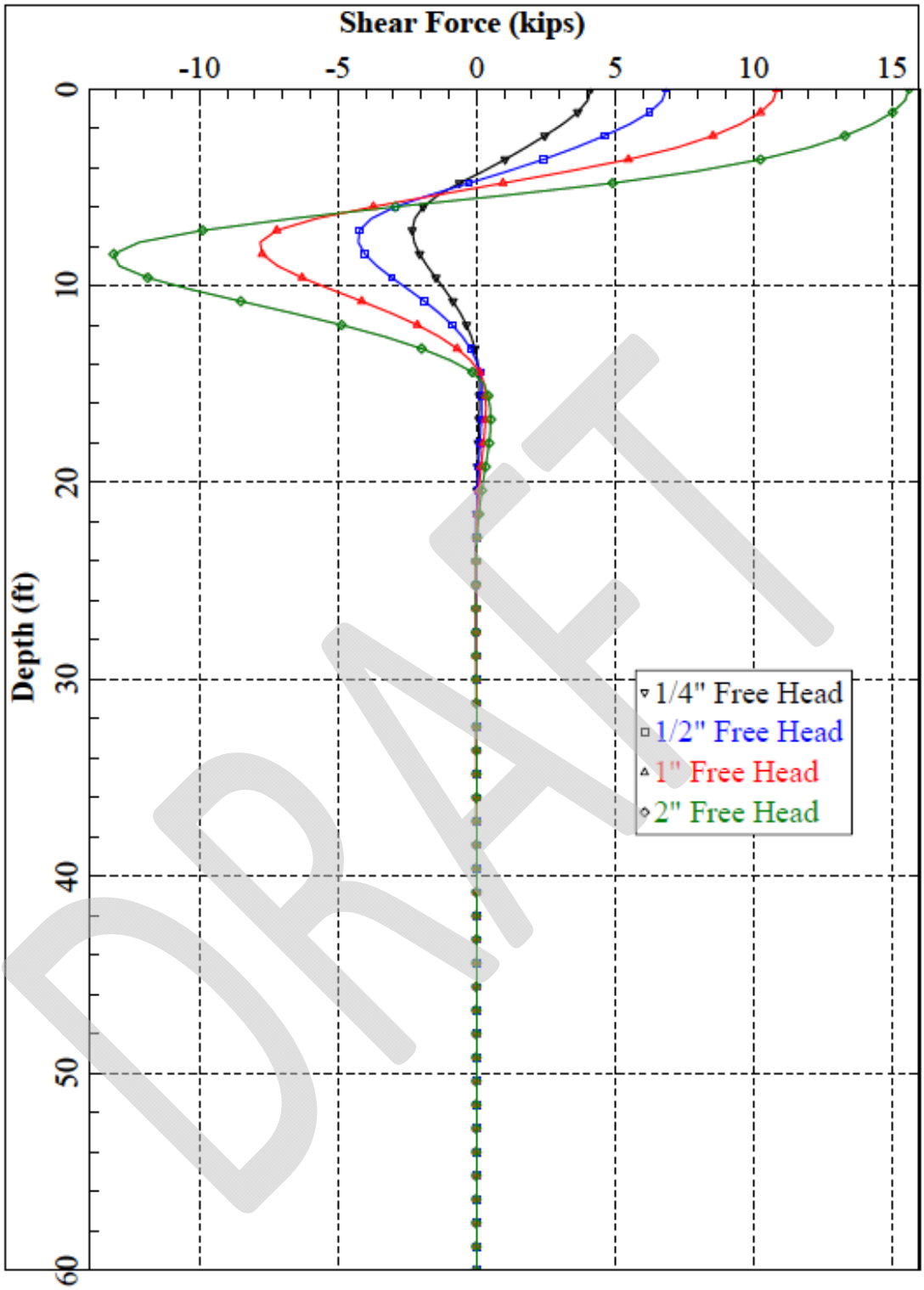
8-inch Steel Pipe Pile
Deflection vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 6

0183-132-00 Date Exported: 9/5/19



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

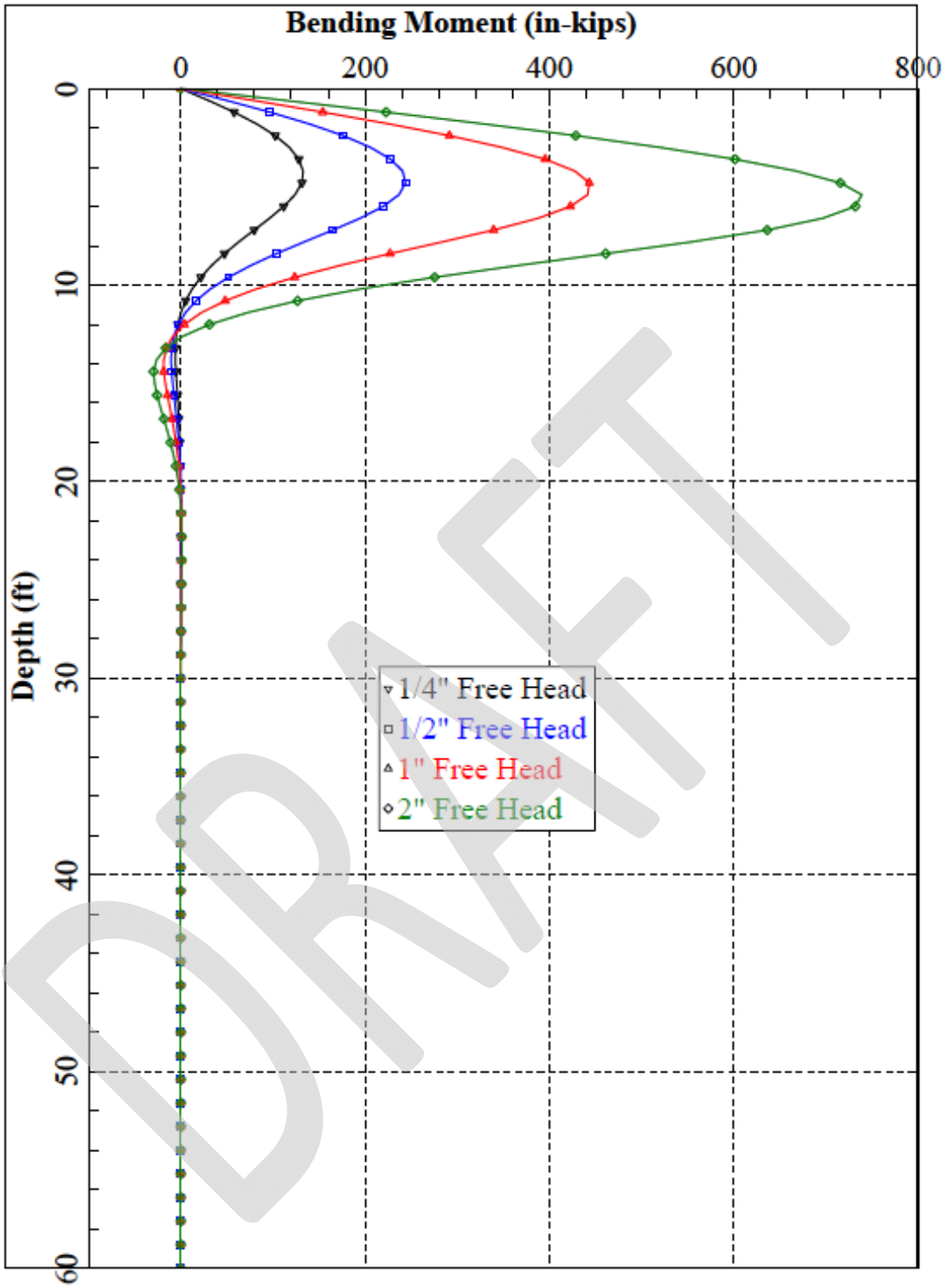
8-inch Steel Pipe Pile
Shear vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 7

0183-132-00 Date Exported: 9/5/19



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

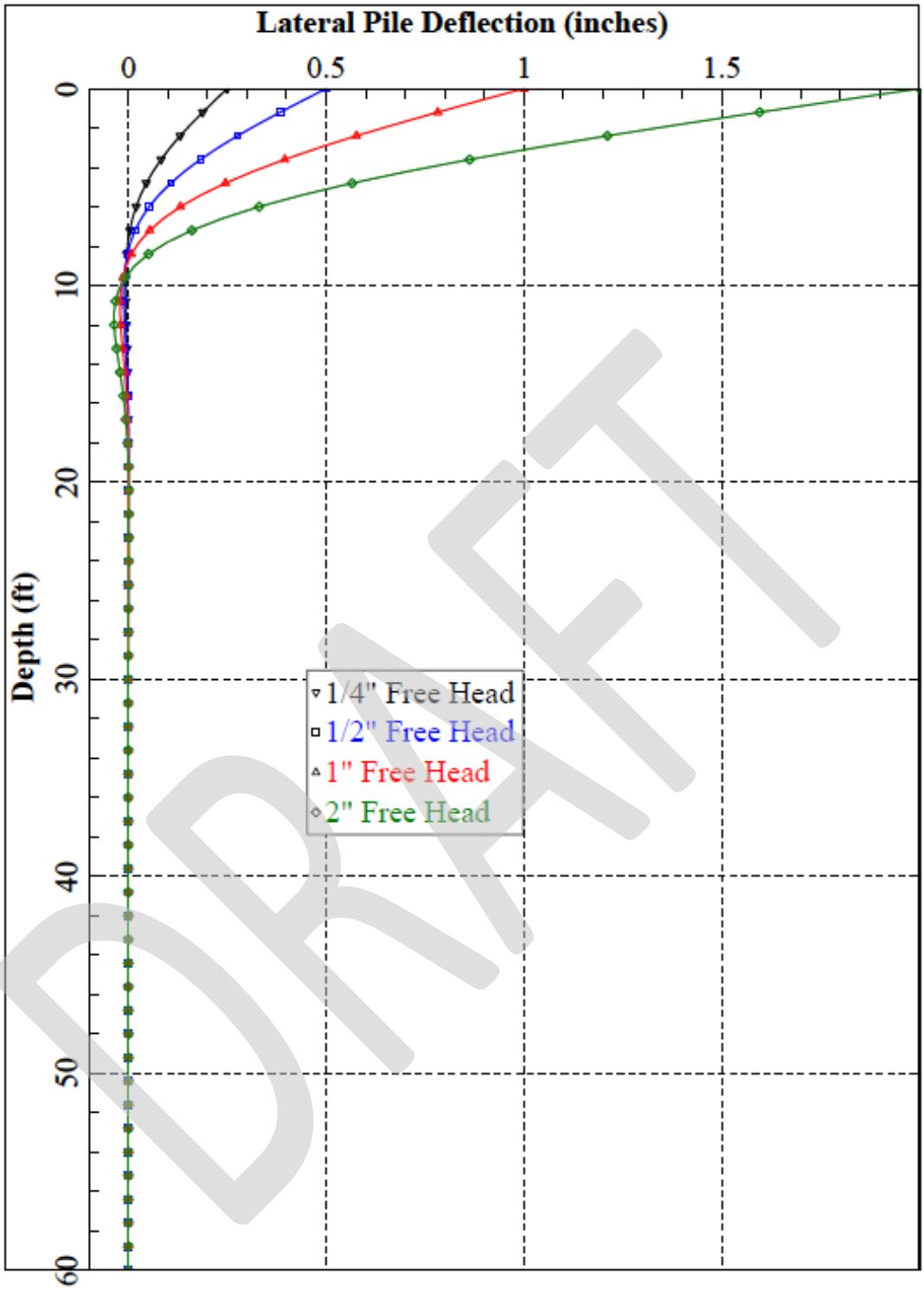
8-inch Steel Pipe Pile
Moment vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 8

0183-132-00 Date Exported: 9/5/19



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

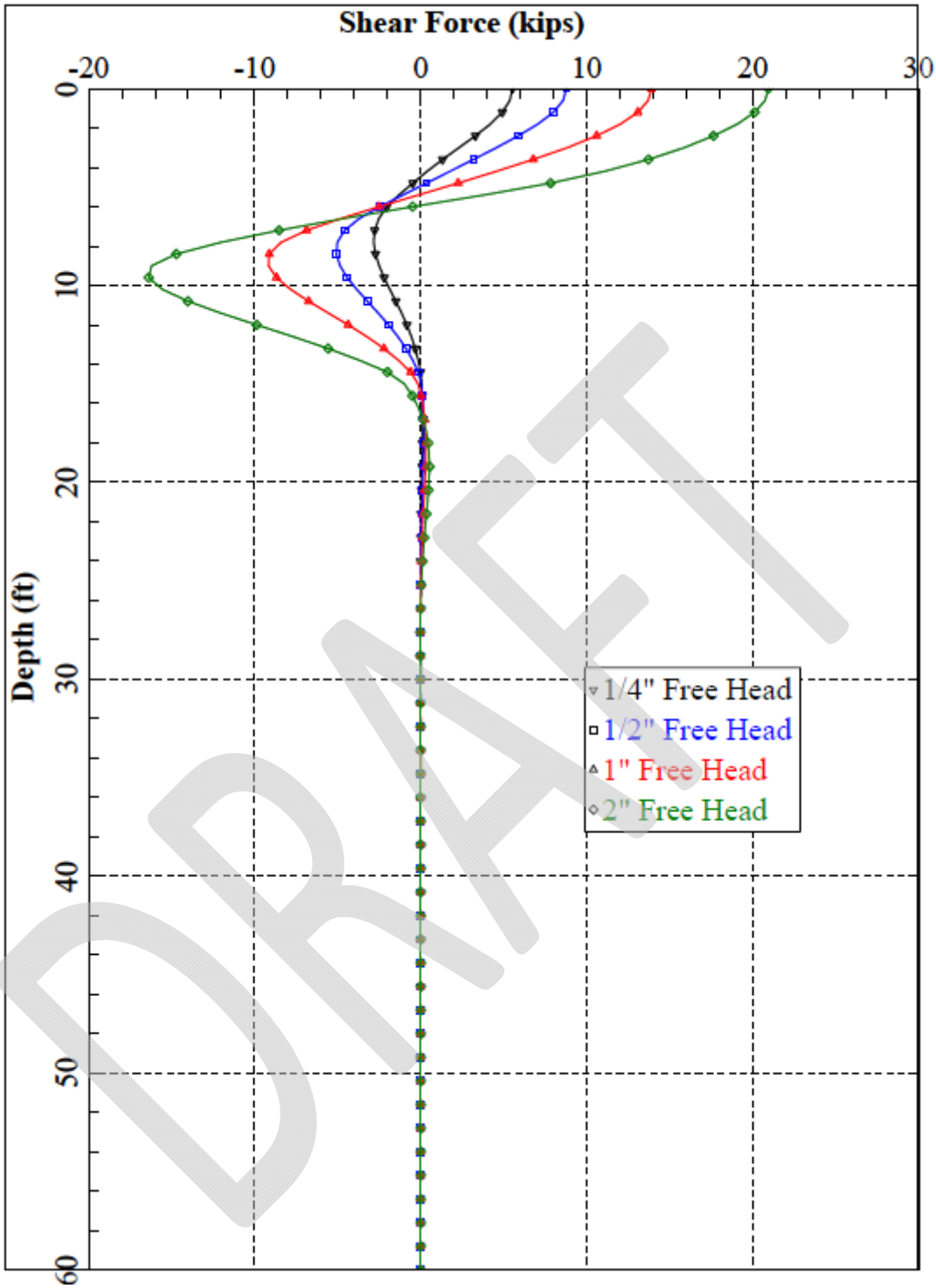
2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

12-inch Augercast Pile
Deflection vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 9



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

12-inch Augercast Pile
Shear vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 10

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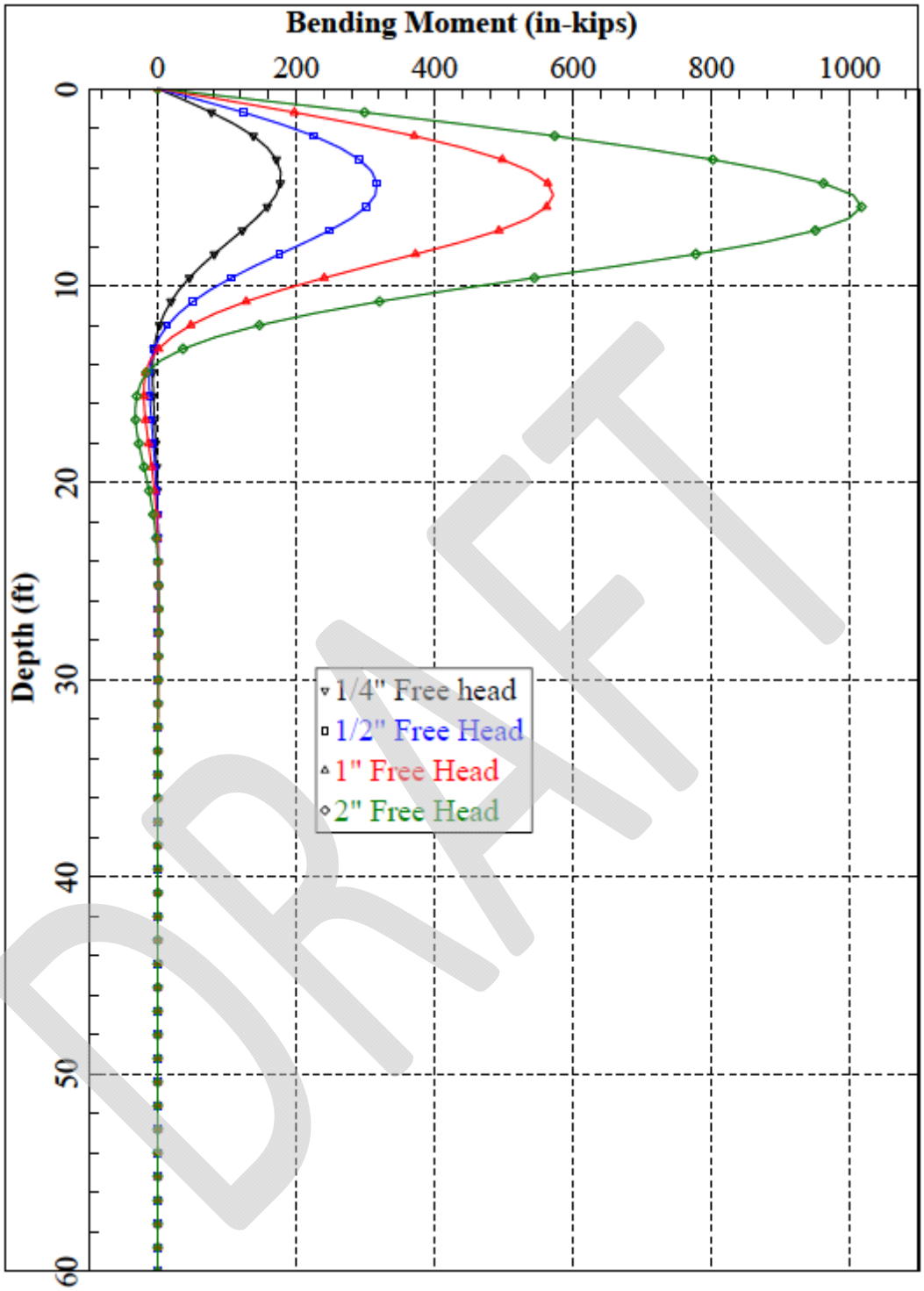

Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

12-inch Augercast Pile
Moment vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 11

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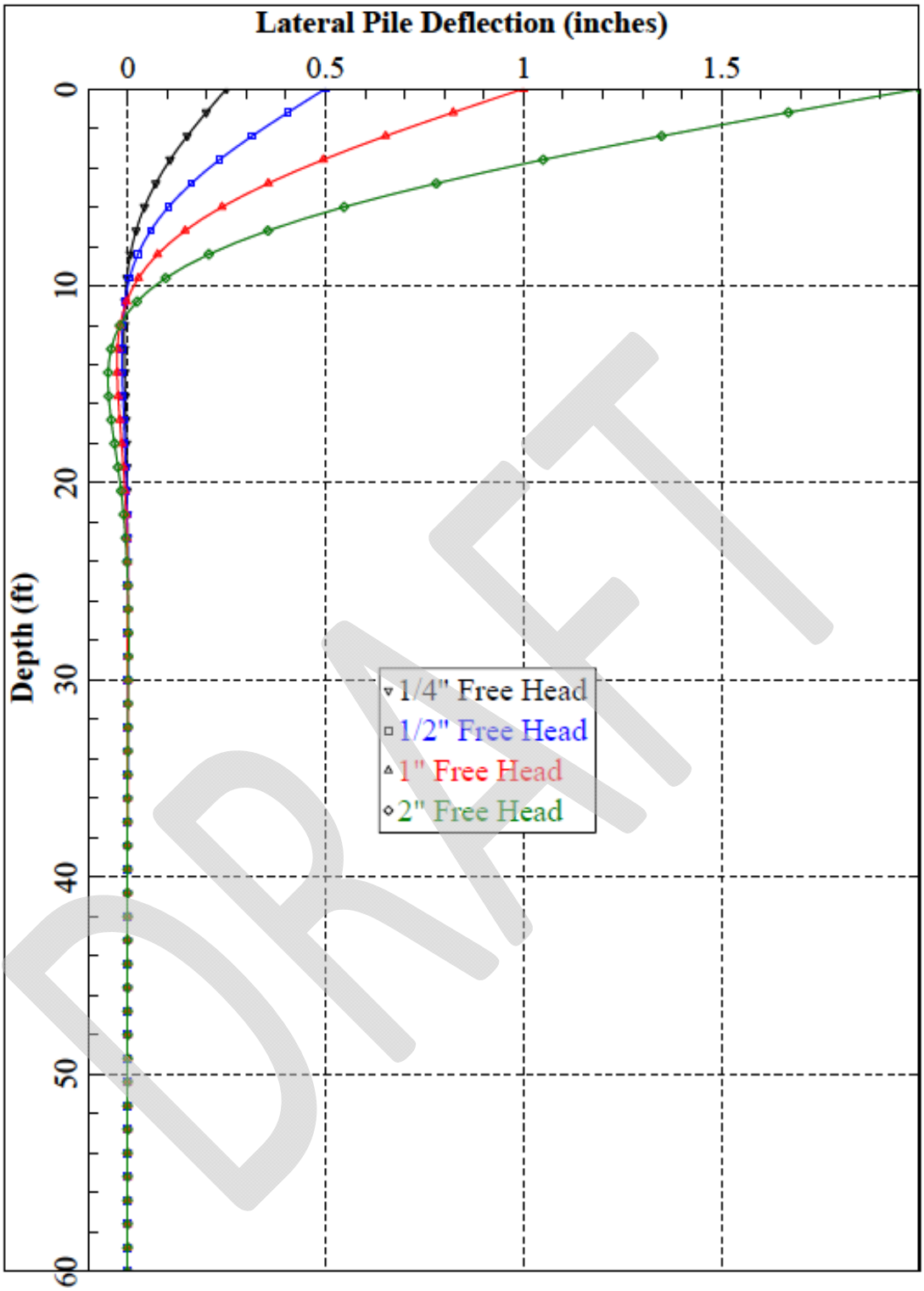


Notes:

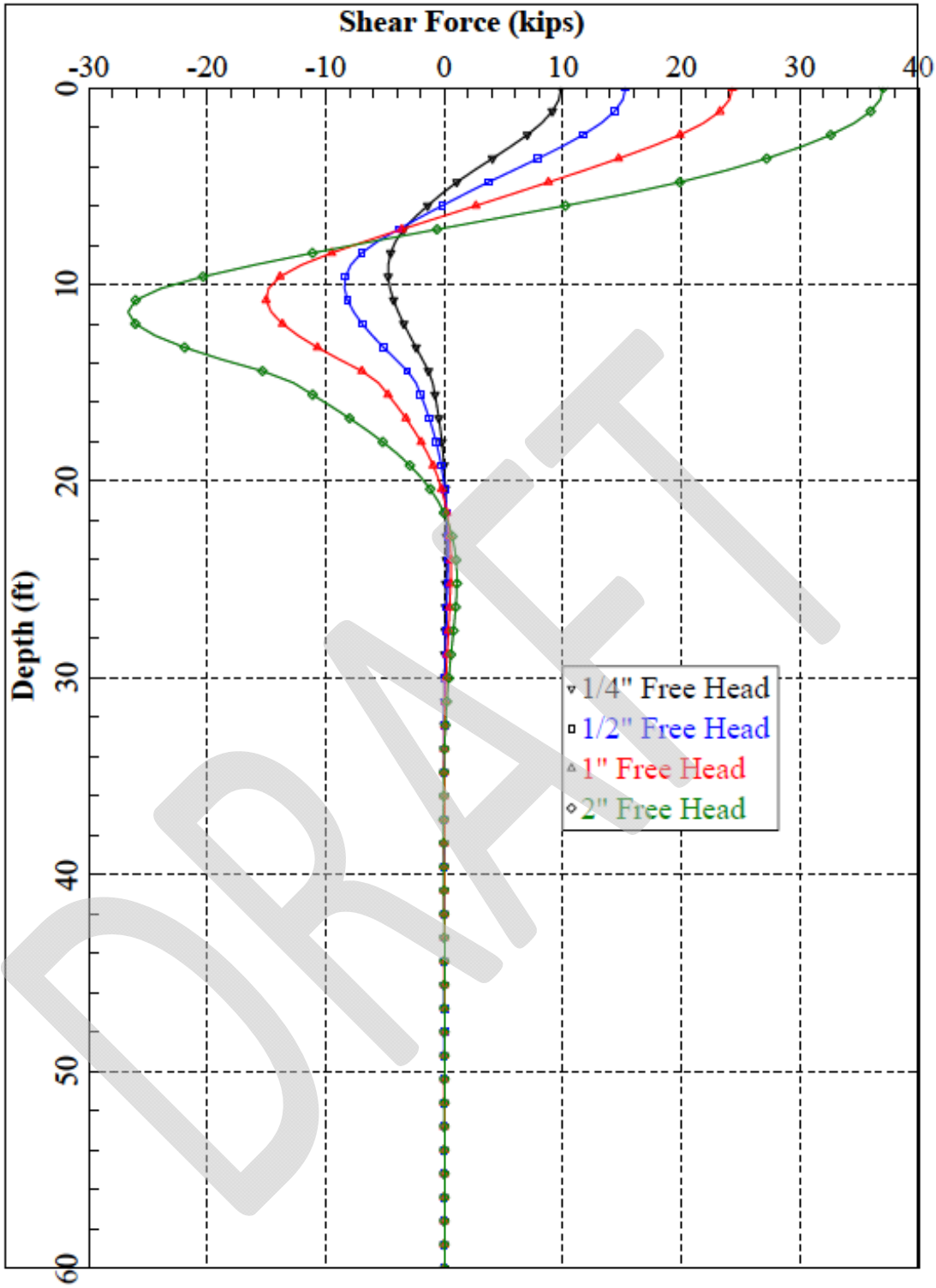
1. Lateral pile capacities were evaluated using LPILE v2016
2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

16-inch Augercast Pile
Deflection vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 12



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

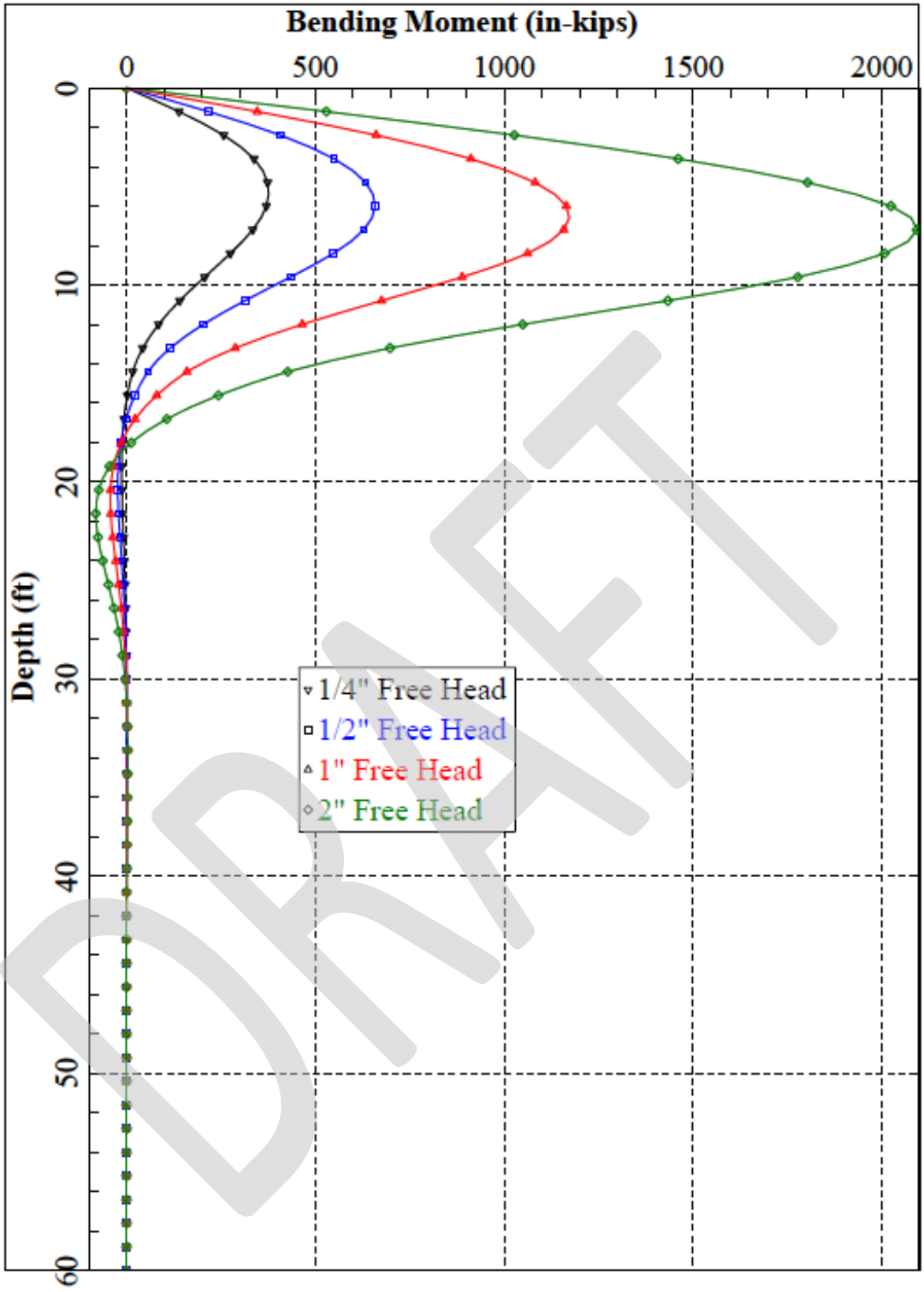
16-inch Augercast Pile
Shear vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 13

0183-132-00 Date Exported: 9/5/19



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

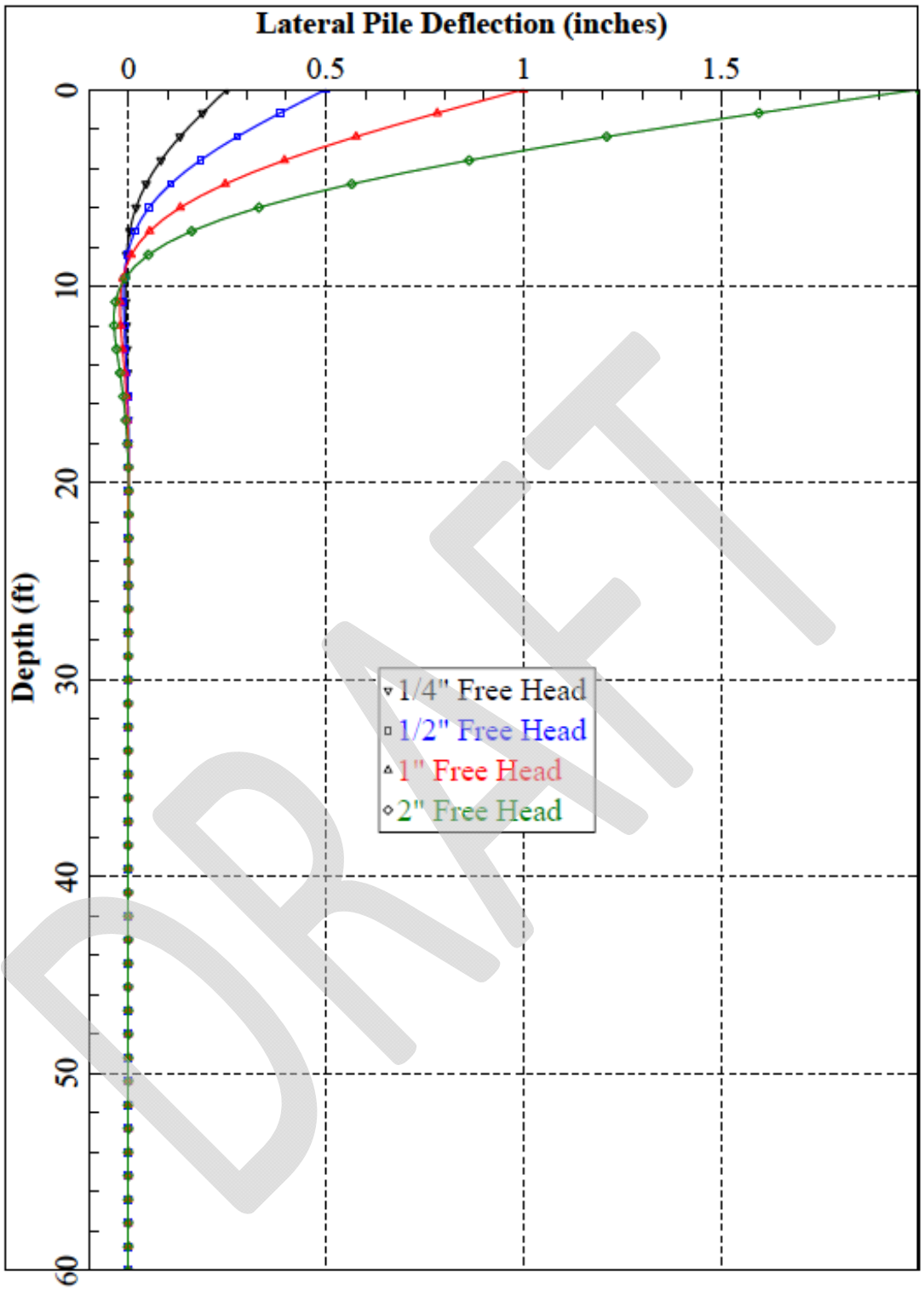
2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

16-inch Augercast Pile
Moment vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 14



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016
2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

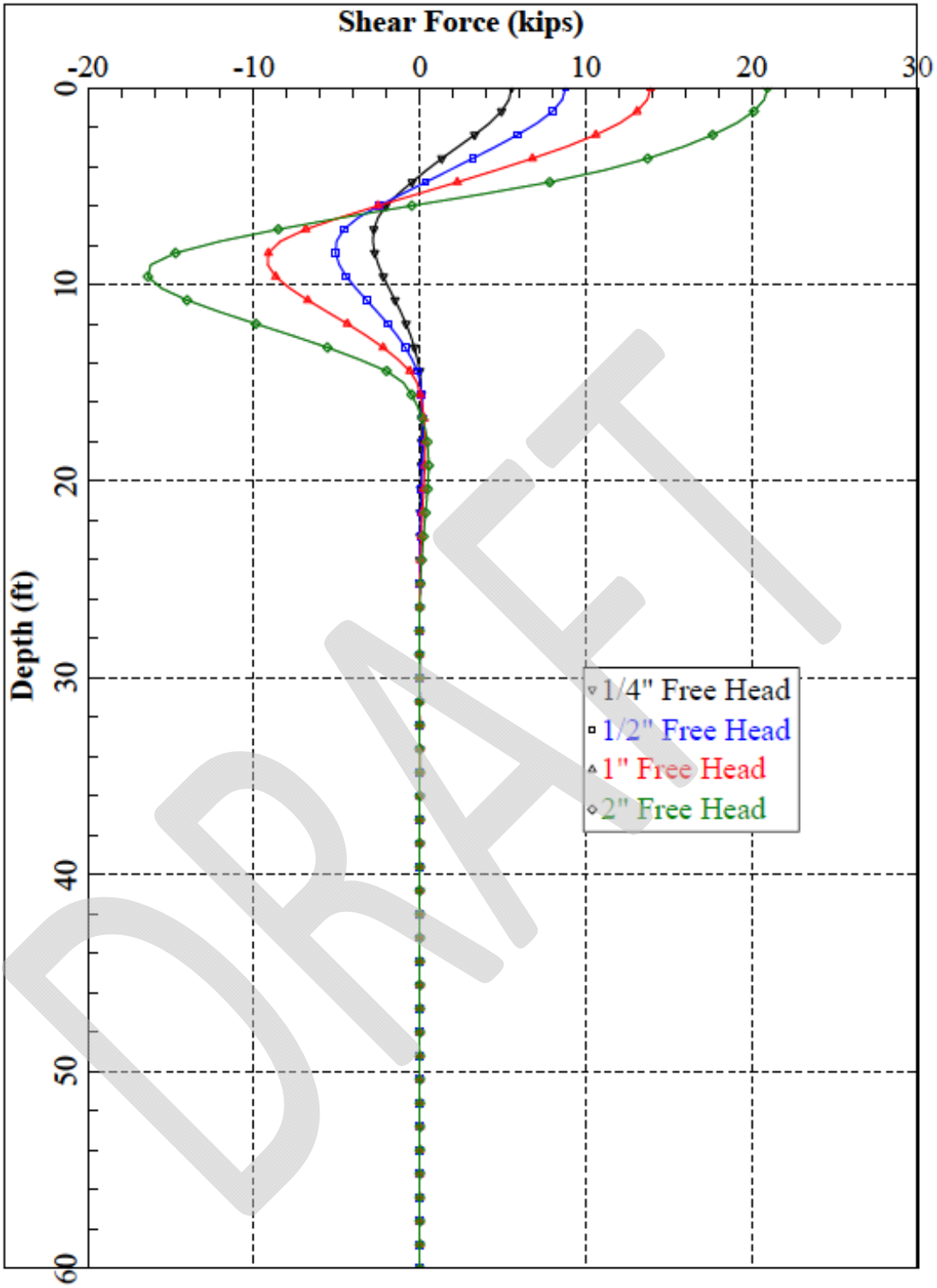
18-inch Augercast Pile
Deflection vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 15

0183-132-00 Date Exported: 9/5/19



Notes:

1. Lateral pile capacities were evaluated using LPILE v2016

2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

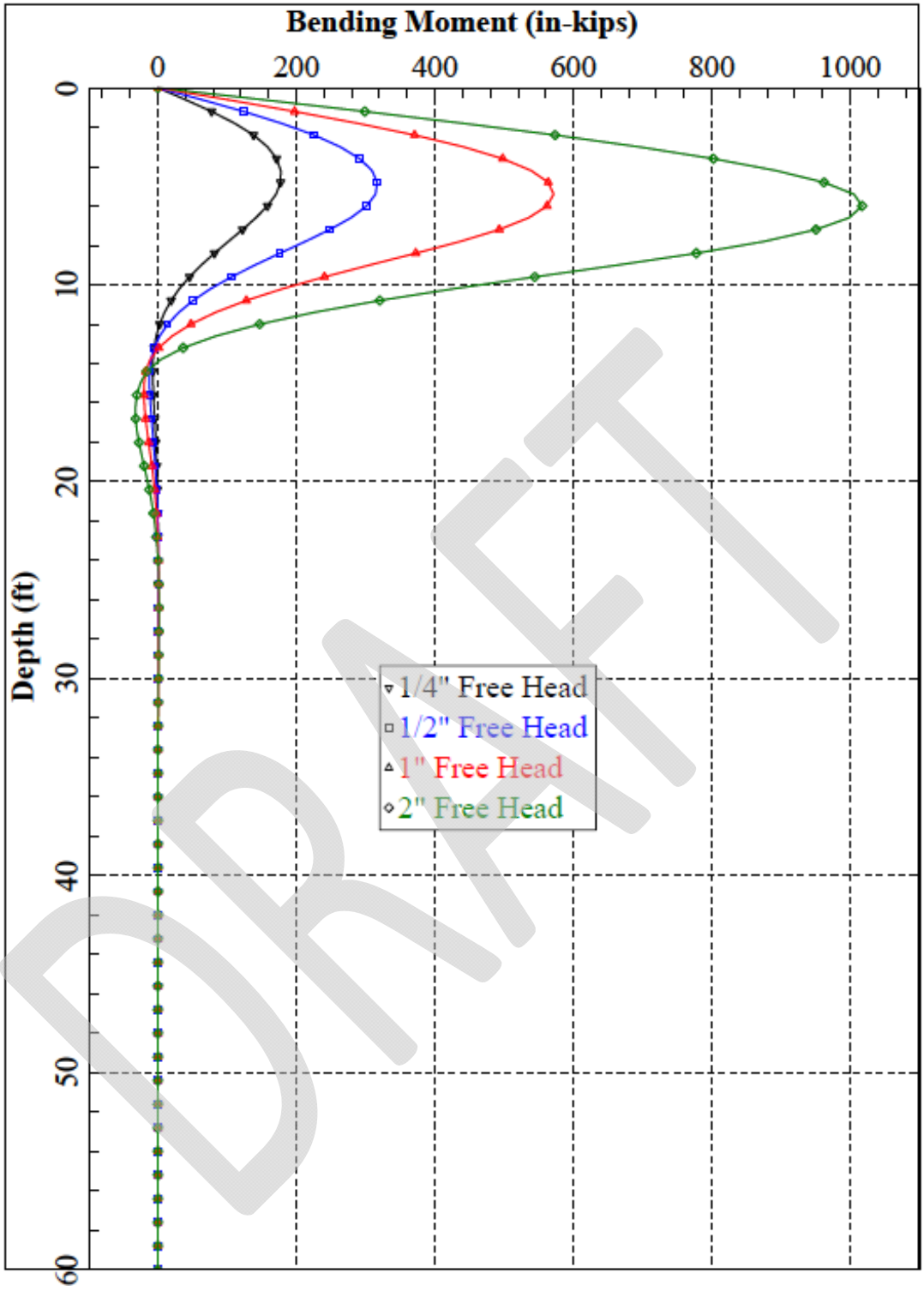
18-inch Augercast Pile
Shear vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 16

0183-132-00 Date Exported: 9/5/19



Notes:

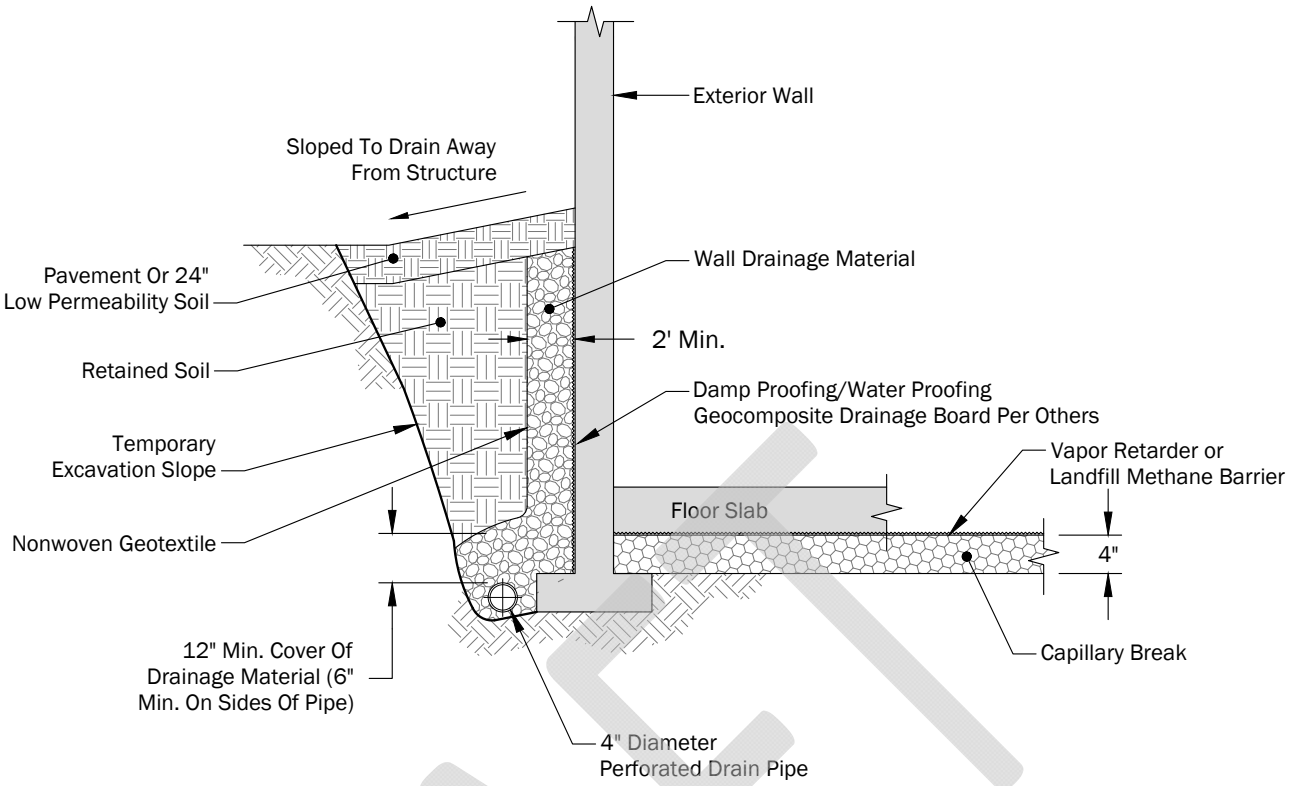
1. Lateral pile capacities were evaluated using LPILE v2016
2. Fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

18-inch Augercast Pile
Moment vs Depth

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 17



Not To Scale

MATERIALS:

A. WALL DRAINAGE MATERIAL

Shall consist of 1 inch washed gravel (Seattle Mineral Aggregate Type 5) or conform to Section 9-03.12(4) of the 2018 WSDOT Standard Specifications surrounded with a non-woven geotextile such as TenCate Mirafi 140N (or approved equivalent). Alternatively Seattle Mineral Aggregate Type 26 may be used without a geotextile fabric in conjunction with a wall drainage board. However, a minimum of 12 inches of Seattle Mineral Aggregate Type 5 surrounded with a geotextile fabric should be used around the drain pipe with 2 inches under the pipe.

B. RETAINED SOIL

Should consist of structural fill, either on-site soil or imported. The backfill should be compacted in loose lifts not exceeding 6 inches. Wall backfill supporting building floor slabs should consist of imported sand and gravel such as Seattle Mineral Aggregate Type 17 or WSDOT Standard Specification 9-03.14 compacted to at least 95 percent ASTM D1557. Backfill not supporting building floor slabs, sidewalks or pavement should be compacted to 90 to 92 percent of the maximum dry density, per ASTM D1557. Backfill supporting sidewalks or pavement areas should be compacted to at least 95 percent in the upper two feet. Only hand-operated equipment should be used for compaction within 5 feet of the walls and no heavy equipment should be allowed within 5 feet of the wall.

C. CAPILLARY BREAK

Should consist of at least 4 inches of clean crushed gravel with a maximum size of 1 inch and negligible sand or fines, such as Seattle Mineral Aggregate Type 22 (crushed) or WSDOT Standard Specifications Section 9-03.1(4)C, Grading No. 67.

D. PERFORATED DRAIN PIPE

Should consist of a 4-inch diameter perforated heavy-wall solid pipe (SDR-35 PVC) or rigid corrugated polyethylene pipe (ADS N-12) or equivalent. Drain pipes should discharge to the storm water collection system.

Wall Drainage and Backfill

UW Softball Performance Center
Seattle, Washington

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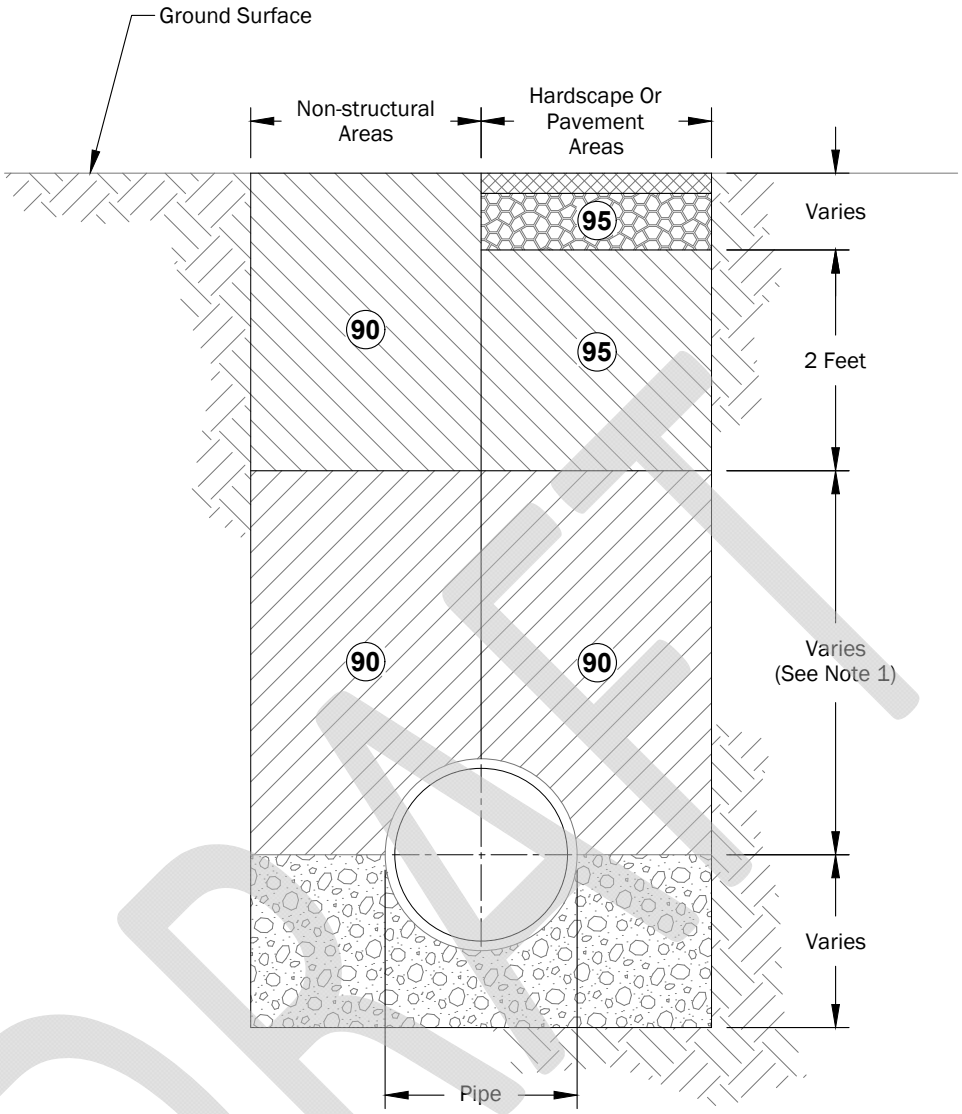
Figure 18



Not To Scale

Legend

95 — Recommended Compaction as a Percentage of Maximum Dry Density, by Test Method ASTM D1557 (Modified Proctor)

Concrete or Asphalt Pavement

Base Course

Trench Backfill

Pipe Bedding

Notes:

1. All backfill under building areas should be compacted to at least 95 percent per ASTM D1557.

Compaction Criteria for Trench Backfill

UW Softball Performance Center
Seattle, Washington

GeoEngineers

Figure 19

APPENDIX A
Field Explorations

APPENDIX A
FIELD EXPLORATIONS

Borings B-1-19 and B-2-19 were completed on July 29, 2019 at the approximate locations shown on Figure 2. The borings were advanced to depths of about 42 and 52 feet below ground surface (bgs), respectively. The borings were completed using a limited access Bobcat drill rig owned and operated by Geologic Drill Partners, Inc.

The borings were continuously monitored by a geologist from our firm who evaluated and classified the soils encountered, obtained representative soil samples, and observed groundwater conditions. Our representative maintained a detailed log of each boring. Disturbed samples of the representative soil types were obtained from the borings using standard penetration test (SPT) sampling procedures. SPT sampling was performed using a 2-inch outside diameter split-spoon sampler driven with a standard 140-pound hammer in accordance with ASTM International (ASTM) D 1586.

The soils encountered in the borings were typically sampled at 2½- to 5-foot vertical intervals with the SPT split spoon sampler. Samples were obtained by driving the sampler 18 inches into the soil with an automatic hammer free-falling 30 inches. The number of blows required for each 6 inches of penetration is recorded. The standard penetration resistance ("N-value") of the soil is calculated as the number of blows required for the final 12 inches of penetration (blows per foot). This value is shown on the boring logs. This resistance, or N-value, provides a measure of the relative density of granular soils and the relative consistency of cohesive soils. If the high penetration resistance encountered in the very dense soils precluded driving the total 18-inch sample interval, the penetration resistance for the partial penetration is entered on logs as follows: if the penetration is greater than 6 inches and less than 18 inches, then the number of blows is recorded over the number of inches driven; 30 blows for 6 inches and 50 for 3 inches, for instance, would be recorded as 80/9". The blow counts are shown on the boring logs at the respective sample depths. The SPT is a useful quantitative tool from which soil density/consistency was evaluated.

Soils encountered in the borings were classified in the field in general accordance with ASTM D 2488, the Standard Practice for Classification of Soils, Visual-Manual Procedure, which is summarized in Figure A-1. Logs of the borings are provided in Figures A-2 and A-3.

Boring locations were determined in the field by measuring from physical features on site. Boring locations should be considered accurate to the degree implied by the method used. Ground surface elevations at the boring locations were not surveyed.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point lead test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

GeoEngineers

Figure A-1

Drilled: Start 7/29/2019 End 7/29/2019	Total Depth (ft): 42	Logged By: CRG Checked By: CWM	Driller: Geologic Drill Partners, Inc.	Drilling Method: Hollow-stem Auger	
Surface Elevation (ft): 43 Vertical Datum: NAVD88		Hammer Data: Rope & Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment: Bobcat Limited Access drill rig	
Easting (X): 1278796 Northing (Y): 241070		System Datum: WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
40	0						SOD	2-inch-thick sod and topsoil			
							SM	Brown silty fine to medium sand with occasional gravel, small roots (loose, moist) (fill)			
		12	7		1 MC				17		
35	5	14	6		2						
		14	24		3 %F		SP-SM	Brown-gray fine to medium sand with silt and gravel (medium dense, moist)	7	10	
30	10	6	17		4A 4B		SM	Gray silty fine sand (medium dense, moist)			
	15	0	15		5						
25							SP-SM	Gray fine to medium sand with silt and occasional gravel (loose, wet) (lacustrine deposits)			
	20	6	9		6 %F				18	10	Groundwater observed at 20 feet during drilling
20	25	0	7		7						
15							SM	Gray silty fine to medium sand; organic matter (medium stiff, wet)			
	30	3	7		8 %F				21	25	
10							ML	Gray-brown sandy silt; mottled, slight oxidation staining (hard, moist) (glacial till)			
	35										

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Topographic Survey. Vertical approximated based on Topographic Survey.

Log of Boring B-1-19

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00

Figure A-2
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
-5	35	5	35		9 MC				17		
							SM	Gray silty fine to medium sand with occasional gravel (very dense, moist)			Very hard drilling
	40	10	50/4"		10 MC				9		

Log of Boring B-1-19 (continued)

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00

Drilled: Start 7/29/2019 End 7/29/2019	Total Depth (ft): 52	Logged By: CRG Checked By: CWM	Driller: Geologic Drill Partners, Inc.	Drilling Method: Hollow-stem Auger	
Surface Elevation (ft): 36 Vertical Datum: NAVD88		Hammer Data: Rope & Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment: Bobcat Limited Access drill rig	
Easting (X): 1278881 Northing (Y): 241032		System Datum: WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
35	0						Brick	3-inch-thick brick walkway			
							SP	2-inch-thick sand base			
		18	22		1 SA		SM	Brown-gray silty fine to coarse sand with gravel (medium dense, moist) (fill)	7	13	
30	5	16	22		2 MC				5		
		4	17		3		SM	Brown-gray silty fine to medium sand with gravel (loose to medium dense, moist)			
25	10	10	10		4 %F				7	20	
20	15	14	8		5 MC			Becomes wet	12		Groundwater observed at 16 feet during drilling
							ML	Gray sandy silt (stiff, wet) (lacustrine deposits)			
15	20	16	9		6 %F				22	66	
							SM	Gray silty fine to medium sand with occasional gravel (loose, wet)			
10	25	10	6		7 %F				18	20	
							ML	Gray sandy silt with occasional gravel (stiff, wet)			
5	30	14	8		8 %F				21	58	
							SM	Gray silty fine to medium sand with occasional gravel; wood debris (very loose to medium dense, wet)			
	35										

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Topographic Survey. Vertical approximated based on Topographic Survey.

Log of Boring B-2-19

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00

Figure A-3
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
0	35	16	3		9 %F				12	30	
-5	40	16	9		10 MC			With peat interbeds	19		
-10	45	10	19		11 MC			3-inch interbedded peat layer	15		
							SM	Gray silty fine to medium sand with gravel (very dense, wet) (glacial till)			
-15	50	4	79/11"		12 MC				10		

Log of Boring B-2-19 (continued)

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00

APPENDIX B
Laboratory Testing

APPENDIX B
LABORATORY TESTING

Soil samples obtained from the borings were transported to our laboratory and evaluated to confirm or modify field classifications, as well as to evaluate engineering properties of the soil. Representative samples were selected for laboratory testing that consisted of moisture content determinations, percent fines, and sieve analysis. The tests were performed in general accordance with test methods of the ASTM International (ASTM) or other applicable procedures.

Soil Classifications

All soil samples obtained from the borings were visually classified in the field and/or in our laboratory using a system based on the Unified Soil Classification System (USCS) and ASTM classification methods. ASTM test method D 2488 was used to visually classify the soil samples, while ASTM D 2487 was used to classify the soils based on laboratory tests results. These classification procedures are incorporated in the boring logs shown in Figures A-2 and A-3, in Appendix A.

Moisture Content Determinations

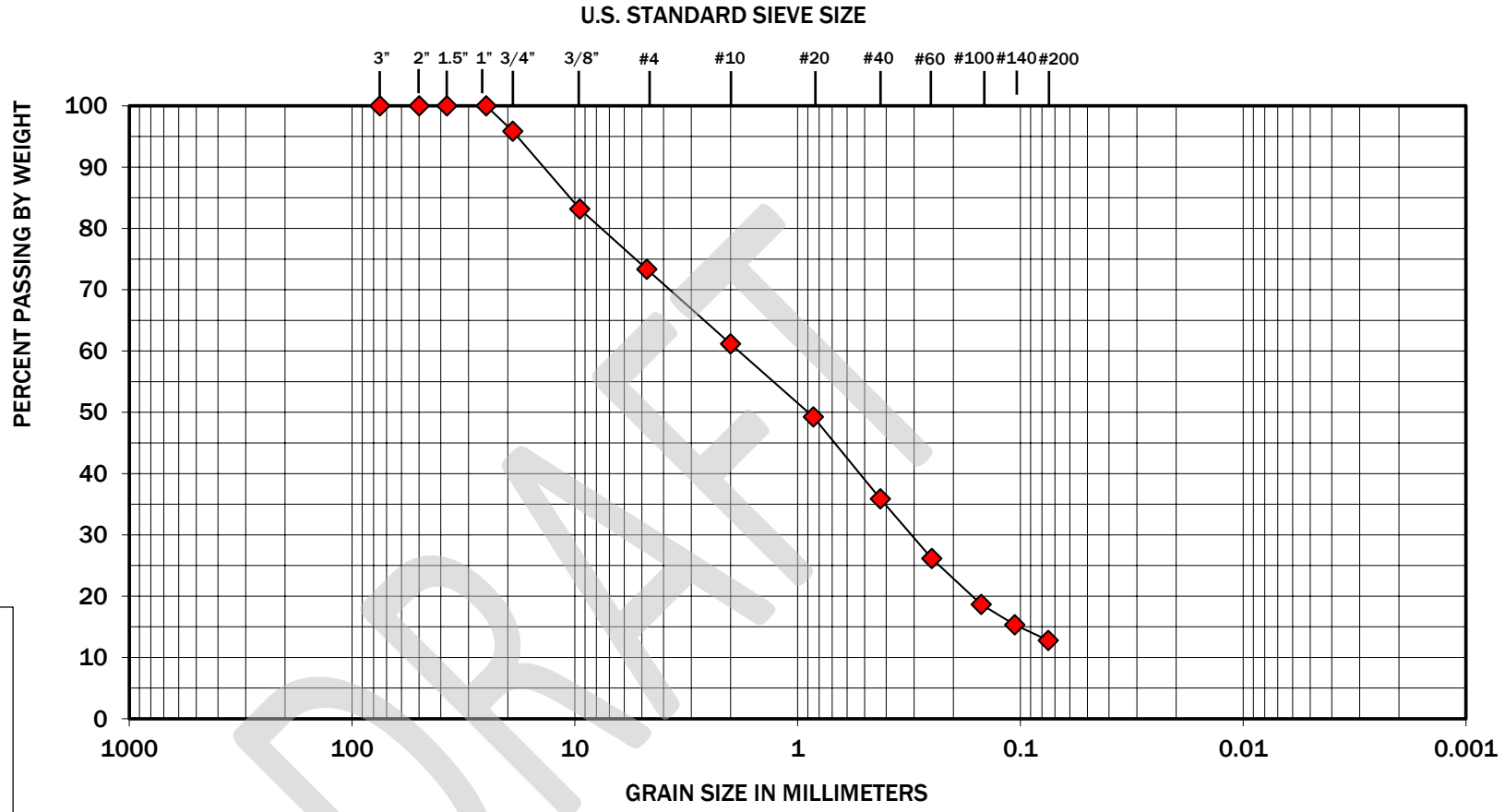
Moisture contents were determined in general accordance with ASTM D 2216 for numerous samples obtained from the borings. The results of these tests are presented on the exploration logs at the respective sample depth in Appendix A.

Percent Passing U.S. No. 200 Sieve (%F)

Selected samples were "washed" through the U.S. No. 200 mesh sieve to estimate the relative percentages of coarse- and fine-grained particles in the soil. The percent passing value represents the percentage by weight of the sample finer than the U.S. No. 200 sieve. These tests were conducted to verify field descriptions and to estimate the fines content for analysis purposes. The tests were conducted in accordance with ASTM D 1140, and the results are shown on the exploration logs in Appendix A at the respective sample depths.

Sieve Analysis

Sieve analyses were performed on seven samples obtained from the borings. The analyses were conducted in general accordance with ASTM D 422. The wet sieve analysis method was used to determine the percentage of soil greater than the U.S. No. 200 mesh sieve. The results of the sieve analyses were plotted, classified in general accordance with the USCS, and presented in in Figure B-1.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	B-2-19	2.5	7	Silty fine to coarse sand with gravel (SM)

GeoEngineers

Figure B-1

UW Softball Performance Center
Seattle, WA

Sieve Analysis Results

AASHTO ACCREDITED

The grain size analysis results were obtained in general accordance with ASTM D 6913. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

APPENDIX C
Boring Logs from Previous Studies

APPENDIX C
BORING LOGS FROM PREVIOUS STUDIES

Included in this section are boring logs from the following previous study completed in the immediate vicinity of the project site.

- GeoEngineers, Inc., 2018. "Draft Geotechnical Engineering Services, University of Washington, Softball Performance Center, Seattle, Washington," dated August 14, 2018.
- Terra Associates, Inc., 1987. "Geotechnical Engineering Report, Indoor Tennis Facility, University of Washington, Seattle, Washington," dated April 23, 1987.

Drilled: Start 7/23/2018 End 7/23/2018	Total Depth (ft): 42	Logged By: CWM Checked By: HRP	Driller: Geologic Drill Partners, Inc.	Drilling Method: Hollow-stem Auger	
Surface Elevation (ft): 45 Vertical Datum: NAVD88		Hammer Data: Rope & Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment: Bobcat Limited Access drill rig	
Easting (X): 1278799 Northing (Y): 241003		System Datum: WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: 2¼-inch I.D. auger

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
40	0					SOD	2-inch-thick sod			
						SM	Brown silty fine to medium sand with occasional gravel and organic matter (loose to medium dense, moist) (fill)			
	5	12	17	1						
		15	8	2 SA				10	27	
35		8	5	3						
	10	15	8	4 SA		SM	Gray silty fine sand with occasional gravel (loose, moist)	11	46	
30	15	15	9	5 MC				13		
25	20	14	10	6A MC 6B		SM	Gray silty fine to medium sand with occasional gravel (loose to medium dense, wet) (lacustrine deposits)	16		
						SM	Dark brown/gray silty fine to medium sand with organic matter (roots) (loose to medium dense, wet)			
20						SM	Gray silty fine to medium sand with gravel (medium dense, wet) (glacial till)			
	25	13	15	7 MC				20		Till-like; weathered till
15						ML	Gray sandy silt with occasional gravel (hard, moist)			
	30	18	81	8 SA				14	70	
10							Becomes without gravel			
	35									

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Topographic Survey. Vertical approximated based on Topographic Survey.

Log of Boring B-1-18

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00

Figure C-1
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	35	18	63		9 %F				14	69	
-5	40	17	86/11"		10 MC				13		

Boring terminated at approximately 42 feet below ground surface due to refusal

Log of Boring B-1-18 (continued)

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00

Drilled: Start 7/23/2018 End 7/23/2018	Total Depth (ft) 50.5	Logged By CWM Checked By HRP	Driller Geologic Drill Partners, Inc.	Drilling Method Hollow-stem Auger	
Surface Elevation (ft) 38 Vertical Datum NAVD88		Hammer Data Rope & Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment Bobcat Limited Access drill rig	
Easting (X) 1278874 Northing (Y) 240987		System Datum WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: 2¼-inch I.D. auger

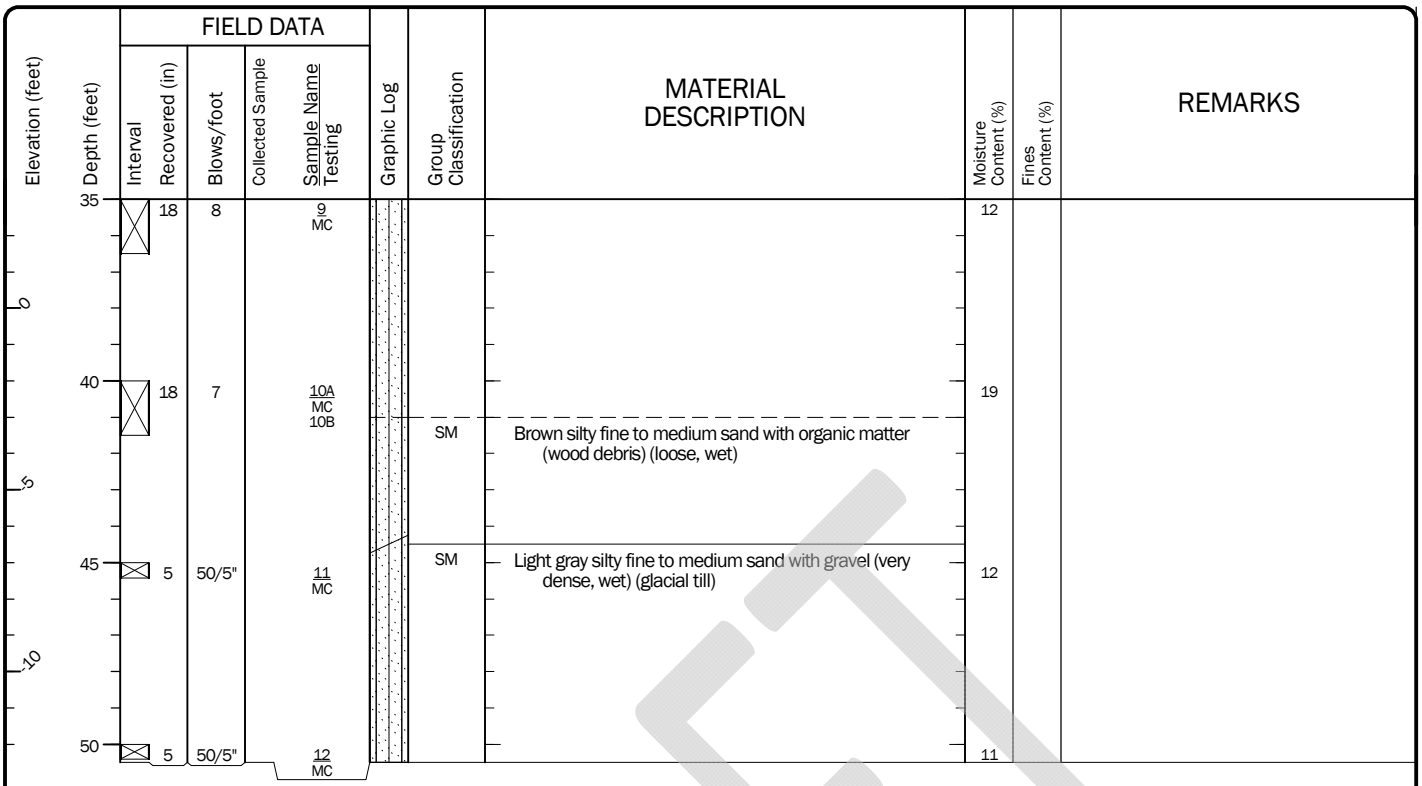
Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
35	0					SOD	2-inch-thick sod			
						CL	Gray lean clay with sand and gravel (stiff, wet) (fill)			Wet from accumulation of water from irrigation?
30	5	18	10	1A, 1B, SA		SM	Brown/gray silty fine to coarse sand with gravel and organic matter (roots) (medium dense, wet)	13	19	
		6	26	2, MC		SM	Gray/black silty fine to medium sand with gravel, concrete fragments (medium dense, moist)	8		
25	10	8	21	3		SM	Gray/brown silty fine to medium sand with gravel (medium dense, moist)			
		7	18	4, MC				8		
20	15	12	9	5, MC		SM	Gray silty fine to medium sand with interbedded silt lenses (loose, wet) (lacustrine deposits)	13		
15	20	16	4	6, MC				16		
10	25	18	6	7, MC				20		
5	30	18	8	8, SA			With gravel	14	24	
	35									

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Topographic Survey. Vertical approximated based on Topographic Survey.

Log of Boring B-2-18

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00



Log of Boring B-2-18 (continued)

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00

Figure C-2
Sheet 2 of 2

Drilled: Start 7/23/2018 End 7/23/2018	Total Depth (ft): 46	Logged By: CWM Checked By: HRP	Driller: Geologic Drill Partners, Inc.	Drilling Method: Hollow-stem Auger	
Surface Elevation (ft): 48 Vertical Datum: NAVD88		Hammer Data: Rope & Cathead 140 (lbs) / 30 (in) Drop		Drilling Equipment: Bobcat Limited Access drill rig	
Easting (X): 1278839 Northing (Y): 240974		System Datum: WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	

Notes: 2¼-inch I.D. auger

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
45	0						SOD	2-inch-thick sod			
		8	15		1		SM	Brown silty fine to medium sand with gravel, trace organic matter (grass/small roots) (medium dense, moist) (fill)			
	5	9	17		2 MC		SM	Brown/gray silty fine to medium sand with gravel (loose to medium dense, moist)	11		
40		5	9		3			Grades with brick fragments			
	10	10	11		4 MC		SP-SM	Brown fine to medium sand with silt (medium dense, moist)	8		
35							ML	Gray/brown sandy silt with gravel (stiff to very stiff, moist)			
	15	10	16		5 SA				12	52	
30											
	20	13	23		6 MC				13		
25							SM	Gray silty fine to medium sand with occasional gravel (loose, wet) (lacustrine deposits)			
	25	18	8		7 SA				15	22	
20											
	30	18	9		8 MC				13		
15							SP-SM	Gray fine to medium sand with silt and occasional gravel (dense, wet)			
	35										

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Topographic Survey. Vertical approximated based on Topographic Survey.

Log of Boring B-3-18

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
-10	35	18	33		9A MC 9B		WD	Brown wood	17		
							SM	Dark brown silty fine to medium sand with interbedded silt layers, organic matter (medium dense, wet)			
-15	40	18	16		10A 10B MC				22		
							ML	Gray sandy silt (hard, wet) (glacial till)			
	45	11	50/5"		11 MC				17		

Boring terminated at approximately 46 feet below ground surface due to refusal

Log of Boring B-3-18 (continued)

GeoEngineers

Project: UW Softball Performance Center
Project Location: Seattle, Washington
Project Number: 0183-132-00

TA-2

BORING NO. 2

Logged By GPM

Date Feb 16, 1987

ELEV. +28.5±

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)
	SM	Gray gravelly silty SAND		I	18	7
	SM	Same, with lenses of silt	10	I	51/6"	10
	SM	Same, with lenses of silt		I	24	16
			20	II*	4	
	SM	Gray gravelly silty SAND and gray very silty fine SAND		I	11	16
	SM	Gray gravelly silty SAND with chunks of gray sandy clay	30	I	10	10
	SM	Gray gravelly silty SAND with seam of brown peat		I	4	18
	SM/Pt	Gray silty SAND, some gravel; thick seam of brown PEAT		I	38	34
	SP	Gray brown slightly silty gravelly SAND	40	I	32	13
	SM	Gray brown silty gravelly SAND				
		Same		I	50/5"	12
		Boring completed at depth 48 feet	50			

See General Notes on Figure 4

APPENDIX D
Report Limitations and Guidelines for Use

APPENDIX D
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for use by the University of Washington and members of the design team for use in the design of this project. This report may be made available to prospective contractors for bidding or estimating purposes; but our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers, Inc. (GeoEngineers) structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. No one except the University of Washington and members of the design team should rely on this report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

A Geotechnical Engineering or geologic Report is Based on A Unique Set of Project-Specific Factors

This report has been prepared for the proposed Softball Performance Center at the University of Washington in Seattle. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- The function of the proposed structure;
- Elevation, configuration, location, orientation or weight of the proposed structure;

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org .

- Composition of the design team; or
- Project ownership.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

Most Geotechnical and Geologic Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical Engineering Report Recommendations are Not Final

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from GeoEngineers' professional judgment and opinion. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by GeoEngineers should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the borings, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

Do not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

Give Contractors a Complete Report and Guidance

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

Contractors Are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical, Geologic and Environmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, or assessment of the presence of Biological Compounds which are Pollutants in or around any structure. Accordingly, this report includes no interpretations, recommendations, findings, or conclusions for the purpose of detecting, assessing, or abating Biological Pollutants. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

APPENDIX B

Greenhouse Gas Emissions Worksheet

City of Seattle Department of Planning and Development
SEPA GHG Emissions Worksheet
Version 1.7 12/26/07

Introduction

The Washington State Environmental Policy Act (SEPA) requires environmental review of development proposals that may have a significant adverse impact on the environment. If a proposed development is subject to SEPA, the project proponent is required to complete the SEPA Checklist. The Checklist includes questions relating to the development's air emissions. The emissions that have traditionally been considered cover smoke, dust, and industrial and automobile emissions. With our understanding of the climate change impacts of GHG emissions, the City of Seattle requires the applicant to also estimate these emissions.

Emissions created by Development

GHG emissions associated with development come from multiple sources:

- The extraction, processing, transportation, construction and disposal of materials and landscape disturbance (Embodied Emissions)
- Energy demands created by the development after it is completed (Energy Emissions)
- Transportation demands created by the development after it is completed (Transportation Emissions)

GHG Emissions Worksheet

This GHG Emissions Worksheet has been developed to assist applicants in answering the SEPA Checklist question relating to GHG emissions. The worksheet was originally developed by King County, but the City of Seattle and King County are working together on future updates to maintain consistency of methodologies across jurisdictions.

The SEPA GHG Emissions worksheet estimates all GHG emissions that will be created over the life span of a project. This includes emissions associated with obtaining construction materials, fuel used during construction, energy consumed during a buildings operation, and transportation by building occupants.

Using the Worksheet

1. Descriptions of the different residential and commercial building types can be found on the second tabbed worksheet ("Definition of Building Types"). If a development proposal consists of multiple projects, e.g. both single family and multi-family residential structures or a commercial development that consists of more than on type of commercial activity, the appropriate information should be estimated for each type of building or activity.

2. For paving, estimate the total amount of paving (in thousands of square feet) of the project.

3. The Worksheet will calculate the amount of GHG emissions associated with the project and display the amount in the "Total Emissions" column on the worksheet. The applicant should use this information when completing the SEPA checklist.

4. The last three worksheets in the Excel file provide the background information that is used to calculate the total GHG emissions.

5. The methodology of creating the estimates is transparent; if there is reason to believe that a better estimate can be obtained by changing specific values, this can and should be done. Changes to the values should be documented with an explanation of why and the sources relied upon.

6. Print out the “Total Emissions” worksheet and attach it to the SEPA checklist. If the applicant has made changes to the calculations or the values, the documentation supporting those changes should also be attached to the SEPA checklist.

UW Softball Performance Facility Project

Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO2e)			**Lifespan Emissions (MTCO2e)**
			Embodied	Energy	Transportation	
Single-Family Home.....	0		98	672	792	**0**
Multi-Family Unit in Large Building	0		33	357	766	**0**
Multi-Family Unit in Small Building	0		54	681	766	**0**
Mobile Home.....	0		41	475	709	**0**
Education		0.0	39	646	361	**0**
Food Sales		0.0	39	1,541	282	**0**
Food Service		0.0	39	1,994	561	**0**
Health Care Inpatient		0.0	39	1,938	582	**0**
Health Care Outpatient		0.0	39	737	571	**0**
Lodging		0.0	39	777	117	**0**
Retail (Other Than Mall).....		0.0	39	577	247	**0**
Office		0.0	39	723	588	**0**
Public Assembly		7.5	39	733	150	**6915**
Public Order and Safety		0.0	39	899	374	**0**
Religious Worship		0.0	39	339	129	**0**
Service		0.0	39	599	266	**0**
Warehouse and Storage		0.0	39	352	181	**0**
Other		0.0	39	1,278	257	**0**
Vacant		0.0	39	162	47	**0**

Section II: Pavement.....

Pavement.....		0.00				**0**

Total Project Emissions: **6915**

Version 1.7 12/26/07

Definition of Building Types

Type (Residential) or Principal Activity (Commercial)	Description
Single-Family Home.....	Unless otherwise specified, this includes both attached and detached buildings
Multi-Family Unit in Large Building	Apartments in buildings with more than 5 units
Multi-Family Unit in Small Building	Apartments in building with 2-4 units
Mobile Home.....	
Education	Buildings used for academic or technical classroom instruction, such as elementary, middle, or high schools, and classroom buildings on college or university campuses. Buildings on education campuses for which the main use is not classroom are included in the category relating to their use. For example, administration buildings are part of "Office," dormitories are "Lodging," and libraries are "Public Assembly."
Food Sales	Buildings used for retail or wholesale of food.
Food Service	Buildings used for preparation and sale of food and beverages for consumption.
Health Care Inpatient	Buildings used as diagnostic and treatment facilities for inpatient care.
Health Care Outpatient	Buildings used as diagnostic and treatment facilities for outpatient care. Doctor's or dentist's office are included here if they use any type of diagnostic medical equipment (if they do not, they are categorized as an office building).
Lodging	Buildings used to offer multiple accommodations for short-term or long-term residents, including skilled nursing and other residential care buildings.
Retail (Other Than Mall).....	Buildings used for the sale and display of goods other than food.
Office	Buildings used for general office space, professional office, or administrative offices. Doctor's or dentist's office are included here if they do not use any type of diagnostic medical equipment (if they do, they are categorized as an outpatient health care building).
Public Assembly	Buildings in which people gather for social or recreational activities, whether in private or non-private meeting halls.
Public Order and Safety	Buildings used for the preservation of law and order or public safety.
Religious Worship	Buildings in which people gather for religious activities, (such as chapels, churches, mosques, synagogues, and temples).
Service	Buildings in which some type of service is provided, other than food service or retail sales of goods
Warehouse and Storage	Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).
Other	Buildings that are industrial or agricultural with some retail space; buildings having several different commercial activities that, together, comprise 50 percent or more of the floorspace, but whose largest single activity is agricultural, industrial/ manufacturing, or residential; and all other miscellaneous buildings that do not fit into any other category.
Vacant	Buildings in which more floorspace was vacant than was used for any single commercial activity at the time of interview. Therefore, a vacant building may have some occupied floorspace.

Sources: .....

Residential 2001 Residential Energy Consumption Survey
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

Commercial Commercial Buildings Energy Consumption Survey (CBECS),
Description of CBECS Building Types
http://www.eia.doe.gov/emeu/cbecs/pba99/bldgtypes.html

Embodied Emissions Worksheet

Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# thousand sq feet/ unit or building	Life span related embodied GHG missions (MTCO2e/ unit)	Life span related embodied GHG missions (MTCO2e/ thousand square feet) - See calculations in table below
Single-Family Home	2.53	98	39
Multi-Family Unit in Large Building	0.85	33	39
Multi-Family Unit in Small Building	1.39	54	39
Mobile Home	1.06	41	39
Education	25.6	991	39
Food Sales	5.6	217	39
Food Service	5.6	217	39
Health Care Inpatient	241.4	9,346	39
Health Care Outpatient	10.4	403	39
Lodging	35.8	1,386	39
Retail (Other Than Mall)	9.7	376	39
Office	14.8	573	39
Public Assembly	14.2	550	39
Public Order and Safety	15.5	600	39
Religious Worship	10.1	391	39
Service	6.5	252	39
Warehouse and Storage	16.9	654	39
Other	21.9	848	39
Vacant	14.1	546	39

Section II: Pavement

All Types of Pavement			50

	Columns and Beams	Intermediate Floors	Exterior Walls	Windows	Interior Walls	Roofs		
Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building	5.3	7.8	19.1	51.2	5.7	21.3		
Average Materials in a 2,272-square foot single family home	0.0	2269.0	3206.0	285.0	6050.0	3103.0	Total Embodied Emissions (MTCO2e)	Total Embodied Emissions (MTCO2e/ thousand sq feet)
MTCO2e	0.0	8.0	27.8	6.6	15.6	30.0	88.0	38.7

Sources

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Residential floorspace per unit
2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

Floorspace per building
EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building
Athena EcoCalculator
Athena Assembly Evaluation Tool v2.3- Vancouver Low Rise Building
Assembly Average GWP (kg) per square meter
http://www.athenasmi.ca/tools/ecoCalculator/index.html
Lbs per kg 2.20
Square feet per square meter 10.76

Average Materials in a 2,272-square foot single family home
Buildings Energy Data Book: 7.3 Typical/Average Household
Materials Used in the Construction of a 2,272-Square-Foot Single-Family Home, 2000
http://buildingsdatabook.eren.doe.gov/?id=view_book_table&TableID=2036&t=xls
See also: NAHB, 2004 Housing Facts, Figures and Trends, Feb. 2004, p. 7.

Average window size
Energy Information Administration/Housing Characteristics 1993
Appendix B, Quality of the Data. Pg. 5.
ftp://ftp.eia.doe.gov/pub/consumption/residential/rx93hcf.pdf

Pavement Emissions Factors
MTCO2e/thousand square feet of asphalt
or concrete pavement

50 (see below)

Embodied GHG Emissions…….Worksheet Background Information

Buildings
Embodied GHG emissions are emissions that are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape disturbance (by both soil disturbance and changes in above ground biomass).

Estimating embodied GHG emissions is new field of analysis; the estimates are rapidly improving and becoming more inclusive of all elements of construction and development.

The estimate included in this worksheet is calculated using average values for the main construction materials that are used to create a typical family home. In 2004, the National Association of Home Builders calculated the average materials that are used in a typical 2,272 square foot single-family household. The quantity of materials used is then multiplied by the average GHG emissions associated with the life-cycle GHG emissions for each material.

This estimate is a rough and conservative estimate; the actual embodied emissions for a project are likely to be higher. For example, at this stage, due to a lack of comprehensive data, the estimate does not include important factors such as landscape disturbance or the emissions associated with the interior components of a building (such as furniture).

King County realizes that the calculations for embodied emissions in this worksheet are rough. For example, the emissions associated with building 1,000 square feet of a residential building will not be the same as 1,000 square feet of a commercial building. However, discussions with the construction community indicate that while there are significant differences between the different types of structures, this method of estimation is reasonable; it will be improved as more data become available.

Additionally, if more specific information about the project is known, King County recommends two online embodied emissions calculators that can be used to obtain a more tailored estimate for embodied emissions: www.buildcarbonneutral.org and www.athenasmi.ca/tools/ecoCalculator/.

Pavement
Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle. For specifics, see the worksheet.

Special Section: Estimating the Embodied Emissions for Pavement

Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle.

The results of the studies are presented in different units and measures; considerable effort was undertaken to be able to compare the results of the studies in a reasonable way. For more details about the below methodology, contact matt.kuharic@kingcounty.gov.

The four studies, Meil (2001), Park (2003), Stripple (2001) and Treolar (2001) produced total GHG emissions of 4-34 MTCO2e per thousand square feet of finished paving (for similar asphalt and concrete based pavements). This estimate does not including downstream maintenance and repair of the highway. The average (for all concrete and asphalt pavements in the studies, assuming each study gets one data point) is ~17 MTCO2e/thousand square feet.

Three of the studies attempted to thoroughly account for the emissions associated with long term maintenance (40 years) of the roads. Stripple (2001), Park et al. (2003) and Treolar (2001) report 17, 81, and 68 MTCO2e/thousand square feet, respectively, after accounting for maintenance of the roads.

Based on the above discussion, King County makes the conservative estimate that 50 MTCO2e/thousand square feet of pavement (over the development's life cycle) will be used as the embodied emission factor for pavement until better estimates can be obtained. This is roughly equivalent to 3,500 MTCO2e per lane mile of road (assuming the lane is 13 feet wide).

It is important to note that these studies estimate the embodied emissions for roads. Paving that does not need to stand up to the rigors of heavy use (such as parking lots or driveways) would likely use less materials and hence have lower embodied emissions.

Sources:

Meil, J. A Life Cycle Perspective on Concrete and Asphalt Roadways: Embodied Primary Energy and Global Warming Potential. 2006. Available: http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/$FILE/ATTK0WE3/athena%20report%20Feb.%202%202007.pdf

Park, K, Hwang, Y., Seo, S., M.ASCE, and Seo, H. , "Quantitative Assessment of Environmental Impacts on Life Cycle of Highways," Journal of Construction Engineering and Management , Vol 129, January/February 2003, pp 25-31, (DOI: 10.1061/(ASCE)0733-9364(2003)129:1(25)).

Stripple, H. Life Cycle Assessment of Road. A Pilot Study for Inventory Analysis. Second Revised Edition. IVL Swedish Environmental Research Institute Ltd. 2001. Available: http://www.ivl.se/rapporter/pdf/B1210E.pdf

Treloar, G., Love, P.E.D., and Crawford, R.H. Hybrid Life-Cycle Inventory for Road Construction and Use. Journal of Construction Engineering and Management. P. 43-49. January/February 2004.

Energy Emissions Worksheet

Type (Residential) or Principal Activity (Commercial)	Energy consumption per building per year (million Btu)	Carbon Coefficient for Buildings	MTCO2e per building per year	Floorspace per Building (thousand square feet)	MTCE per thousand square feet per year	MTCO2e per thousand square feet per year	Average Building Life Span	Lifespan Energy Related MTCO2e emissions per unit	Lifespan Energy Related MTCO2e emissions per thousand square feet
Single-Family Home	107.3	0.108	11.61	2.53	4.6	16.8	57.9	672	266
Multi-Family Unit in Large Building	41.0	0.108	4.44	0.85	5.2	19.2	80.5	357	422
Multi-Family Unit in Small Building	78.1	0.108	8.45	1.39	6.1	22.2	80.5	681	489
Mobile Home	75.9	0.108	8.21	1.06	7.7	28.4	57.9	475	448
Education	2,125.0	0.124	264.2	25.6	10.3	37.8	62.5	16,526	646
Food Sales	1,110.0	0.124	138.0	5.6	24.6	90.4	62.5	8,632	1,541
Food Service	1,436.0	0.124	178.5	5.6	31.9	116.9	62.5	11,168	1,994
Health Care Inpatient	60,152.0	0.124	7,479.1	241.4	31.0	113.6	62.5	467,794	1,938
Health Care Outpatient	985.0	0.124	122.5	10.4	11.8	43.2	62.5	7,660	737
Lodging	3,578.0	0.124	444.9	35.8	12.4	45.6	62.5	27,826	777
Retail (Other Than Mall)	720.0	0.124	89.5	9.7	9.2	33.8	62.5	5,599	577
Office	1,376.0	0.124	171.1	14.8	11.6	42.4	62.5	10,701	723
Public Assembly	1,338.0	0.124	166.4	14.2	11.7	43.0	62.5	10,405	733
Public Order and Safety	1,791.0	0.124	222.7	15.5	14.4	52.7	62.5	13,928	899
Religious Worship	440.0	0.124	54.7	10.1	5.4	19.9	62.5	3,422	339
Service	501.0	0.124	62.3	6.5	9.6	35.1	62.5	3,896	599
Warehouse and Storage	764.0	0.124	95.0	16.9	5.6	20.6	62.5	5,942	352
Other	3,600.0	0.124	447.6	21.9	20.4	74.9	62.5	27,997	1,278
Vacant	294.0	0.124	36.6	14.1	2.6	9.5	62.5	2,286	162

Sources

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Energy consumption for residential buildings

2007 Buildings Energy Data Book: 6.1 Quad Definitions and Comparisons (National Average, 2001)
Table 6.1.4: Average Annual Carbon Dioxide Emissions for Various Functions
http://buildingsdatabook.eren.doe.gov/
Data also at: http://www.eia.doe.gov/emeu/recs/recs2001_ce/ce1-4c_housingunits2001.html

Energy consumption for commercial buildings and Floorspace per building

EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

Note: Data in plum color is found in both of the above sources (buildings energy data book and commercial buildings energy consumption survey).

Carbon Coefficient for Buildings

Buildings Energy Data Book (National average, 2005)
Table 3.1.7. 2005 Carbon Dioxide Emission Coefficients for Buildings (MMTCE per Quadrillion Btu)
http://buildingsdatabook.eere.energy.gov/?id=view_book_table&TableID=2057
Note: Carbon coefficient in the Energy Data book is in MTCE per Quadrillion Btu.
To convert to MTCO2e per million Btu, this factor was divided by 1000 and multiplied by 44/12.

Residential floorspace per unit

2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

average lief span of buildings, estimated by replacement time method

	Single Family Homes	Multi-Family Units in Large and Small Buildings	All Residential Buildings	
New Housing Construction, 2001	1,273,000	329,000	1,602,000	
Existing Housing Stock, 2001	73,700,000	26,500,000	100,200,000	
Replacement time:	57.9	80.5	62.5	(national average, 2001)

Note: Single family homes calculation is used for mobile homes as a best estimate life span.
Note: At this time, KC staff could find no reliable data for the average life span of commercial buildings.
Therefore, the average life span of residential buildings is being used until a better approximation can be ascertained.

Sources:

New Housing Construction, 2001
Quarterly Starts and Completions by Purpose and Design - US and Regions (Excel)
http://www.census.gov/const/quarterly_starts_completions_cust.xls
See also: http://www.census.gov/const/www/newresconstindex.html

Existing Housing Stock, 2001
Residential Energy Consumption Survey (RECS) 2001
Tables HC1:Housing Unit Characteristics, Million U.S. Households 2001
Table HC1-4a. Housing Unit Characteristics by Type of Housing Unit, Million U.S. Households, 2001
Million U.S. Households, 2001
http://www.eia.doe.gov/emeu/recs/recs2001/hc_pdf/housunits/hc1-4a_housingunits2001.pdf

Transportation Emissions Worksheet

Type (Residential) or Principal Activity (Commercial)	# people/ unit or building	# thousand sq feet/ unit or building	# people or employees/ thousand square feet	vehicle related GHG emissions (metric tonnes CO2e per person per year)	MTCO2e/ year/ unit	MTCO2e/ year/ thousand square feet	Average Building Life Span	Life span transportation related GHG emissions (MTCO2e/ per unit)	Life span transportation related GHG emissions (MTCO2e/ thousand sq feet)
Single-Family Home	2.8	2.53	1.1	4.9	13.7	5.4	57.9	792	313
Multi-Family Unit in Large Building	1.9	0.85	2.3	4.9	9.5	11.2	80.5	766	904
Multi-Family Unit in Small Building	1.9	1.39	1.4	4.9	9.5	6.8	80.5	766	550
Mobile Home	2.5	1.06	2.3	4.9	12.2	11.5	57.9	709	668
Education	30.0	25.6	1.2	4.9	147.8	5.8	62.5	9247	361
Food Sales	5.1	5.6	0.9	4.9	25.2	4.5	62.5	1579	282
Food Service	10.2	5.6	1.8	4.9	50.2	9.0	62.5	3141	561
Health Care Inpatient	455.5	241.4	1.9	4.9	2246.4	9.3	62.5	140506	582
Health Care Outpatient	19.3	10.4	1.9	4.9	95.0	9.1	62.5	5941	571
Lodging	13.6	35.8	0.4	4.9	67.1	1.9	62.5	4194	117
Retail (Other Than Mall)	7.8	9.7	0.8	4.9	38.3	3.9	62.5	2394	247
Office	28.2	14.8	1.9	4.9	139.0	9.4	62.5	8696	588
Public Assembly	6.9	14.2	0.5	4.9	34.2	2.4	62.5	2137	150
Public Order and Safety	18.8	15.5	1.2	4.9	92.7	6.0	62.5	5796	374
Religious Worship	4.2	10.1	0.4	4.9	20.8	2.1	62.5	1298	129
Service	5.6	6.5	0.9	4.9	27.6	4.3	62.5	1729	266
Warehouse and Storage	9.9	16.9	0.6	4.9	49.0	2.9	62.5	3067	181
Other	18.3	21.9	0.8	4.9	90.0	4.1	62.5	5630	257
Vacant	2.1	14.1	0.2	4.9	10.5	0.7	62.5	657	47

Sources

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

people/ unit

Estimating Household Size for Use in Population Estimates (WA state, 2000 average)
Washington State Office of Financial Management
Kimpel, T. and Lowe, T. Research Brief No. 47. August 2007
http://www.ofm.wa.gov/researchbriefs/brief047.pdf
Note: This analysis combines Multi Unit Structures in both large and small units into one category;
the average is used in this case although there is likely a difference

Residential floorspace per unit

2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

employees/thousand square feet

Commercial Buildings Energy Consumption Survey commercial energy uses and costs (National Median, 2003)
Table B2 Totals and Medians of Floorspace, Number of Workers, and Hours of Operation for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set1/2003excel/b2.xls

Note: Data for # employees/thousand square feet is presented by CBECS as square feet/employee.
In this analysis employees/thousand square feet is calculated by taking the inverse of the CBECS number and multiplying by 1000.

vehicle related GHG emissions

Estimate calculated as follows (Washington state, 2006)_

56,531,930,000	2006 Annual WA State Vehicle Miles Traveled Data was daily VMT. Annual VMT was 365*daily VMT. http://www.wsdot.wa.gov/mapsdata/tdo/annualmileage.htm
6,395,798	2006 WA state population http://quickfacts.census.gov/qfd/states/53000.html
8839	vehicle miles per person per year
0.0506	gallon gasoline/mile This is the weighted national average fuel efficiency for all cars and 2 axle, 4 wheel light trucks in 2005. This includes pickup trucks, vans and SUVs. The 0.051 gallons/mile used here is the inverse of the more commonly known term “miles/per gallon” (which is 19.75 for these cars and light trucks). Transportation Energy Data Book. 26th Edition. 2006. Chapter 4: Light Vehicles and Characteristics. Calculations based on weighted average MPG efficiency of cars and light trucks. http://cta.ornl.gov/data/tedb26/Edition26_Chapter04.pdf Note: This report states that in 2005, 92.3% of all highway VMT were driven by the above described vehicles. http://cta.ornl.gov/data/tedb26/Spreadsheets/Table3_04.xls
24.3	lbs CO2e/gallon gasoline The CO2 emissions estimates for gasoline and diesel include the extraction, transport, and refinement of petroleum as well as their combustion. Life-Cycle CO2 Emissions for Various New Vehicles. RENew Northfield. Available: http://renewnorthfield.org/wpcontent/uploads/2006/04/CO2%20emissions.pdf Note: This is a conservative estimate of emissions by fuel consumption because diesel fuel,
2205	with a emissions factor of 26.55 lbs CO2e/gallon was not estimated.
4.93	lbs/metric tonne
	vehicle related GHG emissions (metric tonnes CO2e per person per year)

average lief span of buildings, estimated by replacement time method — See Energy Emissions Worksheet for Calculations

Commercial floorspace per unit — EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

APPENDIX C

Tree Survey and Assessment

Tree Solutions Inc
Consulting Arborists

Project No. TS - 6874

Arborist Report DRAFT

TO:	Anna Daeuble – University of Washington
SITE:	UW Softball Building
RE:	Tree Inventory and Assessment
DATE:	August 16, 2019
PROJECT ARBORIST:	Tyler Bunton ISA Certified Arborist #PN-8715A ISA Qualified Tree Risk Assessor
	Andrea Starbird Arborist Technician
ATTACHED:	Table of Trees, Site Map
REFERENCED DOCS:	Site Plan A051 (SRG Partnership, Inc. – Zachary Melnik, dated August 8, 2019)

This report documents the site visit by Tyler Bunton and Andrea Starbird of Tree Solutions Inc. on August 14, 2019 to the above referenced site. We were asked to complete a tree inventory and assessment by Anna Daeuble for project planning purposes.

We inventoried and assessed sixty-seven (67) trees in the project area. Based on the City of Seattle Municipal Code (SMC 25.11), trees measuring six (6) inches or greater in diameter at standard height (DSH) are required to be assessed for development projects. Trees which were tagged as part of the University of Washington (UW) tree inventory were also assessed. Numerical identifiers used are from the UW tree inventory. Alphabetic identifiers were used when no tags were present on the trees, and no numerical identifier was on the survey.

Of the trees assessed, one (1) met the exceptional tree criteria due to size as outlined in the Seattle Director's Rule 16-2008[1].

We found one (1) exceptional tree grove on site comprised of thirteen (13) trees. The City defines an exceptional grove as eight (8) or more trees each with a diameter measuring twelve (12) inches or greater with continuously overlapping canopies.

[1] Sugimura, D.W. "DPD Director's Rule 16-2008". Seattle, WA, 2009

A summary of our recommendations:

- Site planning around exceptional trees must follow the guidelines outlined in SMC 25.11.050[2].
- Site planning around trees in critical areas must follow the guidelines outlined in SMC 25.09.070[3].
- All pruning should be conducted by an ISA certified arborist and following ANSI A300 specifications[4].

Observations

Site

The site is located between Husky Stadium, Dempsey Indoor Center, and Nordstrom Tennis Center on the UW campus. There is currently a wide pedestrian walkway through the site.

According to the Seattle Department of Construction and Inspections (SDCI) GIS map, the site is in a historical landfill and peat settlement prone environmentally critical area (ECA).

Proposed Plans

The most recent plans provided (Site Plan A051, SRG Partnership, Inc. August 8, 2019) propose moving the pedestrian walkway to the south to provide space for a new Softball Performance Center.

Trees

Along the pathway at the northeast entrance to Husky Stadium, there were several higan cherry (*Prunus subhirtella*) trees and strawberry trees (*Arbutus unedo*). Strawberry trees B, C, and E were being managed as a hedge. One of the strawberry trees (I) was of exceptional size with a DSH of 12.3 inches.

Seventeen tulip trees (*Liriodendron tulipifera*) (422-438) were in the lawn area to the south of the pedestrian path running through the center of the site.

There were several vine maples (*Acer circinatum*) (12326-12330, 12334, 12335, L) below the stadium canopy. Most of these vine maples were phototropic to the north.

North of the pedestrian path, was an exceptional grove of dawn redwoods (*Metasequoia glyptostroboides*) consisting of trees 513, 514, 516 through 525, and M. These trees were in fair to good health and good structural condition. Several of these trees had nests in them.

We have included an annotated survey of the site to serve as the site map and attached a table of trees that has detailed information about each tree.

[2] Seattle Municipal Code 25.11.050. General Provisions for Exceptional Trees

[3] Seattle Municipal Code 25.09.070 Standards for Trees and Vegetation in Critical Areas

[4] ANSI A300 (Part 1) – 2017 American National Standards Institute. American National Standard for Tree Care Operations: Tree, Shrub, and Other Woody Plant Maintenance: Standard Practices (Pruning). New York: Tree Care Industry Association, 2017.

Discussion—Construction Impacts

This report is preliminary as we have not reviewed construction plans for this area. However, for planning purposes, replacement requirements and tree protection requirements can be found in SMC 25.11.

Recommendations

- Site planning around exceptional trees must follow the guidelines outlined in SMC 25.11.050[5].
- Site planning around trees in critical areas must follow the guidelines outlined in SMC 25.09.070[6].
- All pruning should be conducted by an ISA certified arborist and following ANSI A300 specifications[7].

Respectfully submitted,

Tyler Bunton, Certified Arborist

[5] Seattle Municipal Code 25.11.050. General Provisions for Exceptional Trees

[6] Seattle Municipal Code 25.09.070 Standards for Trees and Vegetation in Critical Areas

[7] ANSI A300 (Part 1) – 2008 American National Standards Institute. American National Standard for Tree Care Operations: Tree, Shrub, and Other Woody Plant Maintenance: Standard Practices (Pruning). New York: Tree Care Industry Association, 2008.

Photographs

Photo 1. Northeast entrance into Husky Stadium with the exceptional strawberry tree (I) indicated.

Photo 2. Vine maples below the stadium canopy growing phototropic to the north.

Photo 3. Eastern portion of the exceptional grove of dawn redwood trees.

Photo 4. Tulip trees in the lawn area to the south of the pedestrian path.

Appendix A - Assumptions & Limiting Conditions

1. Consultant assumes that the Site and its use do not violate, and is in compliance with all applicable codes, ordinances, statutes or regulations.

2. The Consultant may provide report or recommendation based on published municipal regulations. The Consultant assumes that the municipal regulations published on the date of the report are current municipal regulations and assumes no obligation related to unpublished city regulation information.

3. Any report by Consultant and any values expressed therein represent the opinion of the Consultant, and the Consultant's fee is in no way contingent upon the reporting of a specific value, a stipulated result, the occurrence of a subsequent event, or upon any finding to be reported.

4. All photographs included in our reports were taken by Tree Solutions, Inc. during the documented Site visit, unless otherwise noted. Sketches, drawings and photographs in any report by Consultant, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys. The reproduction of any information generated by architects, engineers or other consultants and any sketches, drawings or photographs is for the express purpose of coordination and ease of reference only. Inclusion of such information on any drawings or other documents does not constitute a representation by Consultant as to the sufficiency or accuracy of the information.

5. Unless otherwise agreed, (1) information contained in any report by Consultant covers only the items examined and reflects the condition of those items at the time of inspection; and (2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, climbing, or coring.

6. These findings are based on the observations and opinions of the authoring arborist, and does not provide guarantees regarding the future performance, health, vigor, structural stability or safety of the plants described assessed.

7. Measurements are subject to typical margins of error, considering the oval or asymmetrical cross-section of most trunks and canopies.

8. Tree Solutions did not review any reports or perform any tests related to the soil located on the subject property unless outlined in the scope of services. Tree Solutions staff are not and do not claim to be soils experts. An independent inventory and evaluation of the site's soil should be obtained by a qualified professional if an additional understanding of the site's characteristics is needed to make an informed decision.

9. Our assessments are made in conformity with acceptable evaluation/diagnostic reporting techniques and procedures, as recommended by the International Society of Arboriculture.

Appendix B – Tree Protection Specifications

- **Tree Protection Fencing:** All trees planned for retention or on neighboring properties that overhang the site shall be protected for the entire duration of the construction project. Tree protection fencing shall consist of high visibility mesh or chain link fencing installed at the extent of the tree protection area. Where trees are being retained as a group the fencing should encompass the entire area.
- **Soil Protection:** No parking, materials storage, or dumping (including excavated soils) are allowed within the tree protection area. Any heavy machinery should remain outside of the protection area unless soils are protected from the load. Acceptable methods of soil protection include applying 1 inch plywood over 3 to 4 inches of wood chip mulch, or use of Alturna mats (or equivalent product).
- **Duff/Mulch:** Retain and protect as much of the existing duff and understory as possible. Retained trees in areas where there are exposed soils shall have 4 to 6 inches of wood chips applied to help prevent water evaporation and compaction. Keep mulch 1 foot away from the base of the tree.
- **Excavation:** Excavation done at or within the tree protection area should be carefully planned to minimize disturbance. Where feasible consider using alternative methods such as pneumatic excavation which uses pressurized air to blow soil away from the root system, directional drilling to bore utility lines, or hand excavation to expose roots. Excavation done with machinery (backhoe) in proximity of trees should be performed slowly with flat front buckets, removing small amounts of soil at a time with one person on the ground spotting for roots. When roots are encountered, excavation should stop and roots should be cleanly pruned as needed so they are not ripped or torn.
- **Root Pruning:** Root pruning should be limited to the extent possible. All roots shall be pruned with a sharp saw making clean cuts. Avoid fracturing and breaking roots with excavation equipment. Root cuts shall be immediately covered with soil or mulch and kept moist.
- **Irrigation:** Retained trees will require supplemental water if construction occurs during summer drought periods.
- **Pruning:** Any pruning required for construction and safety clearance shall be done with a pruning specification provided by the project arborist in accordance with American National Standards Institute ANSI A300 Standard Practices for Pruning. Use of an arborist with an International Society of Arboriculture Certification to perform pruning is strongly advised.

Tree Solutions Inc
Consulting Arborists

Table of Trees

UW Softball Building , Seattle, WA

Arborist: TB AS
Date of Inventory: 8/14/19
Table Prepared: 8/16/19

DSH (Diameter at Standard Height) is measured 4.5 feet above grade.
Multi-stem trees are noted, and a single stem equivalent is calculated using the method defined in the Director's Rule 16-2008.
Letters are used to identify trees on neighboring property with overhanging canopies.
Dripline is measured from the center of the tree to the outermost extent of the canopy.

							Dripline Radius (feet)								
Tree ID	**Scientific Name**	**Common Name**	**DSH** (inches)	**DSH Multistem**	**Health Condition**	**Structural Condition**	**N**	**E**	**S**	**W**	**Exceptional Threshold**	**Exceptional by Size**	**Exceptional Grove**	**Proposed Action**	**Notes**
422	*Liriodendron tulipifera*	Tulip tree	11.6		Good	Good	9.5	10.5	10.0	10.5	*30.0*	-	-		Not tagged
423	*Liriodendron tulipifera*	Tulip tree	12.9		Good	Good	15.5	18.5	22.5	15.0	*30.0*	-	-		
424	*Liriodendron tulipifera*	Tulip tree	11.4		Good	Good	16.5	11.0	8.5	8.5	*30.0*	-	-		
425	*Liriodendron tulipifera*	Tulip tree	6.9		Good	Fair	16.3	7.8	5.8	9.8	*30.0*	-	-		Not tagged; bent leader corrected
426	*Liriodendron tulipifera*	Tulip tree	8.3		Good	Good	14.3	11.3	10.8	8.3	*30.0*	-	-		
427	*Liriodendron tulipifera*	Tulip tree	5.5		Fair	Good	10.2	4.2	4.2	8.7	*30.0*	-	-		Approximately 30 percent dieback
428	*Liriodendron tulipifera*	Tulip tree	6.5		Good	Good	10.8	3.3	10.3	10.3	*30.0*	-	-		Not tagged
429	*Liriodendron tulipifera*	Tulip tree	6.8		Good	Fair	18.8	10.3	4.3	9.3	*30.0*	-	-		Not tagged; phototropic north
430	*Liriodendron tulipifera*	Tulip tree	8.8		Good	Fair	25.4	15.9	1.9	12.4	*30.0*	-	-		Not tagged; phototropic north
431	*Liriodendron tulipifera*	Tulip tree	12.3		Good	Good	14.5	13.5	9.5	11.5	*30.0*	-	-		Not tagged
432	*Liriodendron tulipifera*	Tulip tree	14.0		Good	Good	18.1	12.6	14.1	12.6	*30.0*	-	-		Not tagged
433	*Liriodendron tulipifera*	Tulip tree	9.8		Good	Good	12.4	13.4	4.4	9.4	*30.0*	-	-		
434	*Liriodendron tulipifera*	Tulip tree	9.5		Good	Good	17.9	11.9	9.4	6.9	*30.0*	-	-		Not tagged
435	*Liriodendron tulipifera*	Tulip tree	11.8		Good	Good	16.0	18.5	7.5	7.5	*30.0*	-	-		Not tagged
436	*Liriodendron tulipifera*	Tulip tree	10.7		Good	Good	16.9	13.9	8.9	7.9	*30.0*	-	-		
437	*Liriodendron tulipifera*	Tulip tree	12.2		Good	Good	13.5	14.5	9.0	10.0	*30.0*	-	-		Not tagged
438	*Liriodendron tulipifera*	Tulip tree	9.1		Good	Good	8.9	12.4	6.9	8.9	*30.0*	-	-		Not tagged
440	*Liriodendron tulipifera*	Tulip tree	11.3		Good	Good	13.0	12.5	8.5	7.5	*30.0*	-	-	Retain	Not tagged
441	*Liriodendron tulipifera*	Tulip tree	10.7		Good	Good	10.4	14.9	9.4	11.9	*30.0*	-	-	Retain	Not tagged
442	*Liriodendron tulipifera*	Tulip tree	12.1		Good	Good	21.5	13.0	10.0	11.5	*30.0*	-	-	Retain	Measured at narrowest point below union
443	*Prunus x subhirtella*	Higan cherry	6.8	6.3, 2.6	Fair	Fair	9.8	11.3	3.3	2.8	*13.0*	-	-	Retain	Branch unions with narrow angles of attachment; approximately 15 percent dieback
444	*Prunus x subhirtella*	Higan cherry	8.3		Fair	Good	14.3	12.3	5.3	8.8	*13.0*	-	-	Retain	Brown blossom rot
445	*Prunus x subhirtella*	Higan cherry	7.0		Fair	Good	11.3	13.3	2.3	7.3	*13.0*	-	-	Retain	Brown blossom rot; approximately 10 percent dieback
446	*Prunus x subhirtella*	Higan cherry	6.5		Good	Good	12.3	10.8	7.3	8.8	*13.0*	-	-	Retain	Brown blossom rot
447	*Acer ginnala*	Amur maple	13.7	4.9, 2.7, 3.9, 5.6, 4.4, 4.2, 4, 4, 4.4, 4.7	Good	Fair	17.1	18.1	11.6	10.6	*15.6*	-	-	Retain	Multistem at base; not tagged
506	*Quercus rubra*	Red oak	15.0		Good	Good	18.6	19.1	17.6	21.6	*30.0*	-	-	Retain	
507	*Quercus rubra*	Red oak	6.3		Fair	Fair	9.8	11.3	13.3	16.3	*30.0*	-	-	Retain	Sparse canopy; approximately 25 percent dieback; codominant at approximately 20 feet
513	*Metasequoia glyptostroboides*	Dawn redwood	20.3		Good	Good	22.8	16.8	19.3	20.3	*30.0*	-	Exceptional Grove	Remove	
514	*Metasequoia glyptostroboides*	Dawn redwood	24.1		Good	Good	21.0	16.0	18.0	23.0	*30.0*	-	Exceptional Grove	Remove	Ganoderma
516	*Metasequoia glyptostroboides*	Dawn redwood	22.4		Good	Good	22.4	16.4	13.9	18.9	*30.0*	-	Exceptional Grove	Remove	
517	*Metasequoia glyptostroboides*	Dawn redwood	14.4		Good	Good	16.6	12.1	14.1	13.1	*30.0*	-	Exceptional Grove	Remove	
518	*Metasequoia glyptostroboides*	Dawn redwood	21.9		Good	Good	22.4	15.9	15.4	15.9	*30.0*	-	Exceptional Grove	Remove	Not tagged; surface roots

Tree Solutions Inc
Consulting Arborists

Table of Trees

UW Softball Building , Seattle, WA

Arborist: TB AS
Date of Inventory: 8/14/19
Table Prepared: 8/16/19

Tree ID	Scientific Name	Common Name	DSH (inches)	DSH Multistem	Health Condition	Structural Condition	N	E	S	W	Exceptional Threshold	Exceptional by Size	Exceptional Grove	Proposed Action	Notes
519	*Metasequoia glyptostroboides*	Dawn redwood	21.4		Good	Good	18.4	17.9	18.4	17.4	*30.0*	-	Exceptional Grove	Remove	Surface roots
520	*Metasequoia glyptostroboides*	Dawn redwood	19.9		Good	Good	25.8	15.3	17.8	20.3	*30.0*	-	Exceptional Grove	Remove	Not tagged
521	*Metasequoia glyptostroboides*	Dawn redwood	20.1		Good	Good	23.8	13.3	18.8	14.8	*30.0*	-	Exceptional Grove	Remove	
522	*Metasequoia glyptostroboides*	Dawn redwood	24.2		Good	Good	24.0	13.5	24.5	13.5	*30.0*	-	Exceptional Grove	Remove	Surface roots; nest
523	*Metasequoia glyptostroboides*	Dawn redwood	17.8		Good	Good	18.7	13.7	15.2	11.7	*30.0*	-	Exceptional Grove	Remove	Nest
524	*Metasequoia glyptostroboides*	Dawn redwood	15.4		Good	Good	14.6	16.1	13.1	13.6	*30.0*	-	Exceptional Grove	Remove	
525	*Metasequoia glyptostroboides*	Dawn redwood	27.2		Good	Good	19.1	17.6	18.6	16.1	*30.0*	-	Exceptional Grove	Remove	
526	*Quercus rubra*	Red oak	6.3		Fair	Good	9.3	4.8	8.8	8.3	*30.0*	-	-	Retain	Chlorotic
527	*Quercus rubra*	Red oak	5.0		Fair-	Good	10.7	5.7	10.2	10.7	*30.0*	-	-	Retain	Approximately 15 percent dieback; chlorotic
11359	*Acer circinatum*	Vine maple	4.8	2.8, 1.8, 2.4, 1.9, 1.6	Good	Good	10.2	9.2	10.2	9.2	*8.0*	-	-	Retain	
11360	*Acer circinatum*	Vine maple	3.5	2.1, 1.8, 2.2,	Fair	Good	10.1	7.6	6.6	7.1	*8.0*	-	-	Retain	Not tagged; one large dead branch
11362	*Acer circinatum*	Vine maple	4.8	2.8, 2.6, 2.9	Good	Good	7.7	9.7	11.2	9.2	*8.0*	-	-	Remove	
12326	*Acer circinatum*	Vine maple	7.6	3.5, 2, 3, 3.5, 2, 2, 2.5, 2.5	Good	Good	14.3	11.8	2.8	11.8	*8.0*	-	-	Retain	Multistem at base
12327	*Acer circinatum*	Vine maple	4.2	3, 2.9	Good	Good	12.7	4.2	1.2	13.2	*8.0*	-	-	Retain	Phototropic north
12328	*Acer circinatum*	Vine maple	6.0	2.5, 2.5, 1.5, 1.5, 2, 2, 1.5, 1.5, 2, 1.5	Good	Fair	14.2	13.7	1.2	9.7	*8.0*	-	-	Retain	Multistem at base; phototropic north; stems nearly horizontal
12329	*Acer circinatum*	Vine maple	3.0	1.5, 1.5, 1.5, 1.5	Good	Fair	17.1	8.1	1.1	8.1	*8.0*	-	-	Retain	Heavily phototropic north; multistem at base
12330	*Acer circinatum*	Vine maple	2.9	1.5, 1.5, 2	Good	Fair	10.6	13.1	0.6	7.1	*8.0*	-	-	Retain	Phototropic north
12332	*Acer platanoides*	Norway maple	6.7	4.3, 5.2	Good	Fair	11.3	7.3	9.3	5.3	*30.0*	-	-	Retain	Codominant at 1 foot
12334	*Acer circinatum*	Vine maple	6.6	1.5, 1, 1.5, 2, 1.5, 1.5, 1.5, 2, 1.5, 1.5, 1.5, 1.5, 1, 2, 1.5, 1.5, 1.5, 1.5	Good	Good	9.3	13.3	3.8	9.3	*8.0*	-	-	Retain	Multistem at base
12335	*Acer circinatum*	Vine maple	5.1	1.5, 2.5, 2, 2.5, 2, 1.5, 1	Good	Good	12.2	8.7	1.7	10.7	*8.0*	-	-	Retain	Multistem at base
12336	*Prunus x subhirtella*	Higan cherry	Dead		Dead	Dead					*13.0*	-	-	Remove	
12337	*Prunus x subhirtella*	Higan cherry	4.3	3.2, 2.8	Poor	Fair	2.7	6.7	5.2	5.2	*13.0*	-	-	Retain	Southwest stem mostly dead; codominant at base
A	*Prunus x subhirtella*	Higan cherry	5.0		Good	Fair	6.2	6.7	12.2	10.7	*13.0*	-	-	Retain	Gummosis; swept base; prunung wounds

Tree Solutions Inc
Consulting Arborists

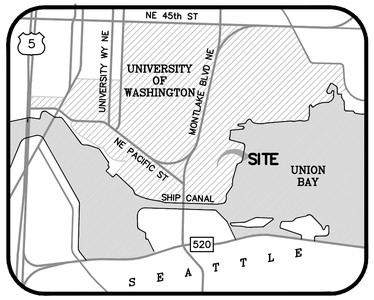
Table of Trees

UW Softball Building , Seattle, WA

Arborist: TB AS
Date of Inventory: 8/14/19
Table Prepared: 8/16/19

Tree ID	Scientific Name	Common Name	DSH (inches)	DSH Multistem	Health Condition	Structural Condition	N	E	S	W	Exceptional Threshold	Exceptional by Size	Exceptional Grove	Proposed Action	Notes
B	*Arbutus unedo*	Strawberry tree	6.0	3.6, 3.3, 1.8, 2.5, 1.7	Good	Fair	4.8	3.3	3.3	9.3	*10.2*	-	-	Retain	Pruned as hedge
C	*Arbutus unedo*	Strawberry tree	7.2	4, 6	Good	Fair	3.8	3.3	3.3	7.3	*10.2*	-	-	Retain	Pruned as hedge; DSH estimated at 4.5 feet due to stems growing together
D	*Prunus x subhirtella*	Higan cherry	7.6	5.6, 5.1	Good	Fair	5.8	13.3	6.8	10.3	*13.0*	-	-	Retain	Sprout below graft; gummosis
E	*Arbutus unedo*	Strawberry tree	5.4	3.1, 4.4	Good	Good	6.2	3.2	6.2	7.2	*10.2*	-	-	Retain	Pruned as hedge
F	*Arbutus unedo*	Strawberry tree	5.8	3.7, 4.5	Good	Good	3.2	8.7	7.7	3.2	*10.2*	-	-	Retain	Crown raised for path clearance
G	*Arbutus unedo*	Strawberry tree	5.1	3.6, 3.3, 1.4,	Good	Good	5.7	9.7	6.2	2.2	*10.2*	-	-	Retain	Crown raised for path clearance
H	*Arbutus unedo*	Strawberry tree	7.6	3.9, 4.6, 4.3, 1.7	Good	Good	7.3	13.3	9.3	3.3	*10.2*	-	-	Retain	Crown raised for path clearance
I	*Arbutus unedo*	Strawberry tree	12.3	6.8, 5, 3.5, 3.6, 4, 3.5, 4.2, 1.5, 2.6	Good	Good	12.0	19.5	14.5	5.0	*10.2*	Exceptional	-	Retain	Multistem at base; crown raised for path clearance; good response growth on pruning wounds
J	*Alnus rubra*	Red alder	14.0		Good	Good	15.6	15.6	15.6	15.6	*Not Exceptional unless in grove*	-	-	Retain	DSH estimated; no access
K	*Robinia pseudoacacia*	Black locust	8.5	3.7, 7.7	Good	Good	14.9	16.4	15.4	7.4	*30.0*	-	-	Retain	Codominant at base; not tagged
L	*Acer circinatum*	Vine maple	3.9	1.5, 1.5, 1.5, 1.5, 2, 1.5,	Fair	Poor	16.2	4.2	0.2	16.2	*8.0*	-	-	Retain	Failed at base
M	*Metasequoia glyptostroboides*	Dawn redwood	18.2		Fair	Good	11.8	16.8	13.8	14.8	*30.0*	-	Exceptional Grove	Remove	Not tagged; not surveyed; not on UW tree map; sparse canopy; nest

NW 1/4 OF THE SE 1/4, SEC. 16, TWP. 25N, RGE. 04E, W.M.



VICINITY MAP

NOT TO SCALE

N

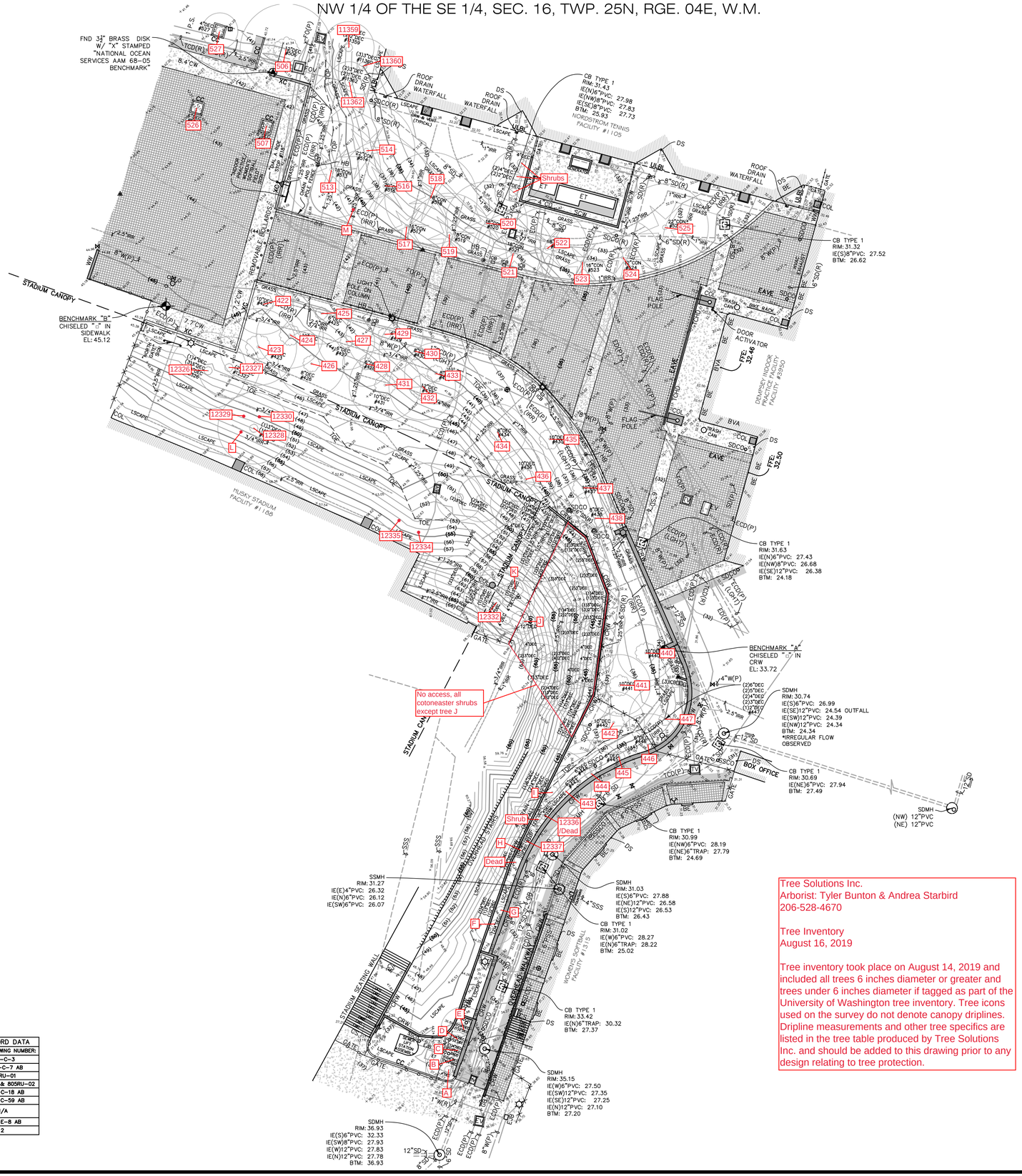
20 0 10 20

(IN FEET)
1 inch = 20 ft.

LEGEND

#XXX	UW TREE TAG ID
	ASPHALT (ASPH)
	BOLLARD
	BUILDING LINE
BE	BUILDING ENTRANCE
	BRASS DISC
BTM	BOTTOM OF STRUCTURE
BVA	BUILDING VEHICLE ACCESS
	CATCH BASIN (CB)
	CONCRETE SURFACE/(CONC)
CD	CONDUIT DROP
CW	CONCRETE WALK
CRW	CONCRETE RETAINING WALL
CC/XC	CONCRETE/EXTRUDED CURB
CP/DI/PVC	CONCRETE/DUCTILE IRON/PVC PIPE
DS	DOWNSPOUT
	CHAIN LINK FENCE (CLF)
COL	COLUMN
CON	CONIFEROUS TREE
DEC	DECIDUOUS TREE
CMP	CORRUGATED METAL PIPE
COC	CENTER OF CHANNEL
ECD	ELECTRICAL CONDUIT
ED	ELECTRICAL DUCT
EJB	ELECTRICAL JUNCTION BOX
EMH	ELECTRICAL MANHOLE
EV/ET	ELECTRICAL VAULT/TRANSFORMER
	FOUND SURVEY MONUMENT (AS NOTED)
	FIRE HYDRANT
FO	FIBER OPTICS
FOV	FIBER OPTIC VAULT
FFE	FINISH FLOOR ELEVATION
GB	GRADE BREAK
	GAS VALVE
	HANDRAIL
HB	HOSE BIBB
	HUB AND TACK
ICB	IRRIGATION CONTROL BOX
IRR	IRRIGATION (R)
	IRON FENCE (WF)
IE	INVERT ELEVATION
	LIGHT POLE (DECORATIVE)
LSCAPE	LANDSCAPE
	MANHOLE
P.S.	PARKING SPACE(S)
PSS	SANITARY SEWER
(P)	PAINTED UTILITY LOCATION
	PIPE FLOW DIRECTION
(R)	RECORD DATA
	PAVERS
	SCREW
SSS	SANITARY SIDE SEWER (RECORD)
SCW	STANDING CONCRETE WALL
SD	SERVICE DRAIN (STORM)
SDCO/SSCO	STORM DRAIN/SANITARY SEWER CLEANOU
	SIGN
TCHD	TRENCH DRAIN
	TEMPORARY BENCHMARK (TBM)
TCD	TELEPHONE CONDUIT (BURIED)
TV	TELEPHONE VAULT
TOE	TOE OF SLOPE
TOP	TOP OF BANK
ULBL	UPPER LEVEL BUILDING LINE
W	WATER MAIN
	WATER VALVE
WW	WING WALL

FACILITIES DOCUMENT REFERENCE FOR COMPILATION OF SURVEY RECORD DATA	
DOCUMENT SUMMARY:	SHEET/DRAWING NUMBER:
CIVIL – NORDSTROM TENNIS UTILITY SITE PLAN	268–C–3
CIVIL – SITE UTILITY, GRADING AND DRAINAGE PLAN	3950–C–7 AB
CIVIL – UTILITIES RECORD PLAN – SANITARY SEWER DISTRIBUTION MAP	805RU–01
CIVIL – UTILITIES RECORD PLAN – STORM SEWER DISTRIBUTION MAP	805RU–04 & 805RU–02
LANDSCAPE – IRRIGATION AND LANDSCAPE PLAN GRID D	3950–C–18 AB
LANDSCAPE – IRRIGATION AND LANDSCAPE PLAN L2.01	3950–C–59 AB
ONLINE TREES – HTTPS://DEPTS.WASHINGTON.EDU/CEOGIS/PUBLIC/TREES/ –SUPPLEMENTAL TREE ID'S	N/A
POWER – ELECTRICAL SITE PLAN NORDSTROM TENNIS	3950–E–8 AB
SURVEY – PREVIOUS BRH SURVEY 2007215 (UW PROJECT 200702)	2



Tree Solutions Inc.
Arborist: Tyler Bunton & Andrea Starbird
206-528-4670

Tree Inventory
August 16, 2019

Tree inventory took place on August 14, 2019 and included all trees 6 inches diameter or greater and trees under 6 inches diameter if tagged as part of the University of Washington tree inventory. Tree icons used on the survey do not denote canopy driplines. Dripline measurements and other tree specifics are listed in the tree table produced by Tree Solutions Inc. and should be added to this drawing prior to any design relating to tree protection.

SITE NOTES

SITE ADDRESS(S):
VICINITY OF HUSKY STADIUM
SEATTLE WA

SETBACKS:
CURRENT SETBACK REQUIREMENTS SUBJECT TO SITE PLAN REVIEW. CURRENT SETBACKS MAY DIFFER FROM THOSE IN EFFECT DURING DESIGN/CONSTRUCTION OF EXISTING IMPROVEMENTS.

THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY BY THE GOVERNING JURISDICTION INDICATES THAT STRUCTURES ON THIS PROPERTY COMPLIED WITH MINIMUM SETBACK AND HEIGHT REQUIREMENTS FOLLOWING CONSTRUCTION.

FLOOD ZONE:
THIS SITE APPEARS ON NATIONAL FLOOD INSURANCE RATE MAP, DATED MAY 16TH, 1995, COMMUNITY PANEL NO. 53033C0340F, AND IS SITUATED IN ZONE "X", AREA DETERMINED TO BE OUTSIDE THE 500–YEAR FLOODPLAIN.

ZONING:
MIO–37–LR1

HORIZONTAL DATUM:
NAD 83/91

VERTICAL DATUM:
NAVD 88

SUBSTRUCTURES:
BURIED UTILITIES ARE SHOWN AS INDICATED ON RECORDS MAPS FURNISHED BY OTHERS AND VERIFIED WHERE POSSIBLE BY FEATURES LOCATED IN THE FIELD. WE ASSUME NO LIABILITY FOR THE ACCURACY OF THOSE RECORDS. FOR THE FINAL LOCATION OF EXISTING UTILITIES IN AREAS CRITICAL TO DESIGN CONTACT THE UTILITY OWNER/AGENCY.

TELECOMMUNICATIONS/FIBER OPTIC DISCLAIMER:
RECORDS OF UNDERGROUND TELECOMMUNICATIONS AND/OR FIBER OPTIC LINES ARE NOT ALWAYS AVAILABLE TO THE PUBLIC. BRH HAS NOT CONTACTED EACH OF THE MANY COMPANIES, IN THE COURSE OF THIS SURVEY, WHICH COULD HAVE UNDERGROUND LINES WITHIN ADJACENT RIGHTS–OF–WAY. THEREFORE, BRH DOES NOT ACCEPT RESPONSIBILITY FOR THE EXISTENCE OF UNDERGROUND TELECOMMUNICATIONS/FIBER OPTIC LINES WHICH ARE NOT MADE PUBLIC RECORD WITH THE LOCAL JURISDICTION. AS ALWAYS, CALL 1–800–424–5555 BEFORE CONSTRUCTION.

UTILITY PROVIDERS:

SANITARY SEWER AND STORM DRAINAGE:
SEATTLE PUBLIC UTILITIES
PROJECT MANAGEMENT AND ENGINEERING
700 5TH AVENUE
PO BOX 34018
SEATTLE, WA 98124–4018
(206) 233–7900

WATER:
SEATTLE PUBLIC UTILITIES
700 5TH AVENUE, SUITE 4900
PO BOX 34018
SEATTLE, WA 98124–4018
(206) 684–3000

POWER:
SEATTLE CITY LIGHT
700 5TH AVENUE, SUITE 3200
SEATTLE, WA 98124–4023
(206) 684–3000

NATURAL GAS:
PUGET SOUND ENERGY
10885 NE 4TH STREET, SUITE 1200
PO BOX 97034
BELLEVUE, WA 98009–9734
(425) 454–6363
(888) 225–5773

TELEPHONE:
CENTURY LINK
1600 7TH AVENUE
SEATTLE, WA 98191
(800) 244–1111

CERTIFICATION:

SURVEY IDENTIFICATION NO.: 20190069.00

REGISTERED LAND SURVEYOR NO.: 44634

SURVEYOR'S ADDRESS & COMPANY: BUSH, ROED & HITCHINGS, INC.
2009 MINOR AVENUE EAST
SEATTLE, WA 98102–3513

TELEPHONE: (206) 323–4144

THE FIELD WORK WAS COMPLETED ON APRIL 23RD, 2019.

DATE OF PLAT OR MAP: 6/28/2019

JAMES M. HARPER, P.L.S. NO. 44634

THE ABOVE CERTIFICATE IS BASED UPON WORK PREPARED IN ACCORDANCE WITH GENERALLY ACCEPTED PROFESSIONAL SURVEY PRACTICE. WE MAKE NO OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED.

STATEMENT OF TOPOGRAPHIC MAP ELEMENTS (WAC 332–130–145)

2(B) PURPOSE: FEASIBILITY AND DESIGN

2(C) CONTOUR SOURCE: CONTOURS DERIVED FROM DIRECT FIELD OBSERVATIONS

2(F) CONTOUR ACCURACY: COMPLIES WITH UNITED STATES NATIONAL MAP ACCURACY STANDARDS (90% OR GREATER OF ALL SURVEY POINTS CHECKED ARE CORRECT WITHIN HALF OF ONE CONTOUR INTERVAL).

2(G) LIMITATIONS: THE PURPOSE OF THIS TOPOGRAPHIC SURVEY IS TO SUPPORT DESIGN AND ENTITLEMENT EFFORTS.

2(H) BOUNDARY SOURCE: FIELD SURVEY OF CONTROLLING MONUMENTS, AND CONSIDERATION OF EXISTING RECORDS OF SURVEYS FOR DETERMINING ON THE GROUND POSITIONS OF DEEDED PROPERTY AND EASEMENT LINES.

3(A) & 3(B) UTILITIES:

UNDERGROUND UTILITIES ARE SHOWN BY ONE OR MORE OF THE FOLLOWING METHODS:

1.SURVEY FIELD OBSERVATION OF MARKINGS PRODUCED BY DIRECT UTILITY DETECTION WORK.

2.DIRECT OBSERVATIONS OF UNDERGROUND, GRAVITY FLOW PIPES PERFORMED AT VISIBLE CONTROLLING STRUCTURES.

3.SCALING OF AS–BUILTS, DESIGN DRAWINGS OR OTHER RECORDS.

3(C) SCOPE STATEMENT: UTILITY INVESTIGATIONS ARE SUBJECT TO THE LIMITATIONS OF ACCURACY OF CONVENTIONAL UNDERGROUND UTILITY DETECTION EQUIPMENT, THE EXISTENCE / ACCURACY OF RECORD UTILITY MAPS PRODUCED BY OTHERS, OR THE AWARENESS OR LOCAL KNOWLEDGE OF ANYTHING CONCEALED UNDERGROUND. THE COMPREHENSIVENESS OF SAID INVESTIGATIONS ARE THEREFORE LIMITED TO THE CAPACITY OF SAID TECHNOLOGIES AND /OR THE AVAILABILITY OF SUCH RECORDS OR KNOWLEDGE.

SURVEYORS NOTE:

STORM DRAIN & SANITARY SEWER SYSTEMS (GRAVITY FLOW), AS SHOWN HEREON REFLECT A COMPREHENSIVE INVESTIGATION OF PHYSICAL AND RECORD EVIDENCE.

INCOMPLETE CONNECTIONS INDICATE A LACK OF RECORDS OR CONCEALMENT OF PHYSICAL EVIDENCE INCLUDING OBSTRUCTED LINES OF SIGHT. THEREFORE ADDITIONAL INVESTIGATIONS UTILIZING OTHER TECHNOLOGIES (CAMERA WORK, POT–HOLING, ETC.) MAY BE REQUIRED.

SEE ITEM 3 ABOVE.

JAMES M. HARPER — 44634 — REGISTERED PROFESSIONAL LAND SURVEYOR — 6/28/2019

BUSH, ROED & HITCHINGS, INC.
LAND SURVEYORS & CIVIL ENGINEERS
2009 MINOR AVE. EAST
SEATTLE, Washington
98102–3513
(206) 323–4144
1–800–935–0508
FAX# (206) 323–7135

NO	REVISION	DATE
1	SCOPE EXPANSION SOUTH	6/28/19

TOPOGRAPHIC SURVEY
UW SOFTBALL BUILDING – PROJECT #205714
UNIVERSITY OF WASHINGTON
SEATTLE KING COUNTY WASHINGTON

drawn by	checked by
TTB	JMH
scale 1"=20'	date 5/15/19
job no. 2019069.00	
sheet 1 of 1	

24"x36" 6/28/2019 U:\C3D\2019\2019069\SURVEYING\DWG\XS–SUR–00.DWG

APPENDIX D

Nesting Bird Survey

SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

August 16, 2019

Ms. Anna Daeuble
University of Washington
University Facilities Building
PO Box 352205
Seattle, WA 98105

RE: UNIVERSITY OF WASHINGTON SOFTBALL BUILDING PROJECT; NESTING BIRD SURVEY

Dear Ms. Daeuble:

This letter describes the activities undertaken by Shannon & Wilson to determine nesting bird activity on the University of Washington campus as it pertains to work being proposed for the Softball Project (Project) located at the southeast corner of the Nordstrom Tennis Center, 3833 Walla Walla Road, Seattle (see Exhibit 1). Our scope of services includes surveys specifically for great blue heron and bald eagle throughout the survey area and all bird species within the Project area. The survey area boundaries encompass a minimum 800-foot buffer to include both potential great blue heron and bald eagle management zones. The great blue heron is a designated species of local importance within the City of Seattle's environmentally critical areas regulations (Seattle Municipal Code [SMC] 25.09.200.C.5). The bald eagle was removed from the federal Endangered Species Act list in 2007 and from the Washington State list of special status species in 2017 and so no longer has explicit protection under the City's regulations. However, the species is still protected under the federal Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (MBTA).

These surveys will help determine actions the University of Washington will need to take to comply with the City of Seattle's regulations and other federal laws.

Exhibit 1: Survey Map. Blue shaded area indicates where nesting bird survey occurred and red box denotes general Project area. Map from Google Earth.

BACKGROUND

In western Washington, the breeding season for great blue heron encompasses a six-month period starting in early February with courtship behavior and culminating around August when successful offspring have fledged and dispersed. Nesting colonies can range from 5 to 500 nests and are typically located in areas with large mature stands of mixed coniferous and deciduous trees in close proximity to large bodies of water. On the University of Washington campus, there is one great blue heron management area designated by the City of Seattle Department of Planning and Development in conjunction with Washington State Department of Fish and Wildlife (WDFW). The management area includes two documented nesting sites and their associated year-round buffers and is located on the opposite side of Montlake Boulevard from the Project. The nesting sites were documented as inactive during a previous survey conducted by Shannon & Wilson in June 2019. Maps of

management areas can be found on the Seattle Department of Construction & Inspections' GIS online map.

Bald eagles create large nests in large trees, which they reuse year after year. In western Washington, they begin laying eggs from late February to early March. Eggs are then incubated for approximately 35 days until they hatch. Chicks will stay in the nest for 10 to 12 weeks, after which they will fledge. Bald eagle management areas are documented on both the north and south sides of Union Bay. There are no documented management areas within a half mile of the Project site; however, habitat along the shoreline within 100 feet of the Project could support nesting activity.

The general nesting season for all bird species in Washington State occurs from late January to mid-August. The length of time from nest building to fledging and the number of clutches per year varies from species to species. There are no previously documented nests on the Project site. Many bird species create new nests each year so it is possible to observe new nests during any given nesting season; therefore, areas where tree removal could occur should be surveyed.

REGULATIONS

The City of Seattle regulates fish and wildlife habitat conservation areas under SMC 25.09.200. Under city code, "Development on parcels containing fish and wildlife habitat conservation areas shall comply with any species habitat management plan set out in a Director's Rule. The Director may establish by rule a habitat management plan to protect any species listed as endangered or threatened under the federal Endangered Species Act, any priority habitat or species identified by WDFW or any species of local importance" (SWMC 25.09.200.2). Species of local importance currently include great blue heron. Other species, including bald eagle, have been covered under critical areas ordinances in the past and could be included again if they become relisted under state law as threatened or endangered.

The U.S. Fish and Wildlife Service (USFWS) is responsible for implementing and enforcing the MBTA, which makes it illegal to "to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid Federal permit" (USFWS, 1918). "Take" can include the knowing destruction of a nest or activities that would cause a nest to fail. Great blue herons and bald eagles are both migratory birds, as are all species of birds native to the United States.

The USFWS is also responsible for implementing the Bald and Golden Eagle Protection Act of 1940. This Act is enforceable regardless of the species listing status and "provides for the protection of the bald eagle and the golden eagle (as amended in 1962) by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit" (USFWS, 1940).

FIELD METHODS

On July 8, 2019, a Shannon & Wilson biologist conducted a site visit to determine nesting activity at the University of Washington campus near the Nordstrom Tennis Center. During the site visit, riparian areas with mature trees within approximately 1,000 feet of the Project area were visually observed using both the naked eye and binoculars. Any nests of appropriate size for eagle or heron were observed for signs of activity. Observations included listening for sounds of adults and chicks, visual observations of the nest for any sign of movement, watching for adult movement to and from the nest, and studying areas below the nest for any sign of use (droppings, feathers, etc.). Trees within and immediately adjacent to the Project area were observed for any sign of current or past nesting activity by any species covered under the MBTA.

RESULTS

During the site visit, no great blue heron or eagle nests were observed at any location within the survey area. Remnants of one large stick nest were observed on the northern edge of the survey area; however, this nest looked to be destroyed and was likely an osprey nest based on its location (on a platform on top of a pole). At the Project site, one nest was observed on a cedar tree; however, based on the appearance of the nest, this was likely a squirrel nest.

RECOMMENDATIONS

We recommend that any tree removal as part of the Project be conducted outside the nesting season for most birds, which extends from early February to mid-August, to avoid impacting potential active nests. If tree removal occurs during the nesting season, we recommend a biologist visit the site prior to the commencement of work to check the trees for active nests. These precautions would aid in avoiding "take" under the MBTA.

CLOSURE

The findings and conclusions documented in this letter have been prepared for specific application to this Project and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions presented in this letter are professional opinions based on interpretation of information currently available to us and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

If you have any questions, please contact me at (206) 695-6715.

Sincerely,

SHANNON & WILSON

Merci Clinton, MSEM
Biologist

MAC:KLW/mac