ENVIRONMENTAL CHECKLIST

for the proposed

Basketball Training Facility & Health/High Performance Center Project

UNIVERSITY *of* WASHINGTON

July 2022

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

PREFACE

The purpose of this Environmental Checklist is to identify and evaluate probable environmental impacts that could result from ***The Basketball Training Facility & Health/High Performance Center Project (H2P)*** and to identify measures to mitigate those impacts. The Basketball Training Facility & H2P Project would include the development of an approximately 50,000 sq. ft. training and operations facility of the University's basketball programs, as well as a health and high performance center.

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 Basketball Training Facility & H2P 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 37) 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, 2022); *Greenhouse Gas Emissions Worksheet* (EA, 2022); *Tree Inventory and Assessment* (Tree Solutions, 2022); *Nesting Bird Survey* (Shannon & Wilson, 2022); and, *Regulated Building Materials Assessment Report* (AECOM, 2022).

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[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 Basketball Training Facility & Health/High Performance Center (H2P) 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

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Julie Blakeslee
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4. Date Checklist Prepared

The Checklist was prepared on June 15, 2022 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 ***Basketball Training Facility & H2P Project*** is anticipated to begin with abatement and demolition of the Pavilion Pool in August 2023, construction of the new facility is anticipated to begin in Winter 2023/2024, with completion and occupancy in Spring/Summer 2025.

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, 2022));
- *Greenhouse Gas Emission Worksheet* (EA Engineering, 2022);
- *Arborist Report* (Tree Solutions, Inc., 2022);
- *Nesting Bird Survey* (Shannon & Wilson, 2022); and,
- *Regulated Building Materials Assessment Report* (AECOM, 2022).

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 ***Basketball Training Facility & H2P 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:
  - Demolition 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 ***Basketball Training Facility & H2P 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 contains the Pavilion Pool Building, an addition to the Hec Edmundson Pavilion / Alaska Airlines Area, sidewalk area and trees/landscaping. The site is generally bounded by Alaska Airlines Arena to the west; the Graves Annex to the north; Parking Lot E9, the Nordstrom Tennis Center, and Softball Performance Facility to the east; and, Snohomish Lane South and Husky Stadium to the south (see **Figure 1** for a vicinity map of the site and **Figure 2** for an aerial map of the project site). The site is identified as Potential Development Site E59 in the February 2019 Compiled Campus Master Plan.[2]

Proposed Project

The proposed ***Basketball Training Facility & H2P Project*** is intended to: provide a "first-class home for men's and women's basketball with 24/7 practice courts; renovate and expand the Health & High Performance Center; consolidate services to better serve the overall performance of student-athletes and the University's commitment to Title IX; and, be cost effective with a look and feel in alignment with recent ICA capital projects.

Consistent with the Design Guidance assumptions for Site E59 in the 2019 Compiled Master Plan, the proposed approximately 50,000 square foot building (net of approximately 23,000 square feet considering demolition of 27,045 square feet of existing building space) would be up to 80 feet in height (see **Figure 3** for the proposed Site Plan and **Figure 4** for the proposed Building Elevation).

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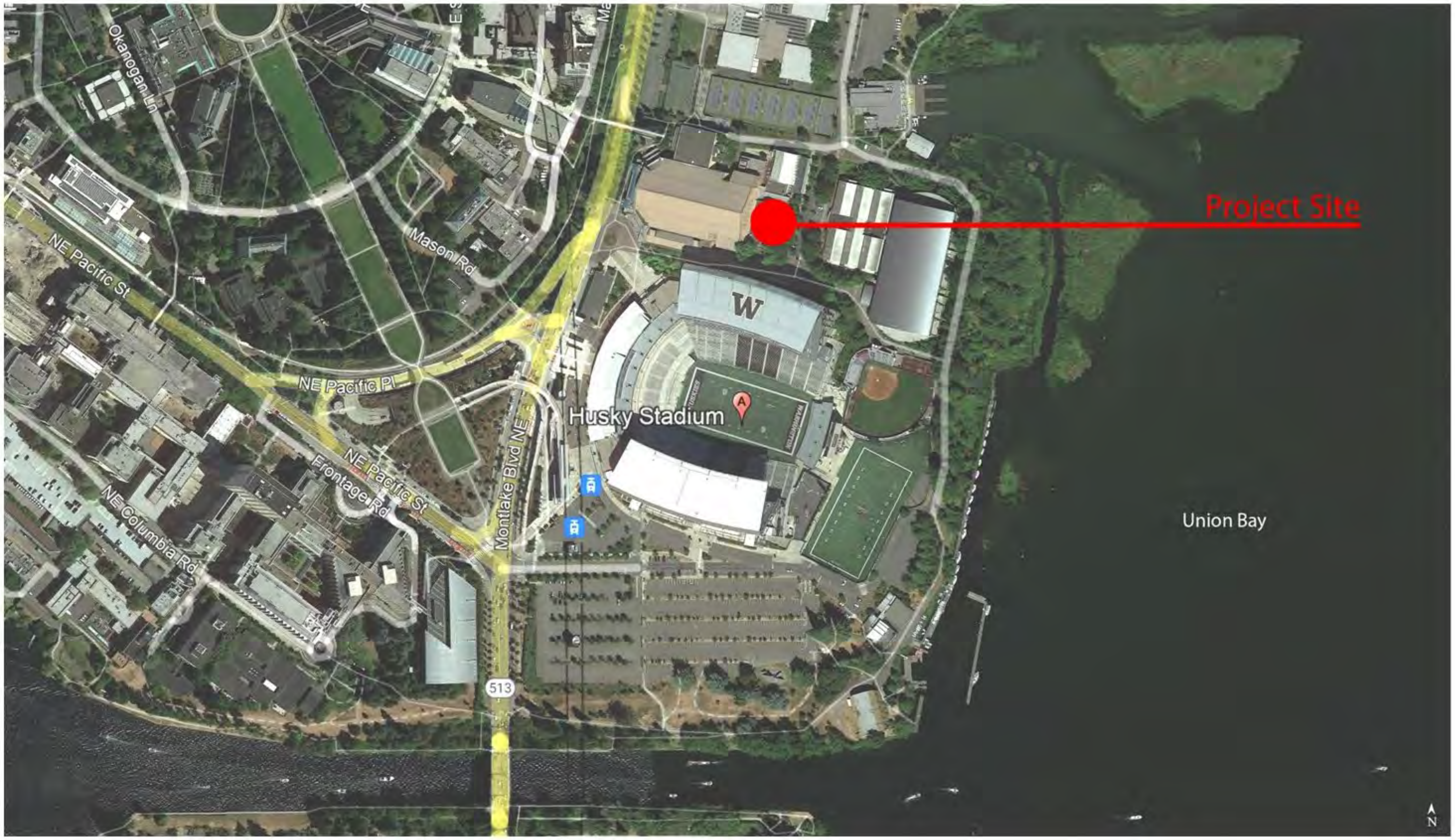
[2] Analyzed in the 2018 Seattle Campus Master Plan Final EIS.

Basketball Training Facility and H2P Project
SEPA Environmental Checklist



Note: This figure is not to scale.

Source: University of Washington, 2022

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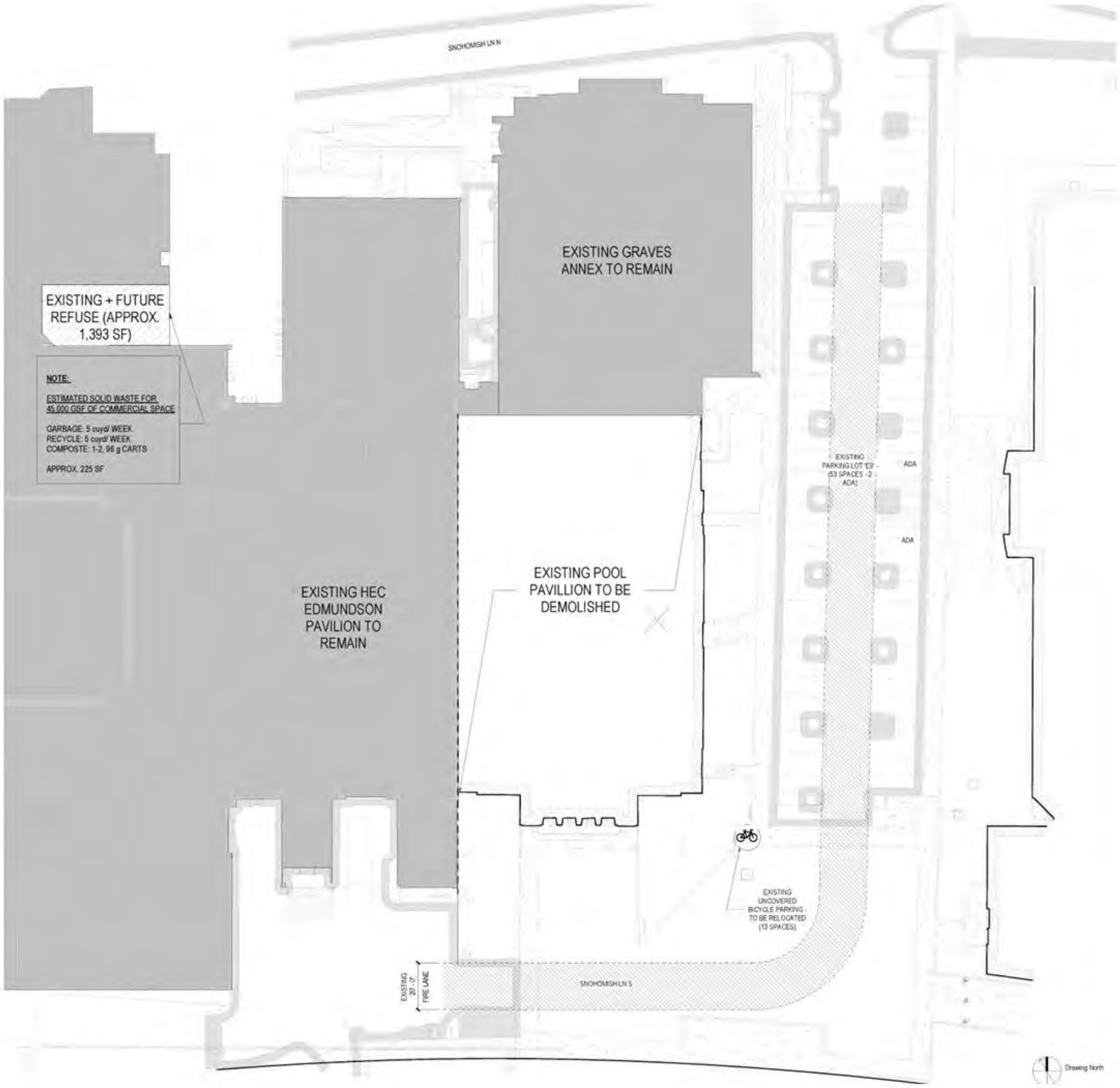
Figure 1

Vicinity Map



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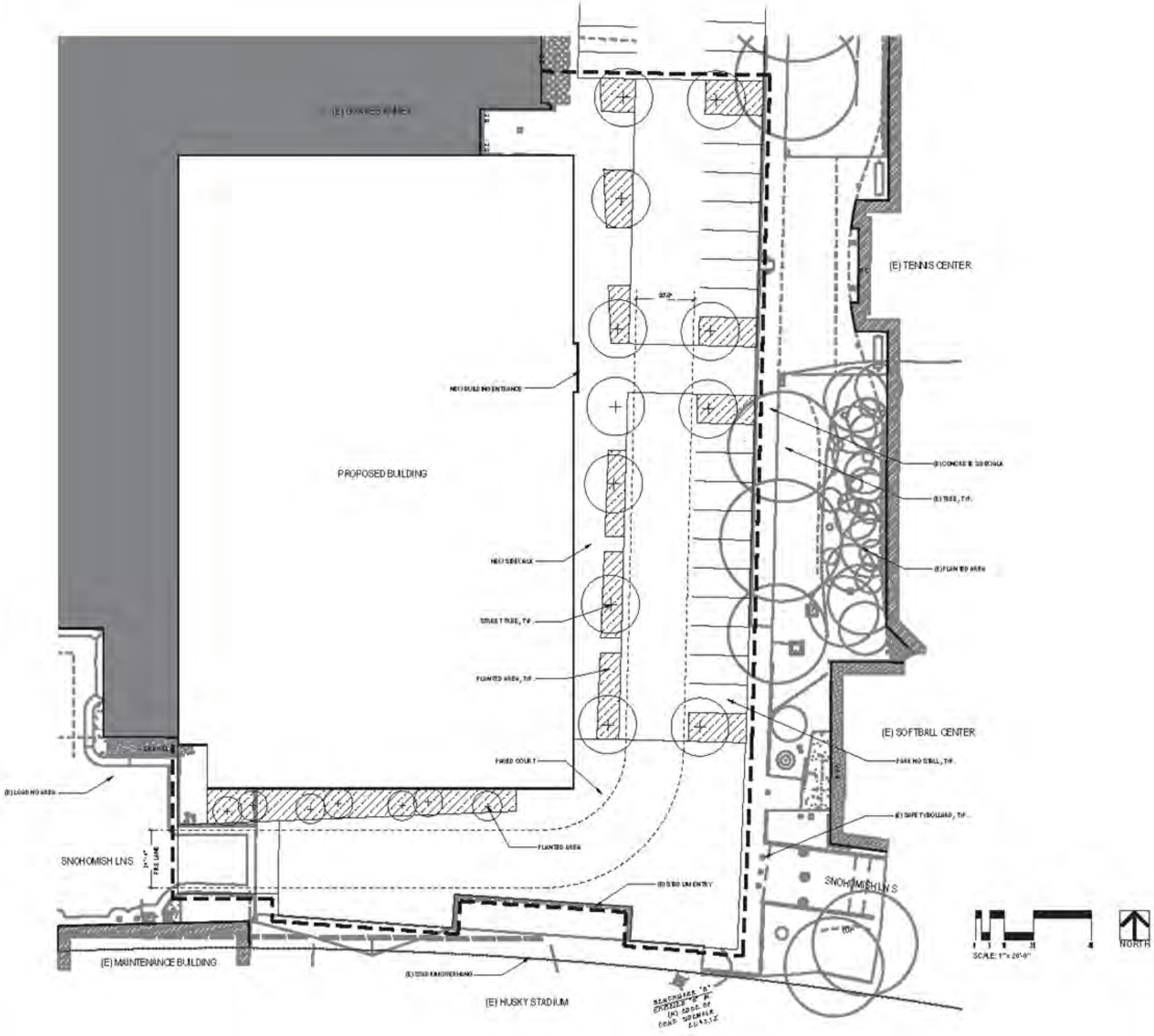
Source: Gensler, 2022

Figure 2

Existing Site Map



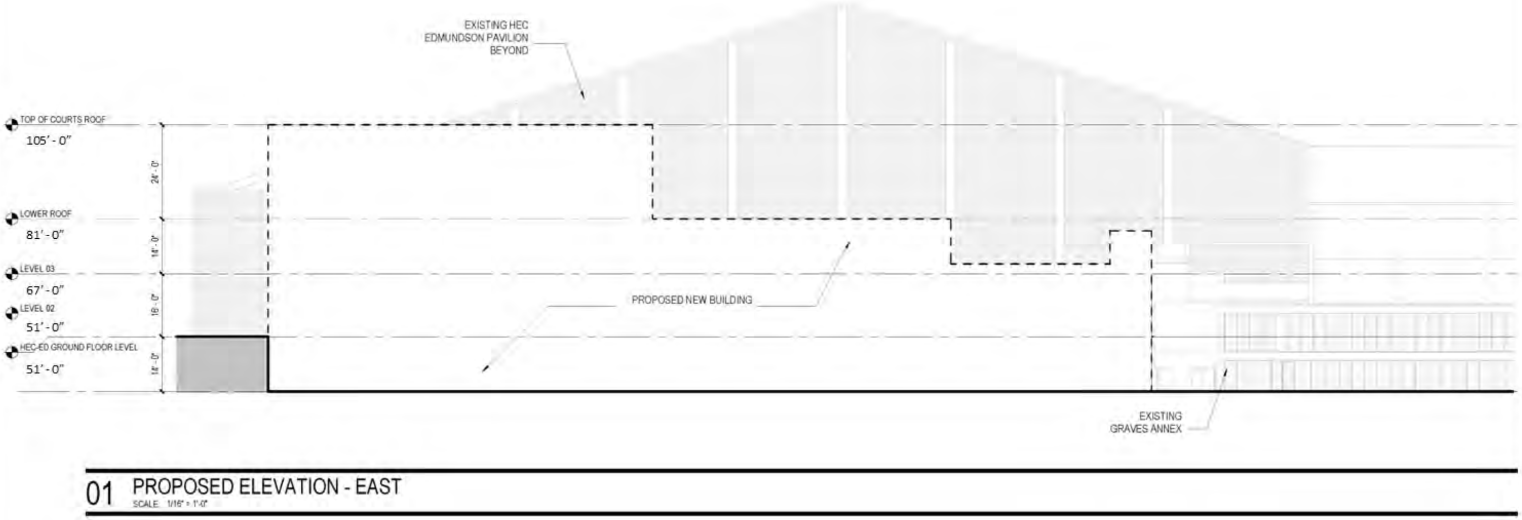
Source: Gensler, 2022

EA Engineering, Science, and Technology, Inc., PBC

Figure 3

Proposed Site Plan

Basketball Training Facility and H2P Project
SEPA Environmental Checklist



Note: This figure is not to scale.

Source: Gensler, 2022

EA Engineering, Science, and Technology, Inc., PBC

Figure 4

Proposed Building Elevation

The project would include new and consolidated facilities for “Basketball Training & Operations” and “Health and High Performance Center”. These would provide a new home for the men’s and women’s basketball programs, including practice courts, locker rooms, player lounges, coaches and meeting rooms, strength and conditioning space, mental health/wellness space, and space for rehabilitation and medical services.

To accommodate construction of the proposed H2P building, the existing 27,045 square Pavilion Pool Building would be demolished consistent with that identified in the 2019 Compiled Campus Master Plan.

Approximately 44 trees would be removed from the site as part of the project. As part of the project, new replacement trees would be provided for every tree removed that is six inches or greater in diameter. New trees would be planted as part of the project and would be anticipated to meet or exceed City of Seattle tree replacement requirements and be in accordance with the University’s Tree Management Plan. Trees would be planted onsite and/or within the overall University campus as part of campus-wide planting initiatives. New landscaping or pedestrian circulation and amenity space would be provided on the site. The proposed design would be approved by the University of Washington Architectural Commission and Landscape Advisory Committee. This committee includes experts in planning, botany, landscape architecture, urban design, horticulture, art, architectural history, and grounds maintenance.

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 ***Basketball Training Facility & H2P Project*** site is located in the south portion of the East Campus area. The site contains the existing Pavilion Pool building and is generally bounded by the Graves Annex to the north; Parking Lot E9, the Nordstrom Tennis Center, and Softball Performance Facility to the east; Snohomish Lane South and Husky Stadium to the south; and Alaska Airlines Arena (Hec Edmundson Pavilion) to the west (see **Figures 1** and **2**).

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one):
<u>Flat</u>, rolling, hilly, steep slopes, mountainous,
other:____

The ***Basketball Training Facility & H2P Project*** site is generally flat with a gradual downward slope toward the north and east portions of the site.

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 51 feet at the southwest 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 northern portion of the site and is approximately 11 percent (*City of Seattle 2022*).

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, subsurface conditions were evaluated based on two borings drilled in the project site area and on previous investigations by others. The borings first encountered fill soils of variable density ranging from thicknesses of 8 to 12 feet. Below the existing fill, alluvial deposits consisting of approximately 8 to 17 feet of very loose to medium-dense silty sand and medium stiff to stiff sandy silt with variable gravel content were found in the subsurface conditions. Organic material was observed in the alluvium. Below these native sand and silt layers, a very dense layer of pre-Fraser Deposits consisting of silty sands and gravels was found at approximately 21 to 40 feet below existing grades.

According to the publicly available City of Seattle's Environmentally Critical Areas (ECA) GIS Maps, the project site area is listed as a peat-settlement prone area; however, investigations for the geotechnical report encountered minor amounts of peat in its borings and stated the use of deep foundations will effectively mitigate any potential settlement issues due to 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.**

The City of Seattle ECA map lists part of the existing Graves building (to the immediate north of the site) as a liquefaction-prone area at the northern area of the project site. The geotechnical report reflects this potential hazard, and the report indicates a potential risk of liquefaction in the sand and sandy silt layers in the alluvium at the project site. The geotechnical report recommends the use of piles to support the building foundation, which will effectively mitigate liquefaction hazard. There are no steep slope areas or potential slide areas listed on the City of Seattle ECA GIS map at the project site (see **Appendix A** for details).

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

Construction of the proposed building would require approximately 1,500 truck cubic yards (tcy) of excavation and approximately 12,500 tcy of fill. Approximately 5,500 cy of excavation would also be required for construction of proposed utilities and associated paving. 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 majority of the site is currently covered with existing impervious surfaces, including the existing Pavilion Pool building and other impervious surfaces (walkways, sidewalks, etc.). With the proposed project, the existing Pavilion Pool building, and other impervious surfaces would be replaced by the proposed ***Basketball Training***

Facility & H2P Project. The 2018 Seattle Campus Master Plan EIS identifies anticipated increases in impervious surfaces with future development of the campus and states that "development would result in an overall increase in hard surfaces associated with buildings and paths/walkways; however, there would be a reduction in hard surfaces associated with streets and surface parking areas". Similarly, the proposed project would generally replace existing hard surfaces of the existing building and associated impervious surfaces with the proposed ***Basketball Training Facility & H2P Project*** and any change in hard surface area would be anticipated to be negligible.

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 could be utilized to mitigate potential settlement issues due to peat (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 ***Basketball Training Facility & H2P 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 minimal 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 B** 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 be approximately 41,490 $MTCO_2e$[3]. Based on an assumed building life of 62.5 years,[4] the proposed building addition would be estimated to generate approximately 664 $MTCO_2e$ 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

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

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

which is approximately 500 feet to the west of the site. Emissions for existing buildings in the vicinity (Alaska Airlines Area, Nordstrom Tennis Center, Softball Performance 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.

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 ***Basketball Training Facility & H2P Project*** site. The nearest surface water body is Union Bay, which is located approximately 600 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, 2022)*.

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**) and anticipates that the regional groundwater table is present on site between 11 and 18 feet below existing grade. Groundwater elevations of 27.5 and 30.6 feet. The depths of the existing water, sewer and storm drain system on site extend into this static groundwater table. Relocation of an 8-inch sewer main and an 18-inch storm drain main are planned as part of this project scope; therefore, temporary dewatering will likely be required to install these pipes and applicable services. Temporary dewatering and temporary shoring may also be required as part of building construction. Permanent groundwater dewatering or discharge is not anticipated as part of this 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.**

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 University of Washington storm drainage system which drains to the Union Bay area of Lake Washington. Stormwater from the site will be collected in a series of catch basins and routed, via gravity flow, to the relocated 18-inch storm main in the fire lane to the east of the project. This 18-inch storm main connects to a 48-inch existing storm main running down Snohomish Lane North and Walla Walla Road.

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 University of Washington's storm drainage system which ultimately drains to the Union Bay area of Lake Washington. The existing on-site system at UW is estimated to have adequate capacity for the proposed IMA Addition Project.

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 59 trees are located within the ***Basketball Training Facility & H2P Project*** area and were inventoried and assessed as part of the Arborist Report for the project (see **Appendix C**), Existing trees on the site primarily include red oak, scarlet oak, as well as , Tulip tree, European hornbeam, Japanese snow drop, and redbud. Existing trees within the site area range in size from approximately 5 inches in diameter to approximately 26 inches in diameter. Two of the existing trees meet the City of Seattle's definition of an Exceptional Tree (City of Seattle Director's Rule 16-2008), including a Strawberry tree located near the southwest corner of the existing building and a Redbud tree located to the northeast of the existing building and Parking Lot E9.

Approximately 44 trees are anticipated to be removed from the site as part of the proposed project, including the Exceptional Strawberry tree that is located adjacent to the southwest corner of the existing building

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 for every tree removed that is six inches or greater in diameter. New trees would be planted onsite and/or within the overall University campus as part of campus-wide planting initiatives. 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. New landscaping or hardscape for pedestrian circulation and amenities would also be provided on the site surrounding the building and parking area. New landscaping or pedestrian circulation and amenity space 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.

In-lieu of onsite tree replacement, a fee could be paid to the University for every tree not replaced onsite.

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 ***Basketball Training Facility & H2P 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. Great blue heron and bald eagle are known to be observed in the site vicinity as well and Nesting Bird Survey was completed as part of the project to identify any active great blue heron or bald eagle nests in the site area (Shannon & Wilson, 2022). As part of the survey, no great blue heron or bald eagle nests were observed at any location within the site vicinity area (see **Appendix D** for details).

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[5]. 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.

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.

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[5] U.S. Fish and Wildlife Service. IPaC. https://ecos.fws.gov/ipac/location/index. Accessed May 2022.

As noted in the Nesting Bird Survey (*Shannon & Wilson, 2022*), 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 (see **Appendix D**).

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 ***Basketball Training Facility & H2P Project*** and would generally be utilized for lighting, electronics, and heating. The project design is also evaluating the potential for including a solar photovoltaic panel system on or adjacent to the site to serve the building.

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 pursuing LEED Gold certification. 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 ***Basketball Training Facility & H2P 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.

A Regulated Building Materials Assessment Report was completed for the project by AECOM (*AECOM, 2022*). As part of the assessment, all areas of the existing Pavilion Pool building that would be affected by demolition were reviewed for asbestos-containing materials (ACM), assumed ACM, lead-containing coatings (paint), mercury-containing light tubes, and polychlorinated biphenyls (PCBs)-containing light ballasts. 45 samples of suspected ACM were collected during the assessment. Nine of the materials were found to contain greater than one percent asbestos, none of the materials were assumed to contain asbestos, and none of the materials were found to contain less than one percent asbestos.

Five paint chip samples were collected and analyzed for lead content. Three of the samples were determined to contain reportable levels of lead.

Mercury-containing fluorescent light tubes were identified within the building and existing light ballasts were observed to be magnetic and are assumed to be PCB-containing (see **Appendix E** for details).

As noted above, the site is also located in an area of a former abandoned landfill. It is anticipated that the fill over the former landfill is at a depth where there is a possibility to encounter waste during excavation activities on the site. Debris piling, testing, and appropriate disposal and safety protocols would be followed in accordance with the University's Montlake Landfill Project Guide and no significant impacts would be anticipated.

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.

All affected ACM would be removed by a licensed asbestos abatement contractor in accordance with applicable regulations. Construction activities that would impact lead-containing coatings would be performed in accordance with Washington Labor and Industries (L&I) regulations for Lead in Construction and L&I regulations for Silica in Construction. The contractor would also address worker protection and proper handling, removal and disposal of PCB-containing products and mercury-containing components during demolition.

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). In addition, as noted in the hazardous materials survey, all hazardous materials within the area of the proposed project would be removed as part of the construction process in accordance with applicable regulations (see **Appendix E** 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 Arena, Nordstrom Tennis Center, Softball Performance 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 ***Basketball Training Facility & H2P 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 ***Basketball Training Facility & H2P 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 ***Basketball Training Facility & H2P 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 is generally comprised of the existing Pavilion Pool building and associated sidewalk, and adjacent 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 Graves Annex and Snohomish Lane N. Further to the north are the University Tennis Courts, Parking Lot E8, and the Intramural Activities Building (student recreation facility).

The area to the east of the site includes Parking Lot E9, the Nordstrom Tennis Center, the Softball Performance Center, and 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 and Husky Stadium. Further to the south and southeast is Husky Softball Stadium, 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 Alaska Airlines Arena (Hec Edmundson Pavilion), which is home of the men's and women's basketball programs, women's volleyball and gymnastics programs, as well as golf and track & field locker rooms. Further to the west is Montlake Boulevard NE, 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.

The existing Pavilion Pool building is located on the ***Basketball Training Facility & H2P Project*** site. The Pavilion Pool building was originally constructed in 1938 and contains approximately 27,045 sq. ft. of building space. The building has generally been used for competitive and recreational swimming; however, the University's competitive swimming program was disbanded in 2009 and the existing building is currently used as a complement to the larger University pool located in the Intramural Activities Building (IMA) to the north of the site.

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

The existing Pavilion Pool building 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 105-foot height limit (MIO-105) 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, 2022*).

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). Measures to prevent the potential accumulation of methane gas would be provided as part of construction, such as methane barriers and a vent pipe system Investigations for the geotechnical report encountered minor amounts of peat in its borings and the use of deep foundations will effectively mitigate any potential settlement issues due to peat.

The City of Seattle ECA map also lists part the northern area of the project site as a liquefaction-prone area. The geotechnical report analysis found a potential risk of liquefaction in the sand and sandy silt layers in the alluvium at the project site and recommends the use of piles to support the building foundation, which will effectively mitigate liquefaction hazard (see **Appendix A** for details). No other environmentally critical areas are located on or adjacent to the project site (*City of Seattle, 2022*).

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

The proposed ***Basketball Training Facility & H2P Project*** would not provide any residential opportunities. Development of the project would create new training and operations areas for the current basketball programs 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 ***Basketball Training Facility & H2P 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 existing Pavilion Pool building that is located on the site is approximately 50 feet tall at its highest point. The tallest point of the existing Alaska Airlines Arena (Hec Edmundson Pavilion), which is located immediately adjacent to the west of the site, is approximately 85 feet.

The height of the proposed building at its tallest point would be approximately 68 feet, which would be below the 105-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 ***Basketball Training Facility & H2P Project*** would primarily include metal, masonry, 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 and mature trees surrounding the project site area. The proposed ***Basketball Training Facility & H2P Project*** would be most visible from areas that are immediately east and south of the site. The building would generally appear as a continuation of athletic facility development in the site area and would be obscured from view in locations outside the immediate vicinity due to the presence of taller and larger buildings such as Alaska Airlines Arena, Husky Stadium and the Dempsey Indoor Center.

The 2019 Compiled Campus Master Plan identifies a view corridor (#3) from the Computer Science and Engineering Building in Central Campus to the east across East Campus toward Union Bay; the site is located within this broad view corridor. As shown in **Appendix F** (View Corridor Photos), proposed building development would not be visible from the Computer Science and Engineering Building viewpoint and would not impact views.

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 medium 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 ***Basketball Training Facility & H2P Project***, there would be an increase in light and glare with the proposed building compared to the existing conditions due to an increased amount of glass to be used in the façade: light and glare associated with the proposal would not be noticeable from beyond the immediate areas due to the presence of the surrounding existing buildings (e.g., Nordstrom Tennis Center, Softball Performance 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. Proposed site lighting would include pedestrian-scale and parking lot lighting at egress, general circulation pathways, and parking areas to meet campus standards and may include accent lighting at gathering areas.

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 ***Basketball Training Facility & H2P Project*** site, including:

- Alaska Airlines Arena (Hec Edmundson Pavilion) is located immediately to the west;
- Husky Stadium is located immediately to the south of the site;
- The Nordstrom Tennis Center is located immediately to the east of the site;
- The Dempsey Indoor Center is located east of the site;

- The Softball Performance Center is located immediately to the east;
- Husky Softball Stadium is located southeast of the site;
- 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 ***Basketball Training Facility & H2P Project*** would provide new and enhanced athletic facilities on the campus. The project would displace existing recreational swimming uses with the proposed demolition of the Pavilion Pool building. It should also be noted that expanded recreational swimming uses would be provided by the IMA Addition Project which is currently in construction and includes expansion of the existing swimming pool in that building.

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

As indicated above (12.b. Recreation) the expanded recreational swimming capacity associated with the IMA Locker Room and Pool Improvement Project will provide additional recreational swimming opportunities on campus.

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.

The existing Pavilion Pool building, an addition to the Hec Edmundson Pavilion, that is located on the ***Basketball Training Facility & H2P***

Project site was originally constructed in 1938 and has generally been used for competitive and recreational swimming. The pool no longer meets regulation length. The UW swim team swam offsite the last few years of competition until the program disbanded in 2009. The building was originally designed by Carl F. Gould. A Landmark Nomination Application was completed for the building in September 2018. The application was reviewed by the City of Seattle's Historic Preservation Officer and in late 2018, the City's Landmarks Preservation Board voted on the nomination of the building and the nomination was denied having not met historic criteria.

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 potentially eligible buildings/structures is the Graves Building located to the northwest of the site (constructed in 1963 and determined eligible in 2013).

Alaska Airlines Arena (Hec Edmundson Pavilion) and Husky Stadium are also located to the west and south 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.

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.

Additionally, 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 has collected photos, video, architectural drawings, and written materials of the building and past swim team photos which will be preserved in the University of Washington Libraries Special Collections and Archives. 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 ***Basketball Training Facility & H2P 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 500 feet to the west of the site

No changes to site access or access to 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 800 feet to the southwest of the ***Basketball Training Facility & H2P 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 in the vicinity of the site, including Route 43, 44, 48, 65, 73, 167, 255, 271, 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 east of the site and includes approximately 54 parking spaces (including two ADA spaces). Due to the size and scale of the proposed project, the number of spaces in Parking Lot E9 is anticipated to be reduced by up to 19 spaces. Several other existing parking areas are located within 0.5 miles of the project site, including Parking Lots E1, E6, E7, E8, E18 and E97.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).

The existing sidewalk that is located within the proposed building footprint would be removed and new sidewalk would be constructed outside of the proposed building area. Approximately 13 bicycle parking stalls would also be relocated outside of the proposed building footprint area. Six bicycle parking lockers could also be relocated to a nearby area. 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 ***Basketball Training Facility & H2P 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 on site, including electricity, natural gas, water, sanitary sewer, telephone, cable/internet services, and an existing steam line.

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 ***Basketball Training Facility & H2P Project*** would connect to the existing UW owned 8-inch water line located in Parking Lot E9 to the east of the proposed building footprint.

The building footprint would require relocation of an 8-inch sewer main and an 18-inch storm drain main along with associated maintenance holes and service connections. Sewer service for the project would reconnect to this relocated 8-inch sewer main.

This project would also require the relocation of a gas main at the southeast area of the project site. Electrical service to the building would be provided by a proposed new electrical duct bank which connects to a vault in the northeast corner of 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:

Julie Blakeslee

Name of Signee:

Julie Blakeslee

Position and Agency/Organization:

SEPA Responsible Official

Date:

July 12, 2022

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Appendix A

Geotechnical Report

Geotechnical Engineering Services

University of Washington
ICA Basketball Training/Operations and H2P Center
Seattle, Washington

for
University of Washington

June 1, 2022

GeoEngineers

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File No. 0183-144-00

June 1, 2022

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1.0 INTRODUCTION

This report presents the results of GeoEngineers, Inc.'s (GeoEngineers) preliminary geotechnical engineering services for the proposed University of Washington (UW) ICA Basketball Training/Operations and Health and High Performance (H2P) Center. The proposed Center is located within the footprint of the existing Hec Edmundson Pavilion Pool building, which is located directly east of Alaska Airlines Arena at Hec Edmundson Pavilion. 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.

1.1. Project Description

The site is bounded by the Graves Annex to the north, Parking Area E9 to the east, Snohomish Lane South to the south, and Alaska Airlines Arena at Hec Edmundson Pavilion to the west. We understand that the project is in the planning stage and that the size and geometry of the building is still being determined. At this time, the proposed Center consists of a 2- to 3-level building that steps up to the south. The north end of the building will consist of three above-grade levels and the lowest finished floor elevation will approximately match existing grades of Parking Area E9 to the east (approximate Elevation 37 feet). The lowest finished floor steps up to the south to follow existing site grades. The south side of the building consists of a gymnasium with a finished floor at approximate Elevation 51 feet. The top level of the proposed Center will have high ceilings for practice basketball courts. The building will include locker rooms, player lounges, film rooms, coach offices, and meetings rooms.

1.2. Purpose and Scope

The purpose of our services is to evaluate soil and groundwater conditions as a basis for developing preliminary design criteria for the geotechnical aspects of the 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. 206829 dated December 15, 2021.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1. Field Explorations

Subsurface conditions were evaluated by reviewing existing explorations previously performed by others in the project area and through a field exploration program that consisted of drilling and sampling two additional hollow-stem auger borings (designated GEI-1 and GEI-2). The two borings were completed along the east side of the existing Hec Edmundson Pavilion Pool building using track-mounted drilling equipment. The approximate locations of the borings are shown in Figure 2.

Borings GEI-1 and GEI-2 were advanced to depths of about 51½ and 31½ feet below the ground surface (bgs), respectively. A groundwater monitoring well was installed within GEI-1 to monitor groundwater levels. 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 (GEI-1 and GEI-2) 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, organic 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.

2.3. Previous Site Evaluations

The logs of selected explorations from previous site evaluations in the project vicinity were reviewed and the approximate locations of these explorations are shown in Figure 2. Relevant logs of 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 Northeastern Seattle (Part of the Seattle North 7.5’x15’ Quadrangle), King County (Booth et al. 2009). The soils across most of the campus located upslope and west of Montlake Boulevard 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 near Montlake Boulevard and east of Montlake Boulevard 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 from about the existing Hec Edmundson Pavilion Pool building to the Montlake Cut, is mapped as peat and artificial fill deposits. The highly compressible peat was deposited in 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 located immediately north of the IMA building was operated from about 1926 to 1966, and landfill materials were placed on top of the peat deposits. Artificial fill is mapped throughout the area east of Montlake Boulevard and is associated with previous development of this portion of campus.

3.2. Surface Conditions

The site is currently occupied by the Hec Edmundson Pavilion Pool building and adjacent landscape areas and hardscape. The ground surface surrounding the building slopes down moderately from approximate Elevation 50 feet on the south side of the building, to Elevation 37 feet near the northeast corner of the building. Landscape areas surround the south and east sides of the building and include small shrubs and numerous medium-sized deciduous trees. Concrete sidewalks, curbs, and an asphalt parking area (E9) exist along the east side of the building. Brick pavers and concrete sidewalks and curbs are located on the south side of the building and lead up to the concrete steps at the south entrance of the building.

3.3. Subsurface Soil Conditions

Our understanding of subsurface soil conditions is based on the results of two recent borings (GEI-1 and GEI-2) and on our review of existing geotechnical information from previous studies in the vicinity of the site (see Figure 2 for the boring locations). In general, the soils encountered in our explorations consisted of the following:

- **Topsoil/Sod:** Boring GEI-2 encountered about 4 inches of sod and topsoil.
- **Asphalt:** Approximately 3 inches of asphalt pavement underlain by about 3 inches of crushed surfacing base course was observed in boring GEI-1.
- **Fill:** Fill was observed below the topsoil and asphalt in both borings and is associated with the construction of the Hec Edmundson Pavilion Pool building, Parking Area E9, and other structures in the area. The fill is approximately 8 to 12 feet thick and generally consists of very loose to medium dense sand with variable silt, gravel, and organic content. The contact between the fill and the underlying looser alluvium is somewhat difficult to distinguish.
- **Alluvium:** Approximately 8 to 17 feet of alluvium was encountered in the explorations below the fill soils. The alluvium generally consists of very loose to medium dense silty sand with variable gravel content and medium stiff to stiff sandy silt with variable gravel content. Wood and organic debris were observed within the alluvium. An approximately 1-foot-thick layer of peat was observed within the alluvium in boring GEI-1. The alluvium is generally wet.
- **Pre-Fraser Deposits:** Dense to very dense/hard pre-Fraser Deposits (weathered and unweathered) was encountered beneath the alluvium in both of our completed borings to the full depth explored. The pre-Fraser Deposits were encountered about 24 and 21 feet bgs in borings GEI-1 and GEI-2, respectively. Pre-Fraser Deposits in the previous explorations were encountered at depths ranging from about 23 to 30 feet bgs. The pre-Fraser Deposits generally consist of dense to very dense silty sand with variable gravel content or hard silt with variable sand and gravel content. Figure 3 illustrates the interpreted elevation contours of competent foundation bearing soils across the site. Although not encountered in our borings, occasional cobbles and boulders have been observed within glacially consolidated soils and may be present at the site.

  The explorations completed by others refer to the glacial soils as glacial till; however; in our opinion, the glacial soils are pre-Fraser Deposits, which is consistent with the geologic map for the area.

3.4. Groundwater Conditions

Groundwater conditions at the site were determined from groundwater measurements obtained in monitoring well GEI-1 installed by GeoEngineers and monitoring well AB-5/MW-1 installed by others. Ground surface and top-of-casing elevation were estimated from contours by a site survey completed for the site by Bush, Roed and Hitchings, Inc., dated April 4, 2022. Groundwater levels are summarized in Table 1.

TABLE 1. GROUNDWATER MEASUREMENTS

Well ID	Ground Surface Elevation (feet)	Top of Casing Elevation (feet)	Well Screen Elevation Range (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Date
GEI-1	39	38.5	14 to 24	11.0	27.5	3/22/22
AB-5/MW-1	49	48.7	9 to 29	18.1	30.6	3/22/22

Based on the monitoring well data as well as groundwater observations in GEI-2 and previous borings by others, we anticipate that the regional groundwater table is present between approximate Elevation 25 to 31 feet below the site.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1. Summary

A summary of the preliminary 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 three environmentally critical areas (ECAs) based on the Seattle Department of Construction and Inspections (SDCI) GIS website. These ECAs include peat settlement-prone area, abandoned landfill buffer area, and liquefaction-prone area.
- Because of the presence of potentially liquefiable soils. the site is designated Site Class F, per the 2018 International Building Code (IBC) and American Society of Civil Engineers (ASCE) 7-16. Site-response analysis is required for Site Class F sites; however, an exception is made for structures that have fundamental periods of vibration less than 0.5 second (sec). At this time, we understand the fundamental period of vibration of the proposed building is not known. We have assumed it will be less than 0.5 sec and that this exception applies. Because of this, the site is best designated as Site Class E based on the standard penetration test (SPT) blowcounts obtained in our borings and nearby previous borings. If it is determined that the fundamental period of vibration is greater than 0.5 sec, we can complete a site-response analysis or a ground motion hazard analysis. These analyses could provide reduced seismic demand.
- The building may be supported on deep foundations consisting of micropiles and/or drilled augercast piles connected with grade beams. The piles should be embedded 15 to 25 feet into the underlying dense/hard pre-Fraser Deposits. Figure 3 illustrates the interpreted elevation contours of competent foundation bearing soils across the site. Pile lengths will likely be on the order of 40 to 50 feet. The actual lengths and embedment depths will depend on the building design loads and should be re-evaluated once the loads are known.
- Ancillary light-weight structures may be supported on conventional spread footings bearing on at least 2 feet of properly compacted structural fill, assuming that seismic induced settlement and potential static settlement can be tolerated by the structure. Footings supported on the properly compacted structural fill may be designed using a maximum allowable bearing pressure of 2,500 psf. The allowable bearing pressure may be increased by one-third for short duration loads such as wind or seismic events.

- Excavations for the building may be on the order of a few feet high in the east portion of the site and up to 10 to 15 feet in the south portion of the site. We anticipate that temporary open cut slopes inclined at 1.5H:1V (horizontal to vertical) may be used where site constraints allow, provided the adjacent Hec Edmundson Pavilion building is adequately supported and not undermined. GeoEngineers should evaluate proposed temporary cut slope conditions on a case-by-case basis based on soils encountered on site. If site constraints do not allow temporary open cut slopes, then temporary shoring consisting of cantilever soldier pile walls may be used.
- Structural fill placed below all structures and pavement elements and during wet weather conditions should consist of imported gravel borrow per City of Seattle Mineral Aggregate Type 17, with the additional restriction that the fines content be limited to no more than 5 percent.
- If feasible, the existing pool may be abandoned in place. We recommend that the perimeter of the pool be demolished such that the pool sidewalls are removed at least 3 feet below the proposed overlying building slab. After the water is pumped out of the pool, it may be backfilled with crushed recycled concrete from building demolition activities or imported gravel borrow. If recycled concrete is used to fill the pool, it should be crushed to meet the gradation specification for imported gravel borrow per City of Seattle Mineral Aggregate Type 17.

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

4.2. Environmentally Critical Areas

Based on our review of ECA maps on the SDCI GIS website, the site is located in peat settlement-prone, abandoned landfill buffer, and liquefaction-prone 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 alluvium below the proposed building. In our opinion, the use of deep foundations will effectively mitigate potential building settlement issues due to the peat.

The site is located within 1,000 feet of the Montlake landfill, which is an abandoned methane-producing landfill. Seattle Municipal Code (SMC) 25.09.220 requires evaluation of methane gas accumulation. Recommendations regarding landfill gas mitigation is discussed in more detail in Section 4.7.

The liquefaction-prone area is associated with lake deposits around Lake Washington encountered in the explorations within the site vicinity. In our opinion, the planned use of deep foundations to support the building will effectively mitigate liquefaction-induced settlement. Liquefaction is discussed in more detail in Section 4.3.2.

4.3. Earthquake Engineering

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

4.3.1. 2018 IBC Seismic Design Information

The 2018 IBC references the 2016 version of Minimum Design Loads for Buildings and Other Structures (ASCE 7-16) for the Site Class determination and the development of seismic design parameters. Per ASCE

7-16 Section 20.3.1, the site is classified as Site Class F due to the presence of potentially liquefiable soils. Site-response analysis is required for Site Class F sites per Section 11.4.8; however, Section 20.3.1 provides an exception for structures that have fundamental periods of vibration less than 0.5 sec whereby the site class may be determined in accordance with Section 20.3 and the corresponding site coefficients determined based on mapped seismic parameters in Section 11.4.4. We understand that the project is in the planning stage and that the size and geometry of the building is still being considered. Depending on the size and structural characteristics of the building, the fundamental building period may be less than 0.5 sec. For the purposes of this report, we have assumed that it will be less than 0.5 sec and that the exception in Section 20.3.1 applies.

Based on the subsurface data from our borings, the site is best classified as Site Class E. Per ASCE 7-16 Section 11.4.8 a ground motion hazard analysis is required for structures on Site Class E with S_S greater than or equal to 1.0 g or S_1 greater than or equal to 0.2 g (where g represents gravitational acceleration). The mapped S_S and S_1 values for this site are 1.311 g and 0.455 g, respectively. Alternatively, mapped seismic design parameters may be used to determine the design ground motions provided Exceptions 1 and 3 of Section 11.4.8 are used. Using these exceptions, F_a is taken as the value for Site Class C (equal to 1.2), and T is less than or equal to T_S and the equivalent static force procedure is used for design. T represents the fundamental period of the structure and T_S=0.66 sec.

If it is determined that the fundamental building period is greater than 0.5 sec, we can complete a site-specific seismic response analysis or a ground motion hazard analysis. These analyses could provide reduced seismic demands relative to the parameters in Table 2 and the requirements of ASCE 7-16 Section 11.4.8 Exceptions 1 and 3 depend on building configuration and site-specific subsurface conditions.

TABLE 2. 2018 IBC SEISMIC PARAMETERS

2018 IBC Parameter[1]	Value
Site Class	E
Mapped MCE_R Spectral Response Acceleration at Short Period, S_s (g)	1.311
Mapped MCE_R Spectral Response Acceleration at 1-second period, S_1 (g)	0.455
Short Period Site Coefficient, F_a	1.20[2]
Long Period Site Coefficient, F_v	2.29[3]
Design Spectral Acceleration at 0.2-second period, S_{DS} (g)	1.049
T_S (sec)	0.66

1. Parameters developed based on latitude 47.6519 and longitude -122.3012 using the Applied Technology Council (ATC) Hazards online tool (https://hazards.atcouncil.org/).
2. Per ASCE 7-16 Section 11.4.8 Exception 1.
3. For calculating T_S only

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 our borings and from existing borings indicate that there is a potential for liquefaction in sand and sandy silt layers within the alluvium. We estimate that the factor of safety is less than 1 for isolated layers of sand and sandy silt located at depths ranging from 8 to 40 feet bgs.

Liquefaction-induced free-field ground settlement of the potentially liquefiable zones is estimated to range from about 1 to 8 inches across the site 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 pre-Fraser Deposits.

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 700 feet west of Union Bay. Based on our analyses, ground rupture due to lateral spreading is unlikely at the site and, therefore, piles supporting the building will not be impacted significantly by laterally spreading soils.

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

Given the site topography, it is our opinion that landsliding as a result of strong ground shaking is unlikely at this site.

4.4. Excavation Support

Excavations are anticipated to be on the order of a few feet high in the east portion of the site and up to 10 to 15 feet in the south portion of the site. We anticipate that cantilever soldier pile shoring may be required for certain areas of the excavation because of site constraints. Where sufficient space is available, temporary cut slopes are considered feasible for the excavations, provided that the recommended inclinations are maintained between adjacent structures/walls and the base of the excavation. Temporary excavations should not encroach within a 1.5H:1V prism extending from the base of adjacent structures/walls. An exception may be made along the east side of Hec Edmundson Pavilion where the existing building is pile supported, as discussed with the structural engineer. In this area, it is our opinion that a 1.25H:1V temporary cut slope extending from the base of the adjacent east wall may be used.

The city of Seattle requires that shoring walls be designed to limit lateral deflections to 1 inch or less in order to reduce the risk of damage to existing improvements. The city of Seattle requires that remedial measures be implemented when lateral deflections reach 1 inch.

4.4.1. Excavation Considerations

The site soils may be excavated with conventional heavy-duty excavation equipment such as trackhoes. The contractor should be prepared to deal with occasional cobbles and boulders in the site soils. Likewise, the surficial fill may contain foundation elements and/or utilities from previous site development, debris, rubble, and/or cobbles and boulders. We recommend that procedures be identified in the project specifications for measurement and payment of work associated with obstructions.

4.4.2. Cantilever Soldier Pile Walls

Soldier pile walls consist of steel beams that are concreted into drilled vertical holes located along the wall alignment, typically about 8 feet on center. Timber lagging is typically installed behind the flanges of the steel beams to retain the soil located between the soldier piles.

The shoring system should be designed to limit lateral deflections to less than 1 inch in order to reduce the risk of damage to existing improvements.

Geotechnical design recommendations for each of these components of the soldier pile wall system are presented in the following sections.

4.4.2.1. Soldier Piles

We recommend that soldier pile walls be designed using the earth pressure diagram presented in Figure 4. The earth pressures presented in Figure 4 are for full-height cantilever soldier pile walls, and the pressures represent the estimated loads that will be applied to the wall system for various wall heights.

The earth pressures presented in Figure 4 do not include loading from maintenance equipment or truck surcharge. In addition, other surcharge loads such as cranes, construction equipment or construction staging areas, should be applied to the shoring system as recommended in Figure 5. No seismic pressures have been included in Figure 4 because it is assumed that the shoring will be temporary.

We recommend that the embedded portion of the soldier piles be at least 2 feet in diameter and extend a minimum distance of 10 feet below the base of the excavation to resist “kick-out.” The axial capacity of the soldier piles must resist downward vertical loads, as appropriate. We recommend using an allowable end bearing value of 30 kips per square foot (ksf) for piles supported on the glacially consolidated soils and 5 ksf for piles supported on the fill or alluvial soils. The allowable end bearing value should be applied to the base area of the drilled hole into which the soldier pile is concreted. This value includes a factor of safety of about 2.5. The allowable end bearing value assumes that the shaft bottom is cleaned out immediately prior to concrete placement. If necessary, an allowable pile skin friction of 1.5 ksf and 0.5 ksf may be used on the embedded portion of the soldier piles to resist the vertical loads in the glacial soils and fill/alluvium, respectively.

4.4.2.2. Lagging

Table 3 presents recommend lagging thicknesses (roughcut) as a function of soldier pile clear span and depth.

TABLE 3. RECOMMENDED LAGGING THICKNESS

	Recommended Lagging Thickness (roughcut) for clear spans of:					
Depth (feet)	**5 feet**	**6 feet**	**7 feet**	**8 feet**	**9 feet**	**10 feet**
0 to 12	2 inches	3 inches	3 inches	3 inches	4 inches	4 inches

Lagging should be installed promptly after excavation, especially in areas where perched groundwater is present or where fill or alluvial soils are located; where clean sand and gravel soils are present; and where caving soils conditions are likely. The workmanship associated with lagging installation is important for maintaining the integrity of the excavation.

The space behind the lagging should be filled with soil as soon as practicable. The city of Seattle requires that voids be backfilled immediately or within a single shift, depending on the selected method of backfill. Placement of this material will help reduce the risk of voids developing behind the wall and damage to existing improvements located behind the wall.

Material used as backfill in voids located behind the lagging should not cause buildup of hydrostatic pressure behind the wall. Lean concrete or controlled density fill (CDF) are suitable options for use as backfill behind the walls. Lean concrete and CDF will reduce the volume of voids present behind the wall. Alternatively, lean concrete or CDF may be used for backfill behind the upper 5 feet of the excavation to limit caving and sloughing of the upper soils, with on-site soils used to backfill the voids for the remainder of the excavation. Based on our experience, the voids between each lean concrete or CDF lift are sufficient for preventing the buildup of hydrostatic pressure behind the wall.

4.4.2.3. Drainage

A suitable drainage system should be installed to prevent the buildup of hydrostatic groundwater pressures behind the soldier pile and lagging wall. Seepage flows at the bottom of the excavation should be contained and controlled. Drainage should be provided for permanent below-grade walls as described in Section 4.10.

4.4.2.4. Construction Considerations

Shoring construction should be completed by a qualified shoring contractor. A shoring contractor is qualified if they have successfully completed at least 10 projects of similar size and complexity in the Seattle/Bellevue area during the previous 5 years. Interested shoring contractors should prepare a submittal documenting their qualifications unless this requirement is waived by GeoEngineers. The shoring contractor's superintendent should have a minimum of 3 years' experience supervising cantilever soldier pile shoring construction, and the drill operators and on-site supervisors should have a minimum of 3 years' experience installing shoring. The personnel experience should be included in the qualification's submittal.

Temporary casing or drilling fluid will be required to install the soldier piles where:

- Fill, alluvium or peat is present;
- The native soils do not have adequate cementation or cohesion to prevent caving or raveling; and/or
- Groundwater is present.

GeoEngineers should be allowed to observe and document the installation of the shoring to verify conformance with the design assumptions and recommendations.

4.4.3. Shoring Wall Performance

Temporary shoring walls typically move on the order of 0.1 to 0.2 percent of H, where H is the vertical distance between the existing ground surface and the base of excavation.

The deflections and settlements are usually highest at the excavation face and decrease to negligible amounts beyond a distance behind the wall equal to the height of the excavation. Localized deflections may exceed the above estimates and may reflect local variations in soil conditions (such as around side sewers) or may be the result of the workmanship used to construct the shoring wall. Given that some movement is expected, existing improvements located adjacent to the temporary shoring system that are not pile supported will also experience movement. The deformations discussed above are not likely to cause structural damage to structurally sound existing improvements; however, some cosmetic damage should be expected (for instance, cracks in drywall finishes; widening of existing cracks; minor cracking of slabs-on-grade/hardscapes; cracking of sidewalks, curbs/gutter, and pavements/pavement panels, etc.). For this reason, it is important to complete a pre-construction survey and photo document existing improvements adjacent to the excavation prior to shoring construction. Refer to Appendix D, for more detailed recommendations for shoring monitoring and preconstruction survey.

4.4.4. Temporary Cut Slopes

The stability of open-cut slopes is a function of soil type, groundwater seepage, slope inclination, slope height, and nearby surface loads. The use of inadequately designed open cuts could impact the stability of adjacent improvements/work areas; could affect existing utilities; and could endanger personnel.

Temporary unsupported cut slopes more than 4 feet high in the fill and alluvium deposits may be inclined at maximum of 1.5H:1V, with the exception of the slopes along the east side of Hec Edmundson Pavilion, where they may be inclined as steep as 1.25H:1V in order to place the footings and/or install deep foundations along the west side of the proposed ICA building. The east side of Hec Edmundson Pavilion is pile supported and the bottom of the piles extend below the planned lowest finished floor elevations of the proposed ICA building. Flatter slopes may be necessary if seepage is present on the face of the cut slopes or if localized sloughing occurs. For open cuts at the site, we recommend that:

- No adjacent foundations, traffic, construction equipment, stockpiles or building supplies be allowed at the top of the cut slopes within a distance of at least 5 feet from the top of the cut;

- Exposed soil along the slope be protected from surface erosion by using waterproof tarps or plastic sheeting;
- Construction activities be scheduled so that the length of time the temporary cut is left open is reduced to the extent practicable;
- Erosion control measures be implemented as appropriate such that runoff from the site is reduced to the extent practicable;
- Surface water be diverted away from the slope; and
- The general condition of the slopes be observed daily by the general contractor and periodically by the geotechnical engineer to confirm adequate stability.

Because the contractor has control of the construction operations, the contractor should be made responsible for the stability of cut slopes, as well as the safety of the excavations. Shoring and temporary slopes must conform to applicable local, state, and federal safety regulations.

Temporary cut slopes should be planned such that they do not encroach on a 1.5H:1V influence line projected down from the edges of nearby or planned foundation elements, with the exception of the east side of Hec Edmundson Pavilion because it is supported on deep foundations. The temporary cut slopes in this area may be steepened to 1.25H:1V, if required.

Water that enters the excavation must be collected and routed away from prepared subgrade areas. We anticipate 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

4.5. Building Support – Deep Foundations

Unsuitable soils consisting of fill and alluvium exist below the planned building. Based on the borings completed for the site as well as the existing borings, we anticipate that competent dense pre-Fraser Deposits are present approximately 21 to 40 feet below existing site grades. Figure 3 shows the estimated depths at which the pre-Fraser Deposits are located below the site. Estimated liquefaction-induced settlement from the design-level earthquake will impact the proposed building if the building is not pile supported. Static settlement due to compression of the fill and alluvium will also impact the proposed building, if it is not pile supported.

Deep foundations are appropriate to support the building and should extend through the unsuitable soils (fill, alluvium, and peat) and be embedded in the underlying dense/very stiff glacial soils. We recommend using 6- to 10-inch-diameter micropiles or 18- to 24-inch-diameter augercast piles depending on the required loads and uplift requirements.

4.5.1. Micropile Foundations

Micropiles may be used for foundation support. Micropiles are high-capacity, small-diameter (typically on the order of 6 to 10 inches in diameter), drilled and grouted piles. Micropiles are constructed by drilling a hole, placing reinforcement and grouting the hole. When installing within loose fill or alluvium, or where groundwater exists, casing is typically required to prevent caving during installation but removed after placement of the grout and reinforcement. Reinforcement generally consists of a large steel reinforcing bar installed down the center. Structural detailing at the tops of the piles is made to connect to the foundation. The grouting method used to construct the micropiles has a significant impact on capacity. Micropiles installed by gravity grouting have lower capacities, and micropiles installed by pressure grouting or post-grouting (two-stage grouting process) can achieve much higher capacities.

Micropiles are generally cost-effective where high-load capacities are required and limited access is available. The construction methodology and equipment have a large influence on micropile capacity and, as a result, micropiles are typically design-build foundation elements. The micropile contractor can modify its equipment and grouting techniques to achieve the required pile capacity. A pile load test program is recommended to be completed to confirm that the required pile capacities have been achieved.

4.5.1.1. Axial Capacity

Axial load capacity in compression and tension will be developed from side frictional resistance in the dense glacial soils beneath the fill and alluvium. We recommend that the diameter of the micropiles be at least 6 inches and extend a minimum of 20 feet into the dense pre-Fraser Deposits. We recommend micropiles be designed with a load transfer of 3, 4, and 6 kips per foot within the pre-Fraser Deposits, for 6-, 8-, and 10-inch-diameter micropiles, respectively. The load transfer may be applied in both compression and tension. Allowable axial capacities are recommended to be limited to 150 kips.

Load transfer in the fill and alluvium should be neglected. Fill and alluvium are estimated to extend up to about 40 feet below existing site grades, based on the results of borings around the project area. A downdrag load of 18, 24 and 30 kips should be subtracted from the allowable axial capacity for 6-, 8-, and 10-inch-diameter micropiles, respectively, due to the potential liquefaction of the fill and alluvium during the design earthquake.

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 2. The capacities apply to single piles. We recommend a minimum pile spacing of 3 feet. In our opinion, if piles are spaced at least 3 feet on center, no reduction of axial capacity for group action is needed.

We recommend that the no-load or unbonded length of the micropile extend into the pre-Fraser Deposits approximately 2 feet when designing the micropiles. The final design load transfer value should be determined by the specialty pile contractor for the proposed installation and grouting methods.

Micropile foundations should only be used for gravity loads. Micropiles can provide limited lateral capacities, and GeoEngineers can provide those capacities if needed.

4.5.1.2. Installation Recommendations

We recommend that all micropiles be installed by a competent foundation contractor experienced with this type of construction. All micropiles should be drilled with straight drilling equipment with sufficient torque to penetrate through the very dense glacial soils. Drilling mud should not be used unless approved by GeoEngineers before the start of construction.

After the hole is drilled to the planned depth, all cuttings must be removed from the hole, either mechanically or by using pressurized air. Water should not be used to remove cuttings from the hole. The installation of each micropile should be observed by a representative from GeoEngineers. If the hole is within tolerance with respect to location, depth and verticality, it should be grouted immediately using a proper grout mix. After grouting is completed, properly sized steel bars should be installed with centering devices.

4.5.1.3. Test Pile Program

We recommend that a test pile program be established to confirm that the required capacities of micropile foundations have been achieved. We recommend that at least one sacrificial pile load test be completed. Tension load tests should be completed in general accordance with ASTM D3689 Section 8 Procedure for Standard Test Methods for Deep Foundations Under Static Axial Tensile Load.

Pile load testing should be completed using a load frame capable of distributing large test loads into the near-surface soils without damaging existing structural elements or below-slab utilities. Large test loads frequently cause damage to slabs-on-grade and other nearby improvements, and the location of pile load tests should be reviewed during the design phase to minimize impacts to existing improvements.

4.5.2. Augercast Piles

Augercast piles (18- or 24-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 to Hec Edmundson Pavilion.

4.5.2.1. Construction Considerations

The augercast piles should be installed using a continuous-flight, hollow-stem auger. Given the distinct contrast in stiffness between the fill, alluvium and peat deposits and the underlying glacial soils, and the need to develop pile capacity from these soils, it is important that the piles achieve a consistent embedment into the glacial soils. In order to confirm that the piles are consistently embedded into the glacially consolidated soils, 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 fill, peat and alluvium deposits to denser glacial soils, which can be used to estimate pile embedment in the glacial soils. 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 fill, peat and alluvium deposits, and glacial soils. 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.

4.5.2.2. Axial Capacity

Axial pile load capacity at this site will primarily be developed from end bearing in the very dense/hard glacial soils with some additional capacity attributed to side frictional resistance. Uplift pile capacity will also be developed from side frictional resistance in these soils.

We developed preliminary axial capacities for 18-inch and 24-inch-diameter augercast piles. Axial pile capacities were evaluated for three conditions:

1. Before earthquake (static conditions);
2. During earthquake; and
3. After earthquake.

The pile capacities were evaluated using ASD procedures and are for combined dead plus long-term live loads. Each of the three cases include a factor of safety of 2, per the Seattle Building Code. The allowable post-earthquake capacities include the effects of downdrag from liquefaction-induced settlement in the liquefiable soils around the pile.

Augercast piles should be embedded 15 to 25 feet into the dense to very dense glacial soils based on lateral capacity requirements. Preliminary augercast pile capacities for static and seismic conditions are summarized in Table 4 for different embedment depths into the glacial soils (depending on lateral loading).

TABLE 4. AUGERCAST ALLOWABLE AXIAL CAPACITIES

Diameter (inches)	Embedment Depth in Glacial Soils (feet)	Lowest Finish Floor Elevation (feet) and Location in Building	Static Conditions		During Earthquake		Post-Earthquake	
			Compression (kips)	Uplift (kips)	Compression (kips)	Uplift (kips)	Compression (kips)	Uplift (kips)
18	15	51 ft, East Side	425	180	385	135	305	N/A
	15	51 ft, West Side	315	115	310	110	245	N/A
	20	37 ft, East Side	300	120	285	105	255	N/A
	20	37 ft, West Side	210	75	205	70	195	N/A
24	15	51 ft, East Side	680	240	625	185	515	N/A
	15	51 ft, West Side	515	155	505	145	415	N/A
	25	37 ft, East Side	560	205	540	185	500	N/A
	25	37 ft, West Side	410	130	405	125	390	N/A

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.

4.5.2.3. 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 18- and 24-inch augercast piles using LPILE v2019 by Ensoft, Inc. Evaluations for the lateral pile capacities were completed for liquefied soil condition/seismic loading. Liquefied soil parameters were modeled in LPILE by applying P-multipliers and residual soil strengths for the liquefiable fill and alluvium deposits. P-multipliers for the liquefied soil were developed based on the average $(N_1)_{60cs}$ for the alluvium deposits per the 2019 Washington State Department of Transportation (WSDOT) Geotechnical Design Manual (GDM).

Pile shear and bending moments were evaluated as described above by controlling lateral deflections at the top of the pile. LPILE runs were completed for deflections of ¼, ½, 1, and 1½ inches for both fixed- and free-head conditions. LPILE analyses were completed on different piles based on lowest finish floor elevation and location in the building. Plots from LPILE of deflection vs depth, shear force vs depth, and bending moment vs depth are provided in Figures 6 through 53. The recommended design parameters for the primary soil units are summarized in Table 5. The structural engineer may use the recommended design LPILE soil parameters to evaluate lateral pile capacities for other loading conditions or pile sizes.

TABLE 5. 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)	P-Multiplier	Undrained Cohesion (psf)	E50
Fill/Alluvium	Varies	Sand (Reese)	120	32	30	-	-	-
Fill/Alluvium (below GWT)	Varies	Soft Clay (Matlock)	57.6 (below GWT)	-	-	0.1	175	0.02
Pre-Fraser Deposits	100	Sand (Reese)	67.6 (below GWT)	40	225	-	-	-

Notes:

pcf – pounds per cubic foot

pci – pounds per cubic inch

psf – pounds per square foot

Piles spaced closer than five 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 piles in a pile group spaced less than five pile diameters apart be reduced in accordance with the factors in Table 6.

TABLE 6. SHAFT P-MULTIPLIERS, P_M, FOR MULTIPLE ROW SHADING

Shaft Spacing (in terms of shaft diameter)[1]	P-Multipliers, P_m[2, 3]		
	Row 1 (leading row)	Row 2 (1st trailing row)	Row 3 and higher (2nd trailing row)
3D	0.8	0.4	0.3
5D	1.0	0.85	0.7

Notes:

[1] The P-multipliers in the table above are a function of the center to center spacing of shafts in the group in the direction of loading expressed in multiples of the shaft diameter, D.

[2] The values of P_m were developed for vertical shafts only per 2017 AASHTO LRFD Table 10.7.4-1.

[3] The P-multipliers are dependent on the shaft spacing and the row number in the direction of the loading to establish values of P_m for other shaft spacing values, interpolation between values should be conducted.

The WSDOT GDM does not require that the reduction in P-multiplier for group effects be combined with the P-multiplier for liquefied soil conditions.

We recommend that the passive soil pressure acting on the pile cap be estimated using an equivalent fluid density of 350 pounds per cubic foot (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.

4.5.3. 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.

4.5.4. Hec Edmundson Pavilion Pile Considerations

We understand that Hec Edmundson Pavilion is supported on piles and that piles for the proposed ICA Building may be located close to the existing Hec Edmundson Pavilion piles. New piles constructed for the UW ICA Basketball Center should maintain a distance that is equal to at least 3 pile diameters from the Hec Edmundson Pavilion piles for no reduction in axial capacities. Depending on lateral capacity requirements, a distance of up to 5 pile diameters may be needed for the ICA piles. This should be evaluated as the design progresses.

4.6. Conventional Shallow Foundations – Ancillary Structures

We recommend that ancillary light-weight structures be supported on conventional spread footings bearing on at least 2 feet of properly compacted structural fill. Footings supported on structural fill may be designed using an allowable bearing pressure of 2,500 psf. The allowable bearing pressures may be increase by one-third for short duration loads such as wind or seismic events.

The overexcavated areas should be backfilled with imported gravel borrow or crushed rock. Two feet of existing soil should be removed from below foundations to accomplish this. The exposed subgrade should then be compacted to the extent practical, and then 2 feet of properly compacted structural fill should be placed. The structural fill should extend at least 2 feet beyond the edges of the foundations.

4.6.1. Foundation Settlement

We estimate that the post-construction static settlement of footings founded on 2 feet of properly compacted structural fill, as recommended above, will be less than 1 inch. Differential settlement over a 30-foot distance should be less than ½ inch. Loose or disturbed soils not removed from footing excavations prior to placing concrete will result in additional settlement.

As mentioned in Section 4.3.2, liquefaction-induced free-field ground settlement of the potentially liquefiable zones of soil are on the order of 1 to 8 inches for the design-level earthquake, and this should be considered for conventional foundations that are planned above the liquefiable soils.

4.6.2. 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 350 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 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.

4.6.3. 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.

4.7. Landfill Gas Collection

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

4.7.1. 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 to provide an impermeable seal at all pipe penetrations or discontinuities, such as interior and exterior foundations, pile foundations, grade beams, 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.

4.7.2. Vent Pipe System

For planning purposes, we recommend perforated vent pipes be installed under the slabs-on-grade of the building. The perforated vent pipes should be spaced a maximum of every 30 feet on center. The perforated pipes should be placed within a 6-inch-layer of clean crushed gravel with negligible sand or silt in conformance with Mineral Aggregate Type 22 (¾-inch crushed gravel), City of Seattle Standard Specification 9-03.14 or Section 9-03.1(4)C, Grading No. 67 of the 2022 WSDOT Standard Specifications. This layer will act as a capillary break and methane collection layer. We recommend that lateral-perforated vent pipes extend to the south or east and vent to the atmosphere on the south or east sides of the exterior building wall. The methane pipes should then vent vapors to the atmosphere by extending vertical riser pipes on the outside of the building to a point at least 10 feet above the exterior grades of the 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.

4.8. Footing Drains

We recommend that perimeter footing drains be installed at the base of exterior footings as shown in Figure 54, 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 needle-punched non-woven geotextile 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.

4.9. Floor Slabs

There are two concerns for potential settlement that may affect the floor slabs of the building and should be considered when designing the floor slabs. These concerns are liquefaction-induced settlement and static-induced settlement.

As discussed in Section 4.3.2, the alluvium and fill located beneath the water table are susceptible to liquefaction during the design-level earthquake. Liquefaction-induced free-field ground settlement of these potentially liquefiable soils is estimated to be on the order of 1 to 8 inches during the design-level earthquake.

The characteristics of the fill and alluvial soils are highly variable across the site and are susceptible to static settlement that may be induced from new loads such as fill to raise site grades and structural loads. The alluvial deposits also contain some thin layers of peat and organic materials, which are subject to compression and decomposition. Based on the variability of these soils, as well as the variable thickness of new fill placed below floor slabs, differential settlement is a concern.

The deep foundations that the building will be supported on will effectively mitigate the risk of liquefaction-induced and static-induced settlement to the superstructure of the building, provided the deep foundation recommendations in this report are followed. If it is determined that liquefaction-induced and static-induced settlements can be tolerated (i.e. the slab is allowed to settle/crack during a design-level earthquake or during static settlement of the soil), the floor slabs do not need to be designed as structural slabs, and conventional slab-on-grade floors may be used. However, if these settlements cannot be tolerated, the floor slabs should be designed as a structural floor slabs that spans between grade beams that are tied into deep foundations.

Static settlement of floor slabs should be evaluated as the design progresses and details about the pool and other backfill to raise site grades is better known.

4.9.1. Subgrade Preparation

The exposed subgrade should be evaluated after site grading is complete. Probing should be used to evaluate the subgrade. The exposed soil should be firm and unyielding, and without significant water. Disturbed areas should be recompacted if possible or removed and replaced with compacted structural fill.

4.9.2. Design Parameters

If conventional slab-on-grade floors are used, we recommend the slab be founded on a 2-foot-thick layer of properly placed and compacted structural fill. For slabs designed as a beam on an elastic foundation, a modulus of subgrade reaction of 75 pci may be used for subgrade soils prepared as recommended.

If structural slab-on-grade floors are used, they should be structurally connected to grade beams that are tied into deep foundations. A 2-foot-thick layer of properly placed and compacted structural fill is not necessary below structural floor slabs.

We recommend that concrete floor slabs (conventional or structural) be underlain by a 6-inch-thick gravel layer as discussed in Section 4.7.2. This gravel layer will act as both capillary break and a methane collection layer.

4.9.3. Below-Slab Drainage

Perched groundwater could accumulate below the lower level building slab (Elevation 37 feet) because the building will be below site grades to the west and south where perched groundwater may be encountered. To help mitigate potential build-up of groundwater below this slab, we recommend that the concrete slab be provided with under drainage to collect and discharge potential groundwater from below the slab. This can be accomplished by installing a 4-inch-diameter, heavy-wall perforated collector pipe in a shallow trench placed below the capillary break gravel layer. The trench should measure about 1.5 feet wide by 2 feet deep and should be backfilled with clean ⅜-inch pea gravel. At a minimum, we recommend installing one underdrain pipe longitudinally (north-south) below the slab centered and along the full length of the building. The underdrain pipe could be connected to the perimeter footing drainpipe. The underdrain pipe should be installed between deep foundations. If connected to the footing drain system, the invert of the underdrain pipe should be higher than the invert of the footing drainpipe where they connect.

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 slabs.

4.10. 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.

4.10.1. Below-grade Walls against Shoring

Permanent below-grade walls built against temporary shoring (if required) should be designed for the pressures presented in Figure 4 with the addition of a seismic surcharge pressure equal to 7H (where H is the height of the wall in feet). Surcharge loads should be designed for surcharge pressures presented in Figure 5.

The soil pressures recommended above assume that wall drains will be installed to prevent the buildup of hydrostatic pressure behind the walls or that the wall is designed to resist hydrostatic pressures. The drains should be tied to permanent drains to remove water to suitable discharge points.

4.10.2. Other Cast-in-Place Walls

Conventional cast-in-place walls may be necessary for small retaining structures located on site. Lateral earth pressures for design of these 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 7H 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.

4.10.3. 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 in Figure 54. 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.

4.10.4. 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.

4.11. 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 and alluvium contain 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 fill and alluvium 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.

4.11.1. 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 4 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.

4.11.2. 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.

4.11.3. Structural Fill

All fill, whether existing on-site fill soil or imported soil, which 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.

4.11.3.1. Materials

Materials used as backfill for foundations, slabs, structures, below-grade walls, drainage layers, utility trenches, and paved areas are classified as structural fill for the purpose of this report. We recommend specifying materials using the 2020 City of Seattle Standard Specifications (Seattle Mineral Aggregate) or the 2022 WSDOT Standard Specifications. Structural fill material quality varies depending upon its use as described below:

1. Structural fill placed below all structures and during wet weather conditions should consist of imported gravel borrow, as described in Section 9-03.14(1) of the 2022 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. On-site alluvial soils and peat should not be planned for reuse as structural fill.
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 2022 WSDOT Standard Specifications, surrounded by a nonwoven geotextile separator, as shown in Figure 54. 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 2022 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 2022 WSDOT Standard Specifications or Seattle Mineral Aggregate Type 22 with negligible fines or sand content.

4.11.3.2. 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. On-site alluvial soils and peat, or high silt content soils, should not be reused as structural fill.

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.

4.11.3.3. 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 as shown in Figure 55.
4. Non-structural fill, such as fill placed in landscape areas, should be compacted to at least 90 percent of the MDD.

4.11.3.4. 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.

4.11.4. 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.

4.11.5. Utility Trenches

Trench excavation, pipe bedding, and trench backfilling should be completed using the general procedures described in the 2022 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; however, the alluvium and peat soils have a moderate to high potential for corrosion.

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 55 illustrates recommended trench compaction criteria under pavement and non-structural areas.

4.11.6. Pool Demolition and Backfill

If the existing pool may be abandoned in place, we recommend that the perimeter of the pool be demolished such that the pool sidewalls are removed at least 3 feet below the proposed overlying building slab to remove potential hard points from under the slab.

Once the pool is drained, the pool may be backfilled with crushed recycled concrete from building demolition activities or imported gravel borrow. If recycled concrete is used to fill the pool, it should be crushed to meet gradation specification for imported gravel borrow per City of Seattle Mineral Aggregate Type 17, as described in Section 4.11.3.1 of this report. Backfill should be compacted as described in Section 4.11.3.3 of this report.

4.11.7. Abandoning Existing Piles

We understand that the existing piles that are currently supporting the Hec Edmundson Pavilion Pool Building will be abandoned and left in place. The abandoned piles will not conflict with the new piles that will support the proposed building. The existing piles should be cut down at least 3 feet below the proposed overlying building slab to remove potential hard points from under the slab.

4.11.8. 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.

4.12. Drainage Considerations

All paved and landscaped areas should be graded so that surface drainage is directed away from the building, as well as between the buildings, 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.

4.13. Infiltration Considerations

Sieve analyses and percent fines were performed on selected soil samples collected from explorations completed at the site. The soil samples typically consisted of fill overlying alluvium and pre-Fraser Deposits at depth. The fill typically has about 10 to 42 percent fines (silt) while the underlying alluvium has a fines content ranging from 28 to 62 percent. Although groundwater was observed about 10 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.

4.14. Pavement Subgrade Preparation

We recommend the subgrade soils in new pavement areas be prepared and evaluated as described in Section 4.11 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.

4.15. 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 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 temporary shoring installation (if needed), 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 E, 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 E for additional information pertaining to use of this report.

6.0 REFERENCES

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FIGURES

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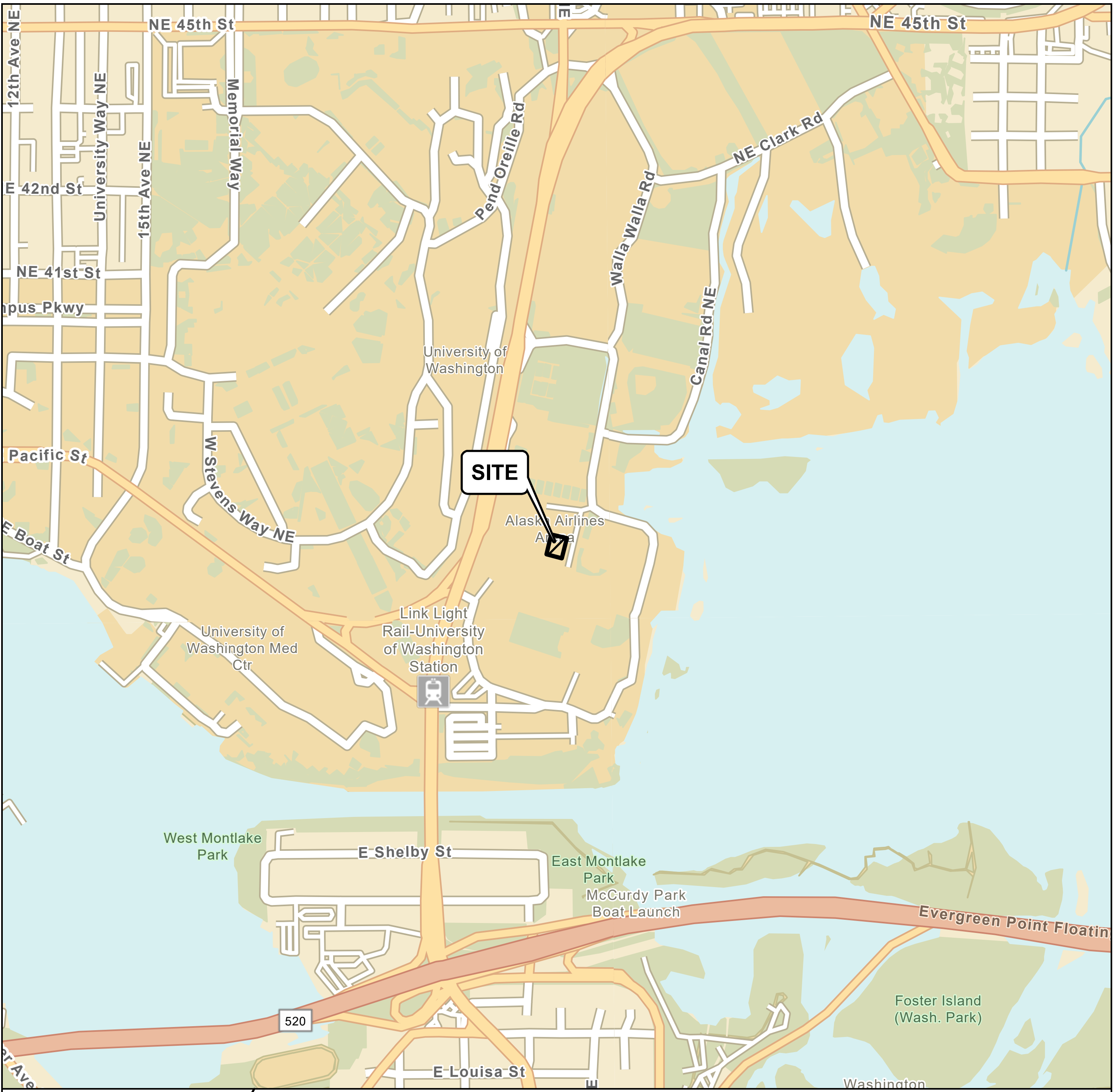

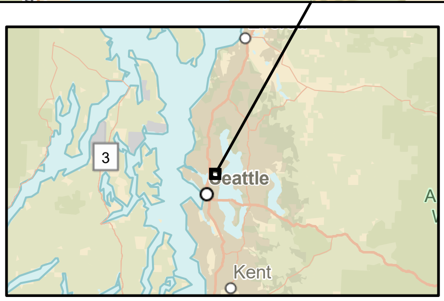

Notes:

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: ESRI

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

UW ICA Basketball Center
Seattle, Washington

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Figure 1

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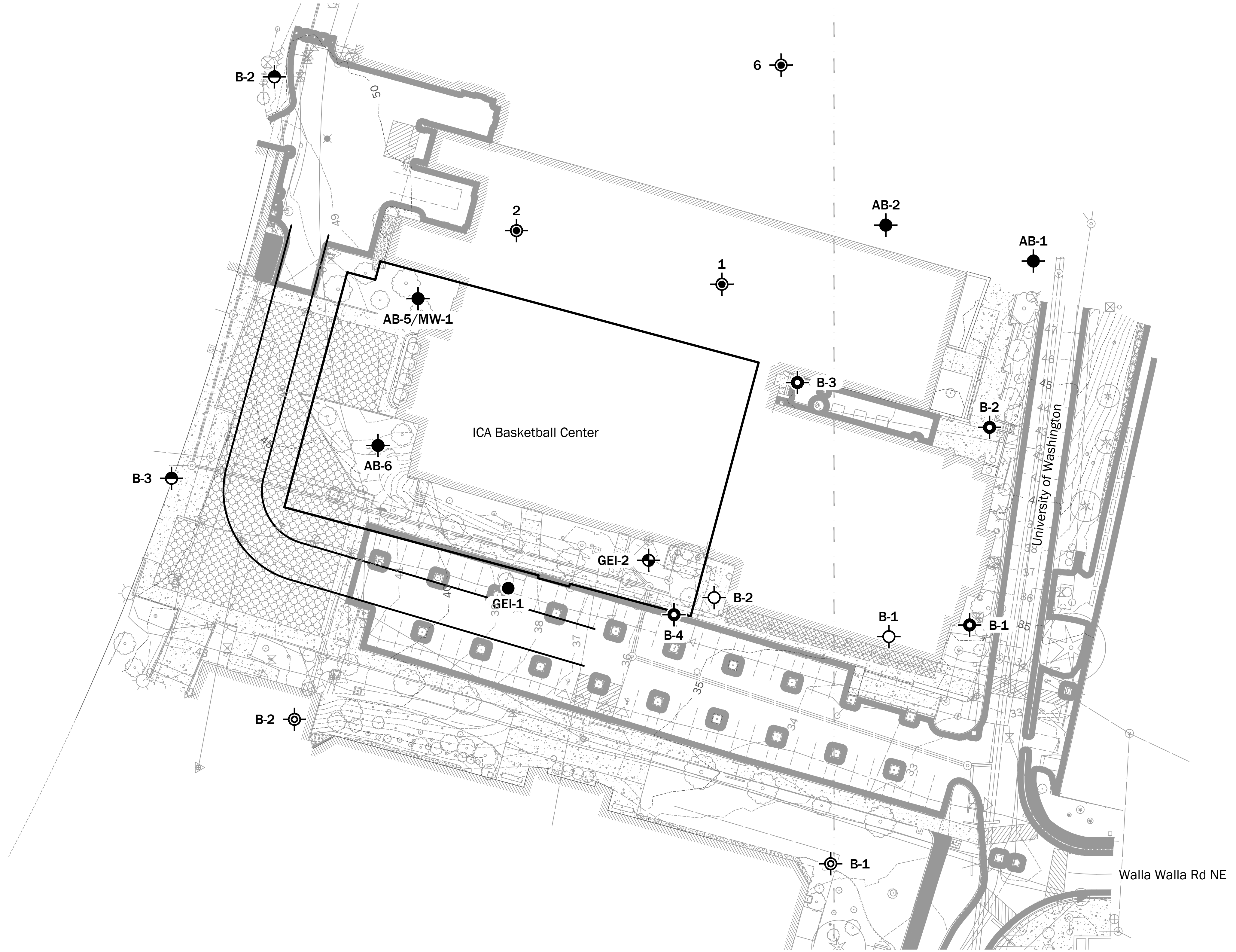

Legend

GEI-2 ⊕	Boring by GeoEngineers, Inc., 2022	B-1 ◎	Boring by Terra Associates, 1987
GEI-1 ●	Boring with Monitoring Well by GeoEngineers, Inc., 2022	B-1 ⊙	Boring by Terra Associates, 1986
AB-1 ●	Boring by AMEC, 2012 and 2014	1 ◉	Boring by Dames and Moore, 1966
B-1 ○	Boring by Sahnnon and Wilson, 2006	B-2 ◒	Boring by Shannon and Wilson, 1964

W N E S

60 0 60
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: CAD File from Bush, Roed and Hitchings, Inc. dated 04/04/2022.

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

Site Plan

ICA Basketball Center
Seattle, WA

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Figure 2

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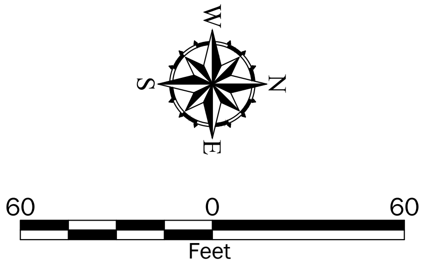
Legend

20	Estimated Glacial Bearing Soil Elevation Contours (Feet)
GEI-2	Boring by GeoEngineers, Inc., 2022
GEI-1 ●	Boring with Monitoring Well by GeoEngineers, Inc., 2022
AB-1	Boring by AMEC, 2012 and 2014
B-1	Boring by Sahnnon and Wilson, 2006
B-1	Boring by Terra Associates, 1987
B-1	Boring by Terra Associates, 1986
1	Boring by Dames and Moore, 1966
B-2	Boring by Shannon and Wilson, 1964



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: CAD File from Bush, Roed and Hitchings, Inc. dated 04/04/2022.

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

Glacial Bearing Soil Elevation Contour Map

ICA Basketball Center
Seattle, WA

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Figure 3

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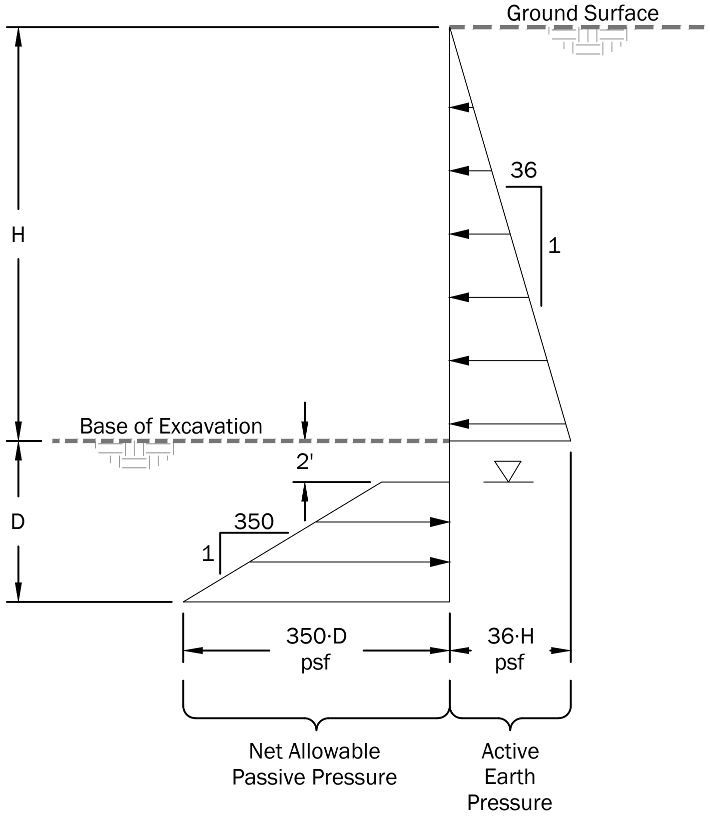
Cantilever Soldier Pile



Legend

H = Height of Excavation, Feet

D = Vertical Embedment Depth, Feet

▽ Design Groundwater Elevation for Drained Walls/ Passive Resistance Design

Not To Scale

Notes:

1. Active earth pressure and traffic surcharge pressure act over the pile spacing above the base of the excavation.
2. Passive earth pressure acts over 2.5 times the concreted diameter of the soldier pile, or the soldier pile spacing, whichever is less.
3. Passive pressure includes a factor of safety of 1.5
4. Additional surcharge from footings of adjacent buildings should be included in accordance with recommendations provided on Figure 4.
5. This pressure diagram is appropriate for temporary cantilever soldier pile walls. If additional surcharge loading (such as from soil stockpiles, excavators, dumptrucks, cranes, or concrete trucks) is anticipated, GeoEngineers should be consulted to provide revised surcharge pressures.

Earth Pressure Diagram
Temporary Cantilever Soldier Pile Wall

UW ICA Basketball Center
Seattle, Washington

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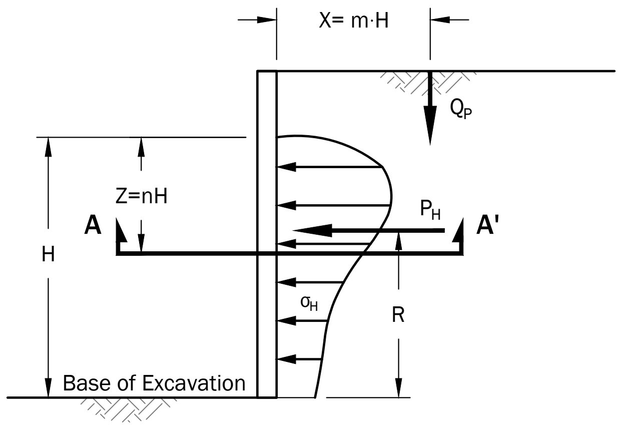
Figure 4

Lateral Earth Pressure from Point Load, Q_P (Spread Footing)



For $m \leq 0.4$

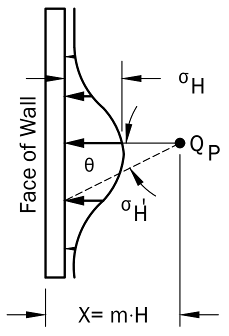
$$σ_H = \frac{k \cdot 0.28Q_P n^2}{H^2(0.16+n^2)^3}$$

For $m > 0.4$

$$σ_H = \frac{k \cdot 1.77Q_P m^2 n^2}{H^2(m^2+n^2)^3}$$

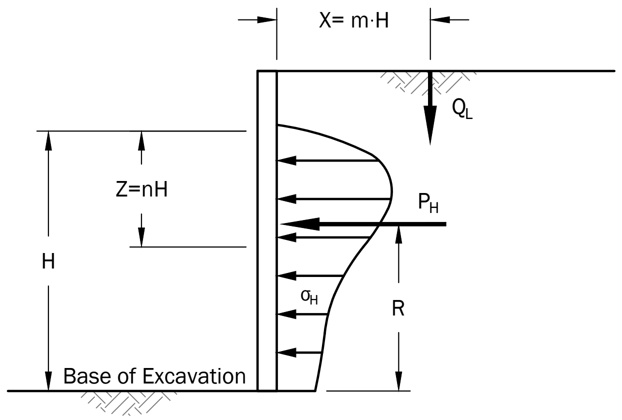
$$σ'_H = σ\,COS^2\,(1.1θ)$$

m	$P_H\left(\frac{H}{Q_P}\right)$	R
0.2	0.78	0.59H
0.4	0.78	0.59H
0.6	0.45	0.48H



Section A-A'
Pressures from Point Load Q_P

Lateral Earth Pressure from Line Load, Q_L (Continuous Wall Footing)



For $m \leq 0.4$

$$σ_H = \frac{k \cdot 0.2n \cdot Q_L}{H(0.16+n^2)^2}$$

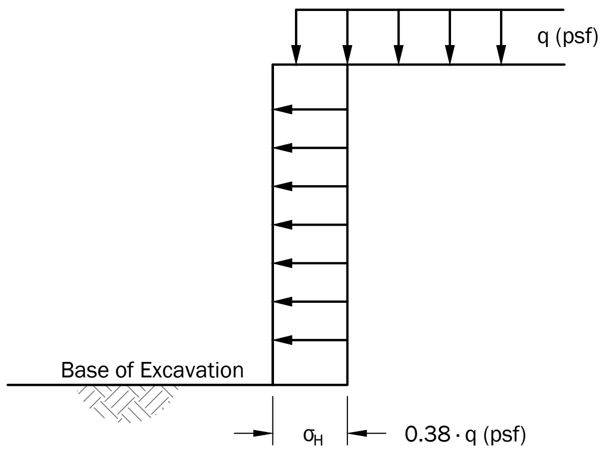
For $m > 0.4$

$$σ_H = \frac{k \cdot 1.28m^2 n Q_L}{H(m^2+n^2)^2}$$

$$\text{Resultant } P_H = \frac{0.64Q_L}{(m^2+1)}$$

m	R
0.1	0.60H
0.3	0.60H
0.5	0.56H
0.7	0.48H

Uniform Surcharges, q (Floor Loads, Large Foundation Elements or Traffic Loads)



$σ_H$ = Lateral Surcharge Pressure from Uniform Surcharge

Wall Type	Surcharge Factor, k
Rigid	1.0
Flexible	0.5

Notes:

1. Procedures for estimating surcharge pressures shown above are based on Manual 7.02 Naval Facilities Engineering Command, September 1986 (NAVFAC DM 7.02).
2. Lateral earth pressures from surcharge should be added to earth pressures presented on Figure 3.
3. See report text for where surcharge pressures are appropriate.
4. Determination of surcharge factor (k). Flexible is for a system that allows small movements (temporary shoring, retaining walls, etc.) and rigid is for a system that does not allow small movements (permanent basement walls, below grade utility structures, etc.). If permanent basement walls are cast/poured directly against temporary shoring, then the lateral surcharge factor should be assumed as flexible when analyzing lateral surcharges.

Definitions:

Q_P = Point load in pounds
Q_L = Line load in pounds/foot
H = Excavation height below footing, feet
$σ_H$ = Lateral earth pressure from surcharge, psf
q = Surcharge pressure in psf
θ = Radians
$σ'_H$ = Distribution of $σ_H$ in plan view
P_H = Resultant lateral force acting on wall, pounds
R = Distance from base of excavation to resultant lateral force, feet
X = Resultant lateral force acting on wall, pounds
Z = Depth of $σ_H$ to be evaluated below the bottom of Q_P or Q_L
m = Ratio of X to H
n = Ratio of Z to H

Not To Scale

Recommended Surcharge Pressure

UW ICA Basketball Center
Seattle, Washington

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Figure 5

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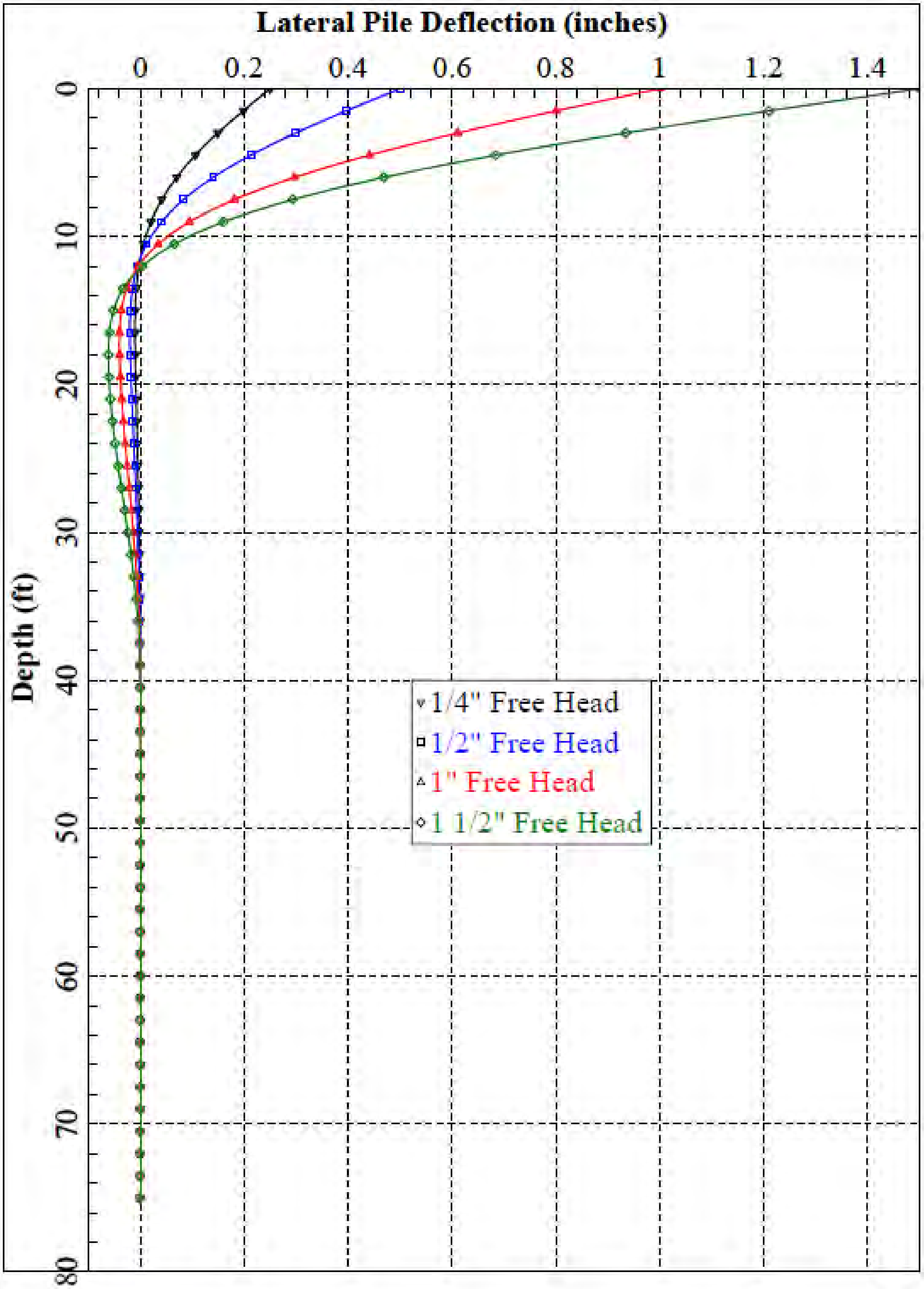

Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
Seattle, Washington

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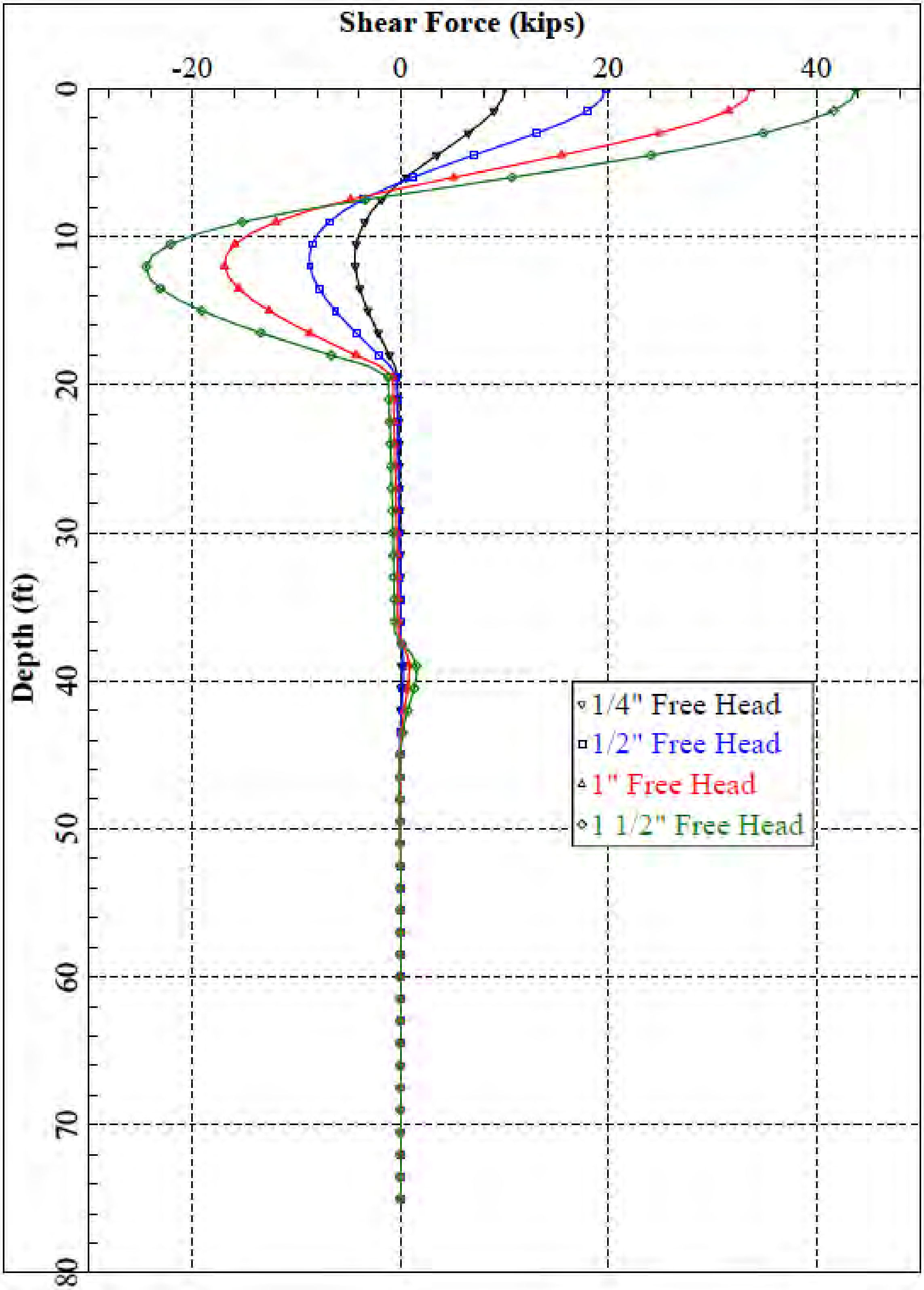
Figure 6



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
Seattle, Washington

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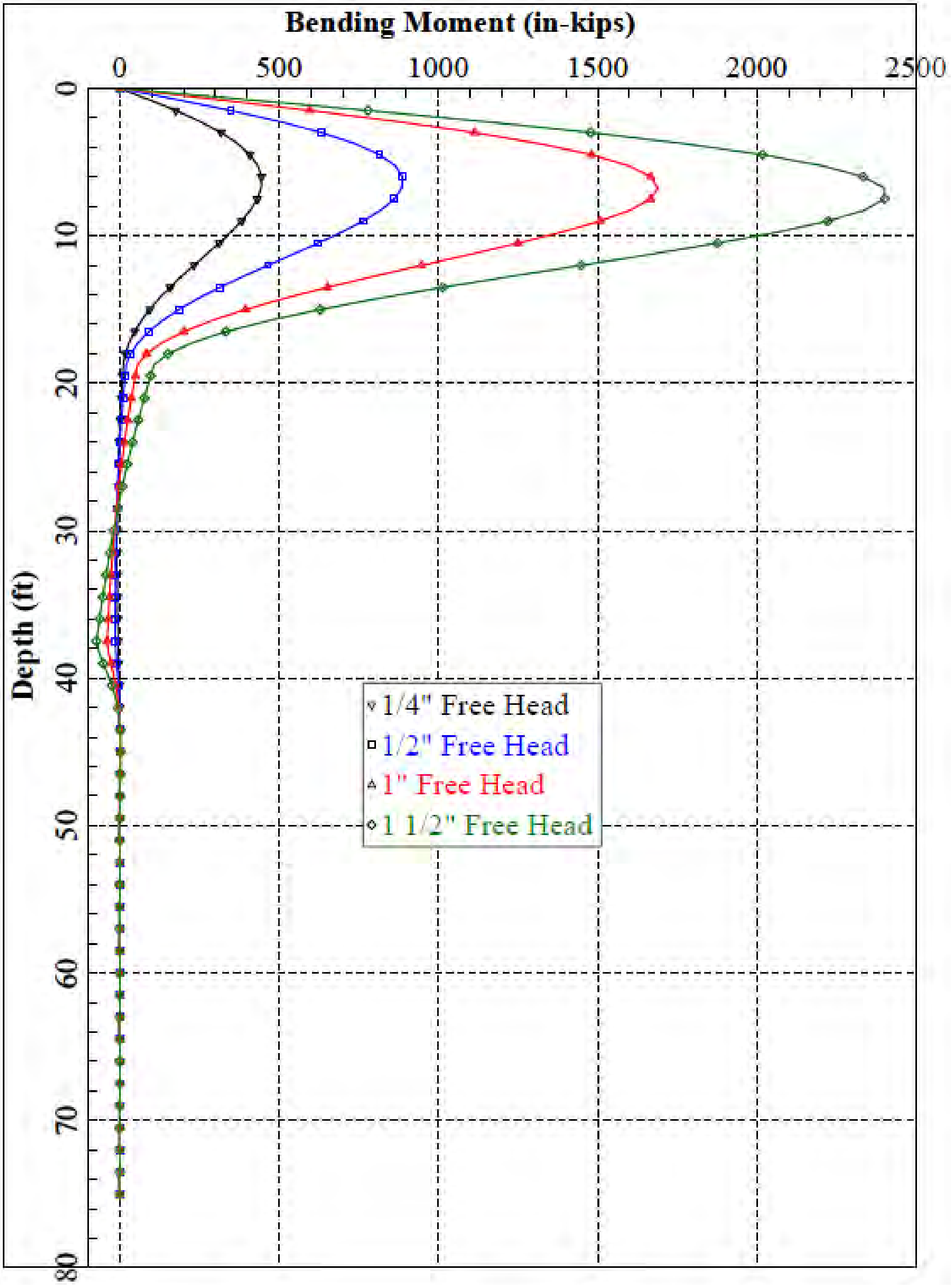
Figure 7



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
Seattle, Washington

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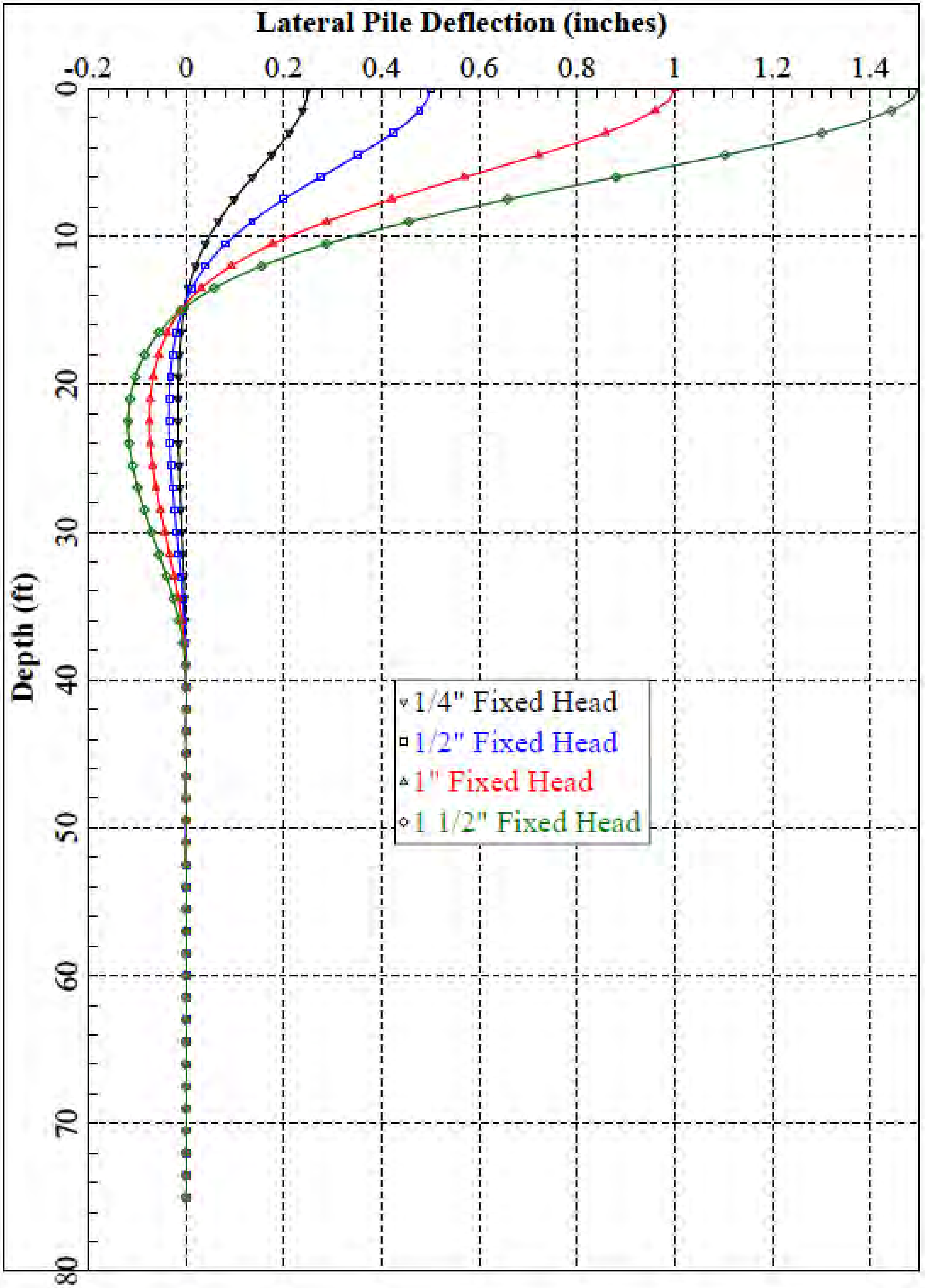
Figure 8



18-inch Augercast Pile
Deflection vs Depth (Fixed Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
Seattle, Washington

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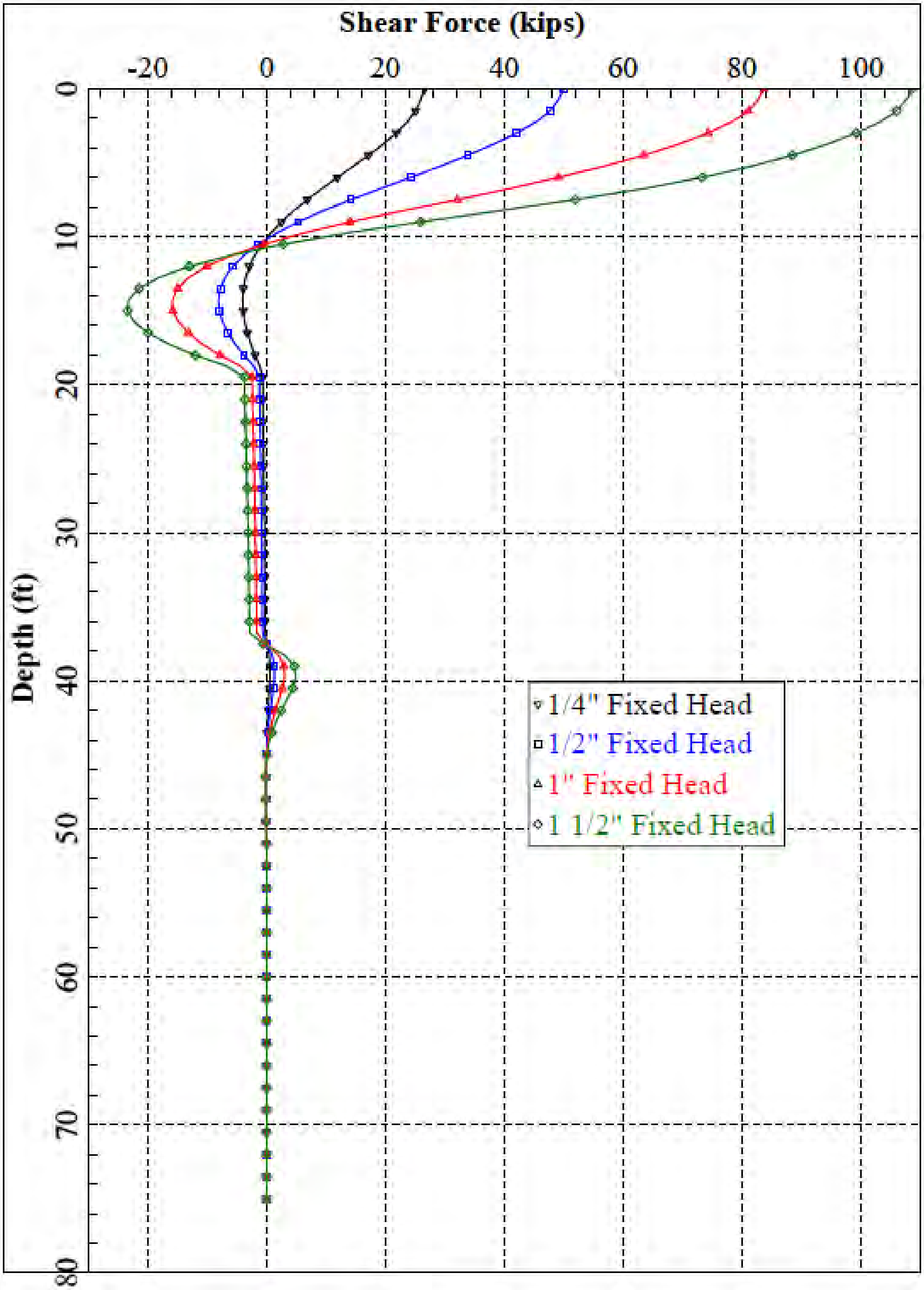
Figure 9

Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
Seattle, Washington

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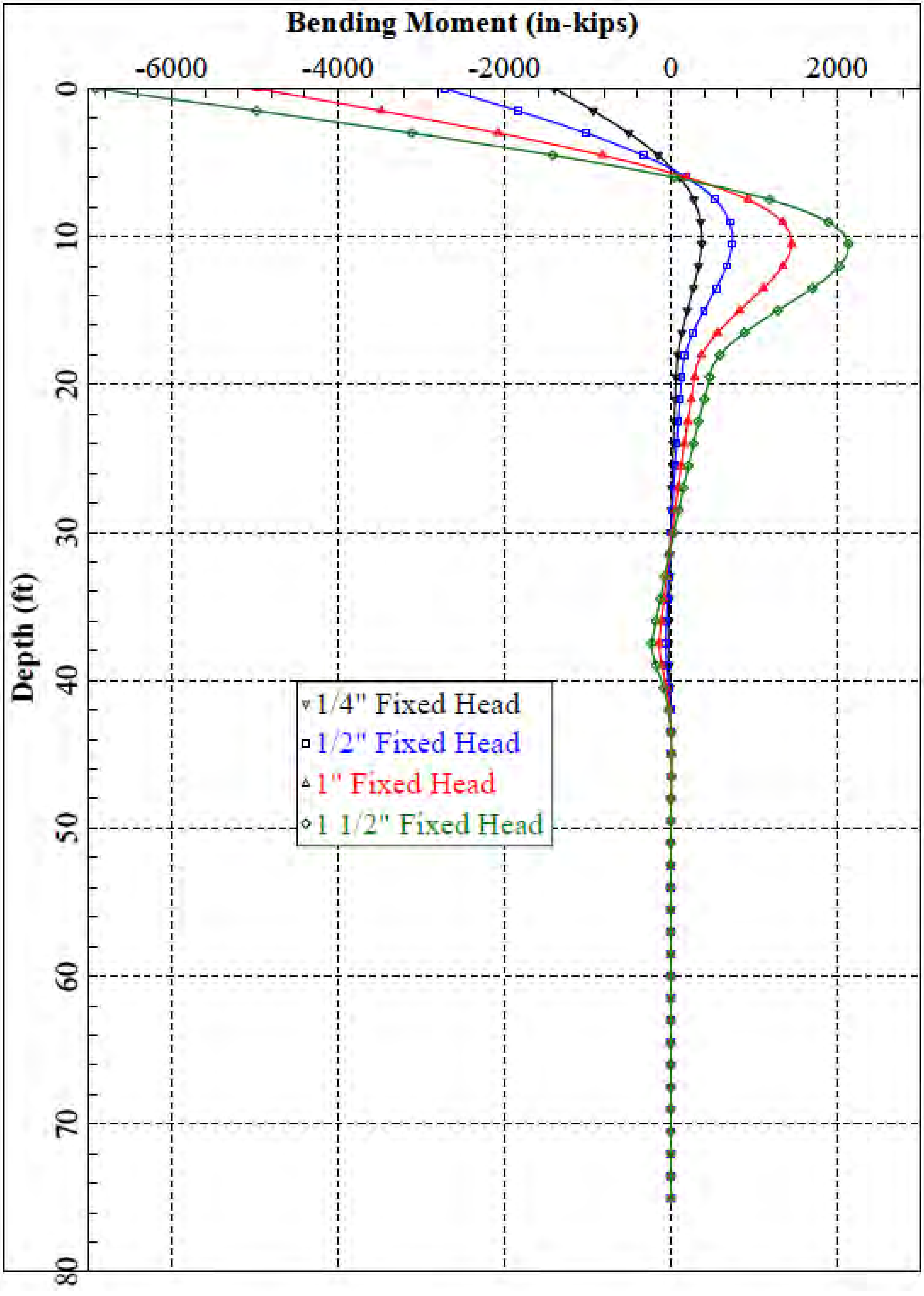
Figure 10



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
Seattle, Washington

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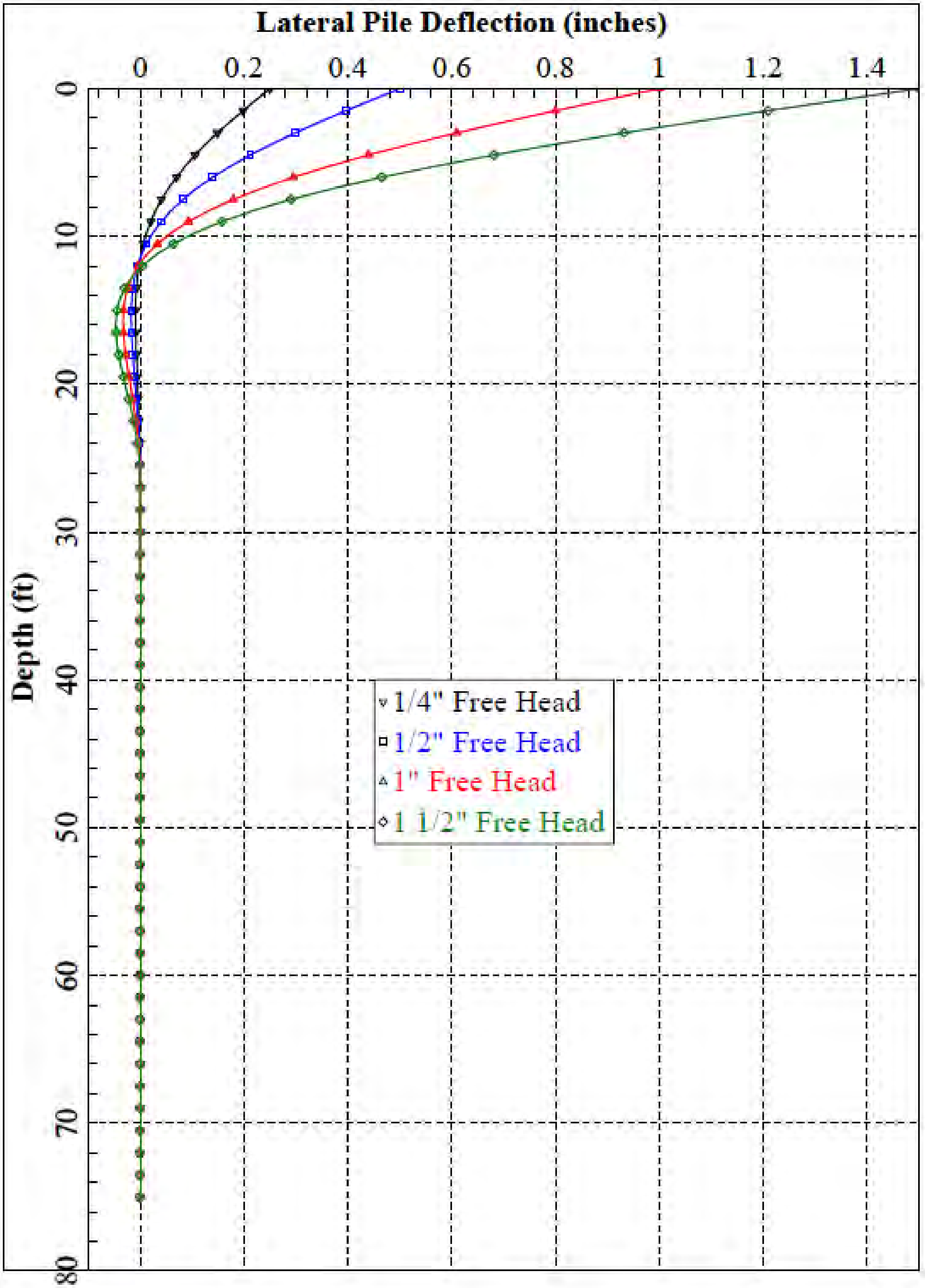
Figure 11

0183-144-00 Date Exported: 06/01/22



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

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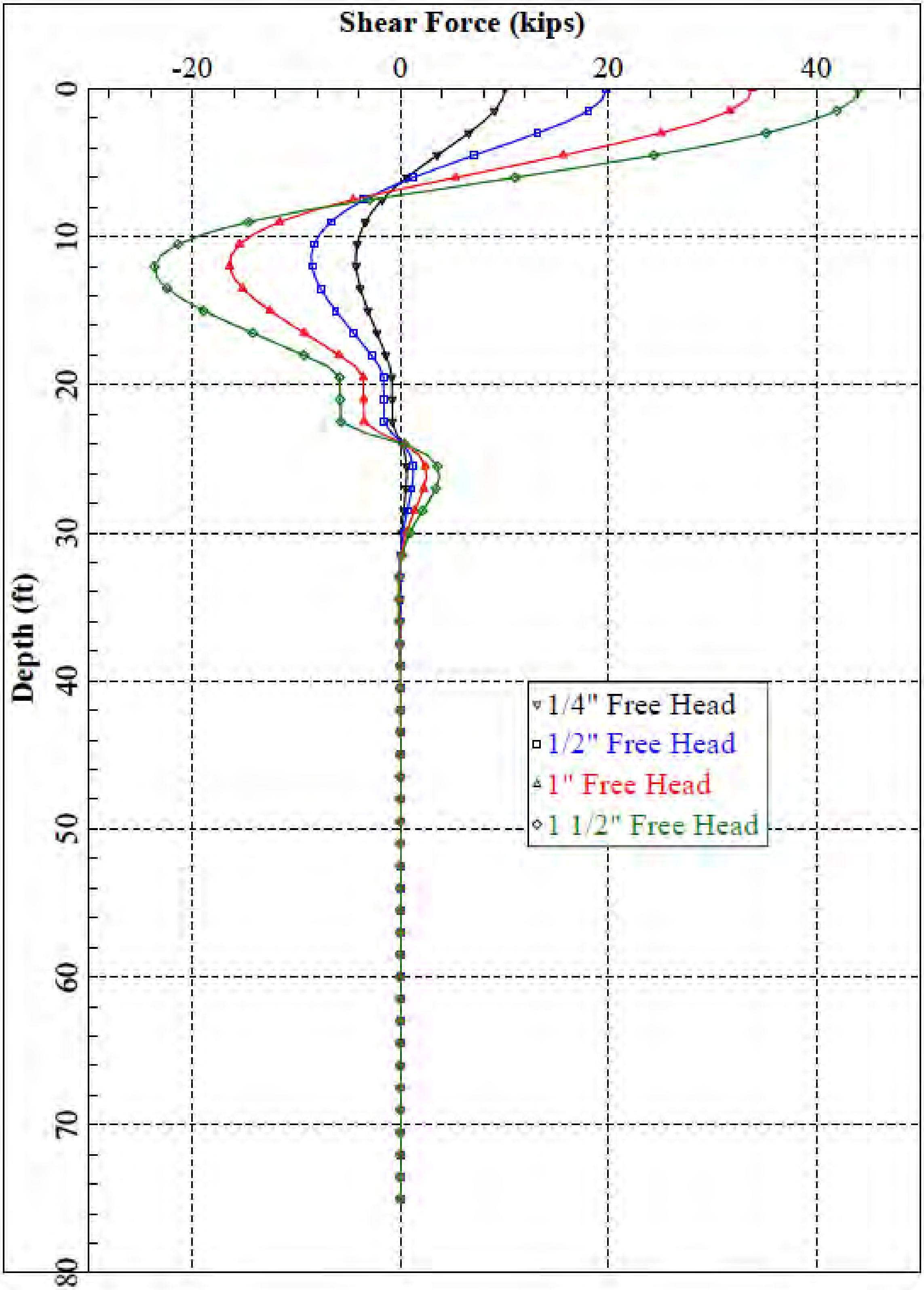
Figure 12



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

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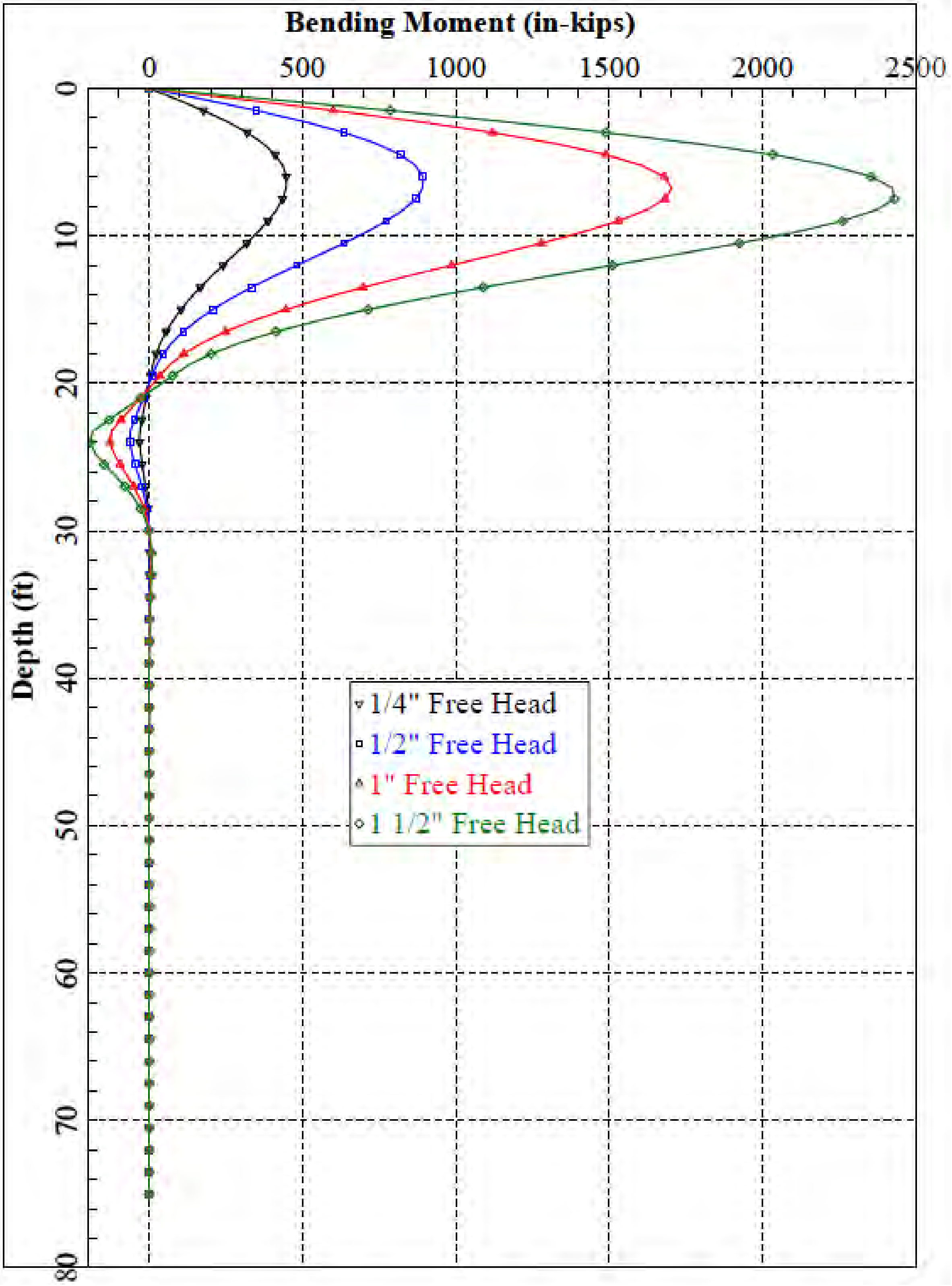
Figure 13



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

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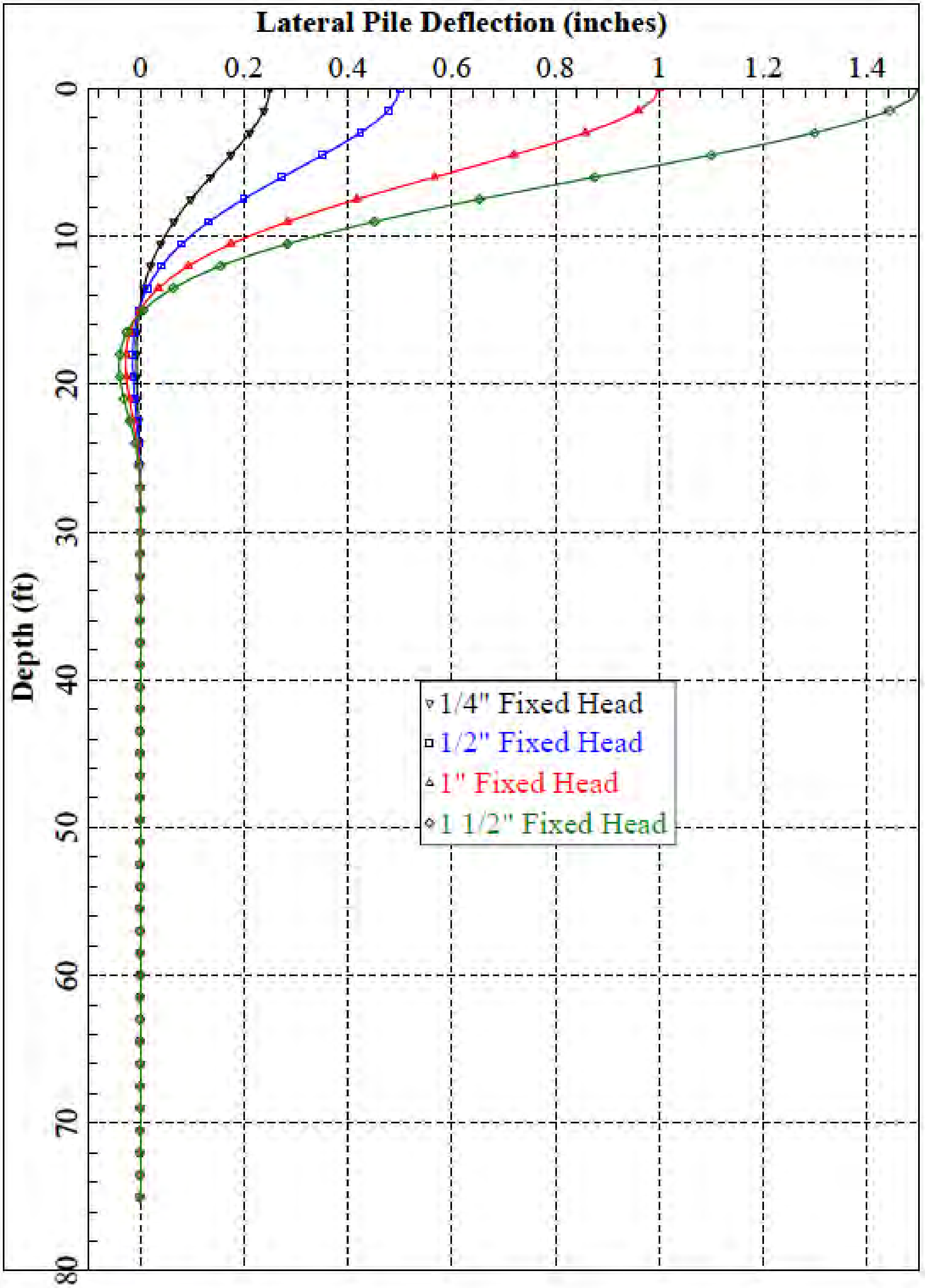
Figure 14



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

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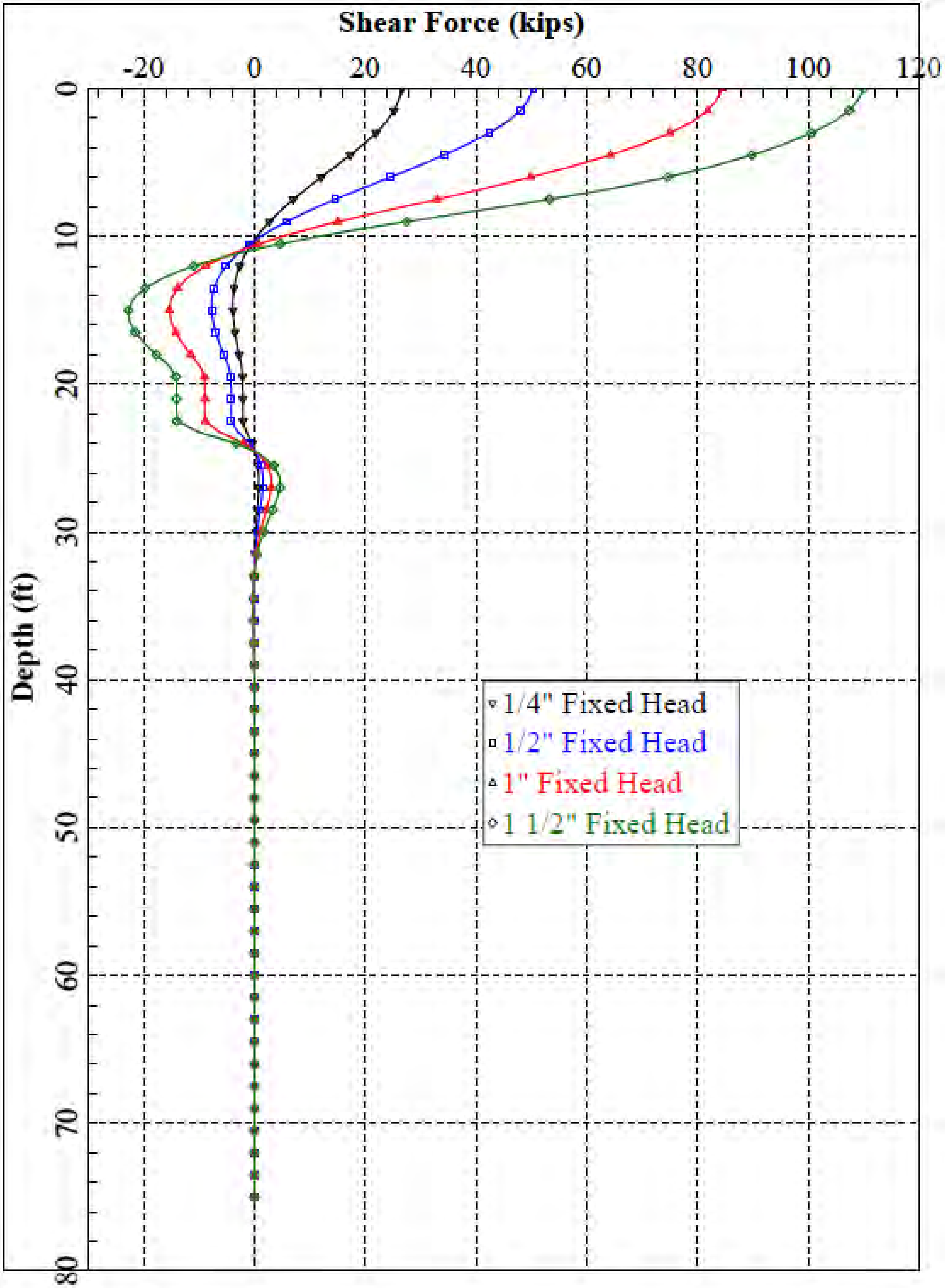
Figure 15



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

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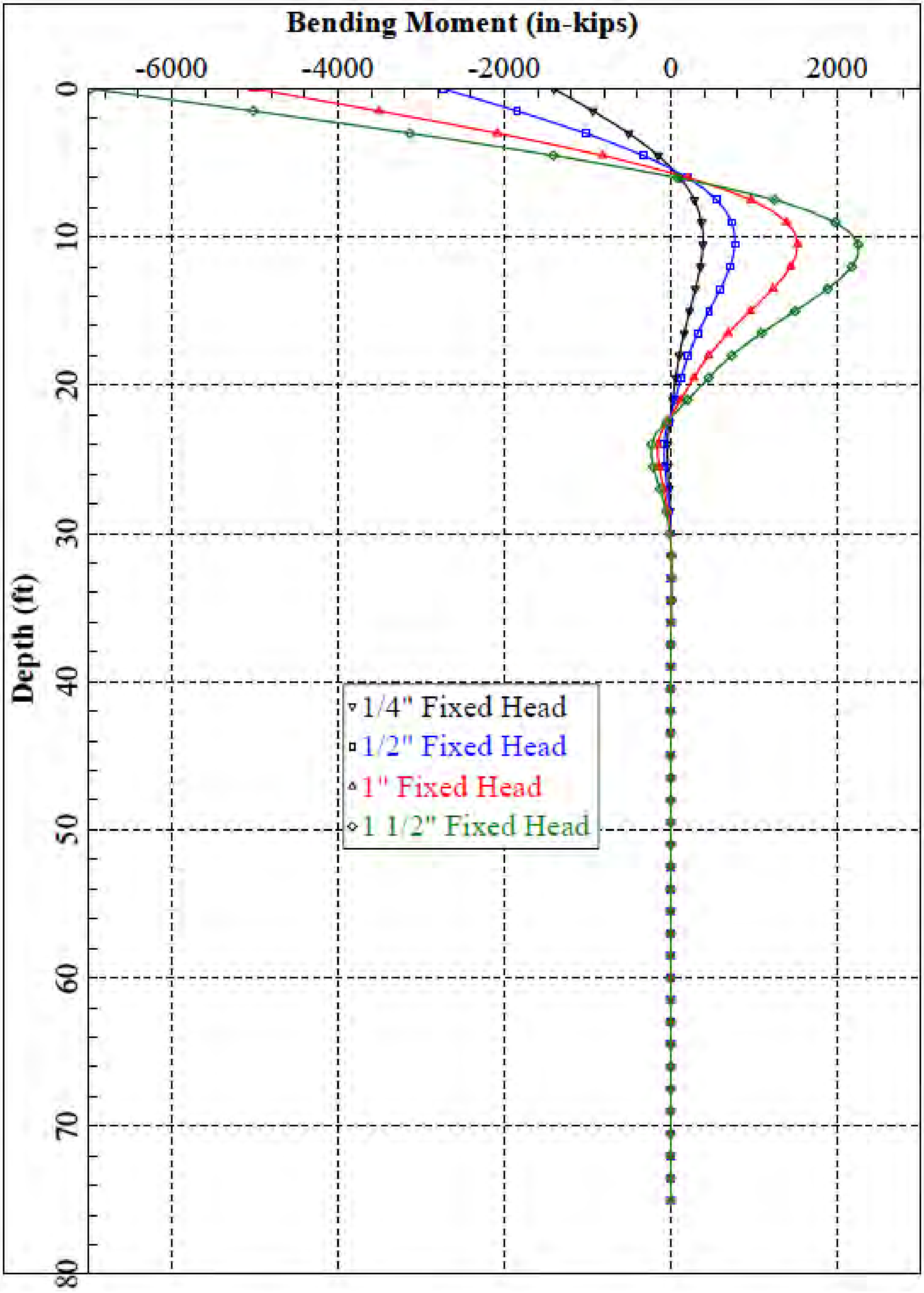
Figure 16



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
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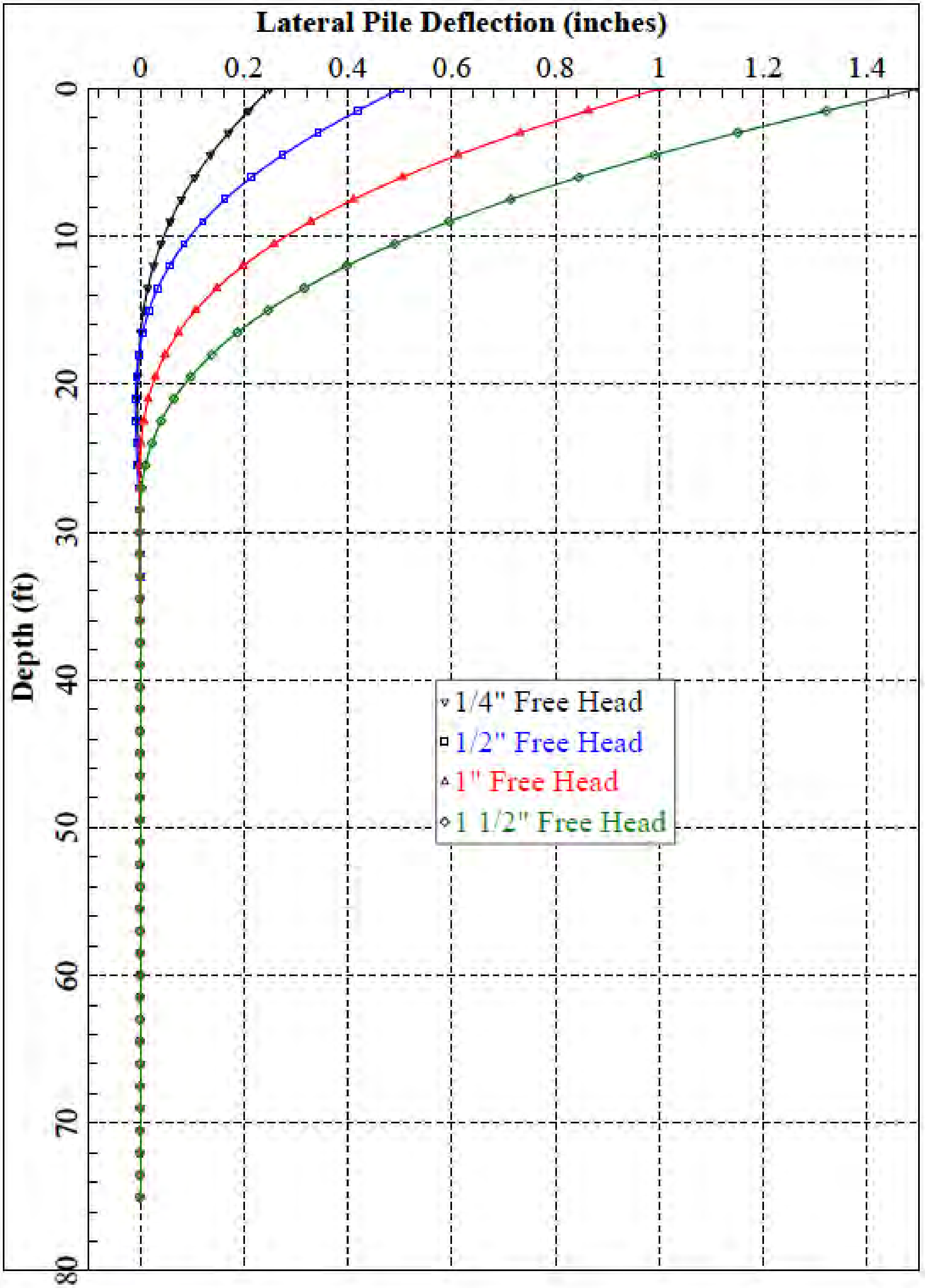
Figure 17



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 37 feet, East Side of Building

UW ICA Basketball Center
Seattle, Washington

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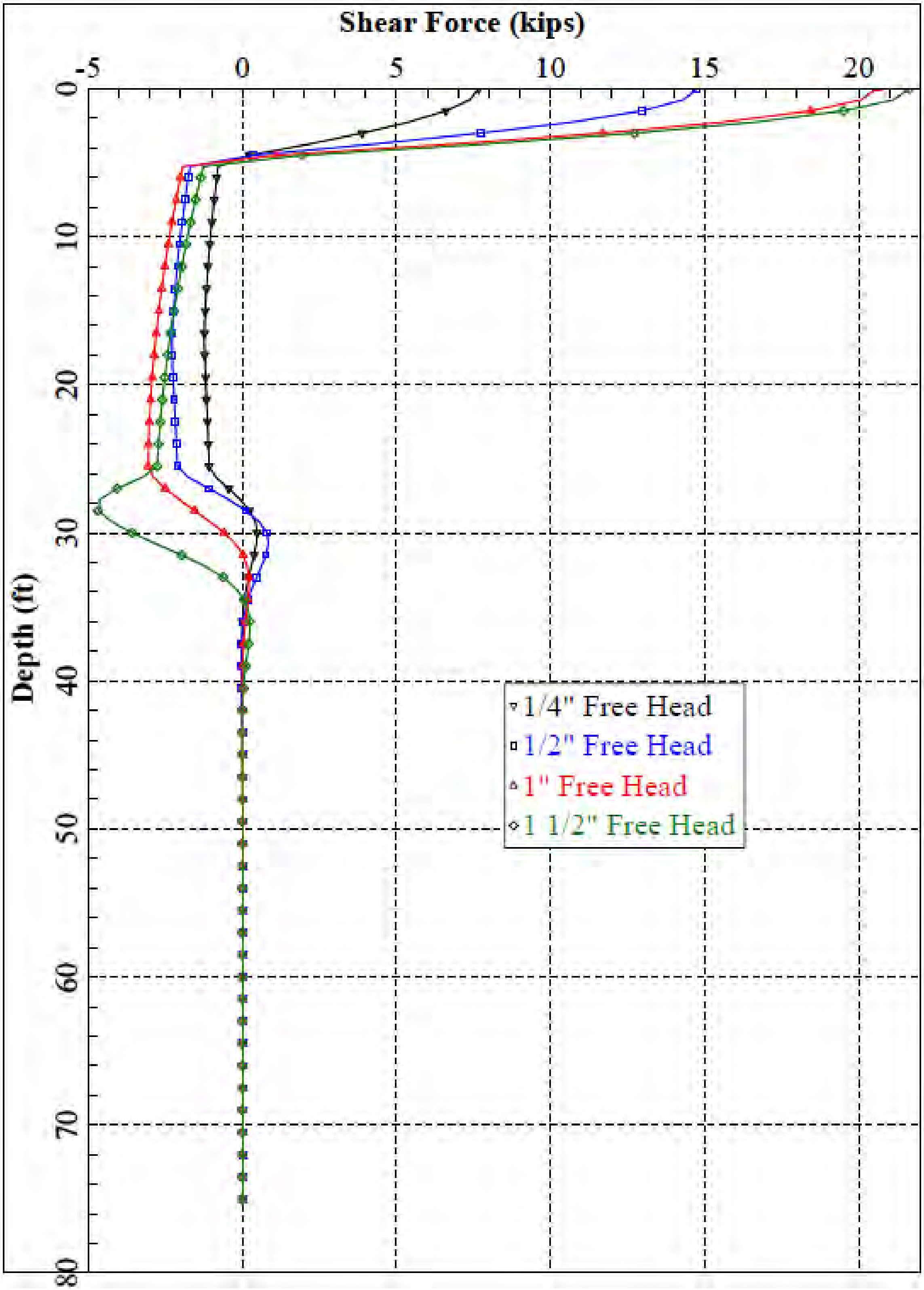
Figure 18



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 37 feet, East Side of Building

UW ICA Basketball Center
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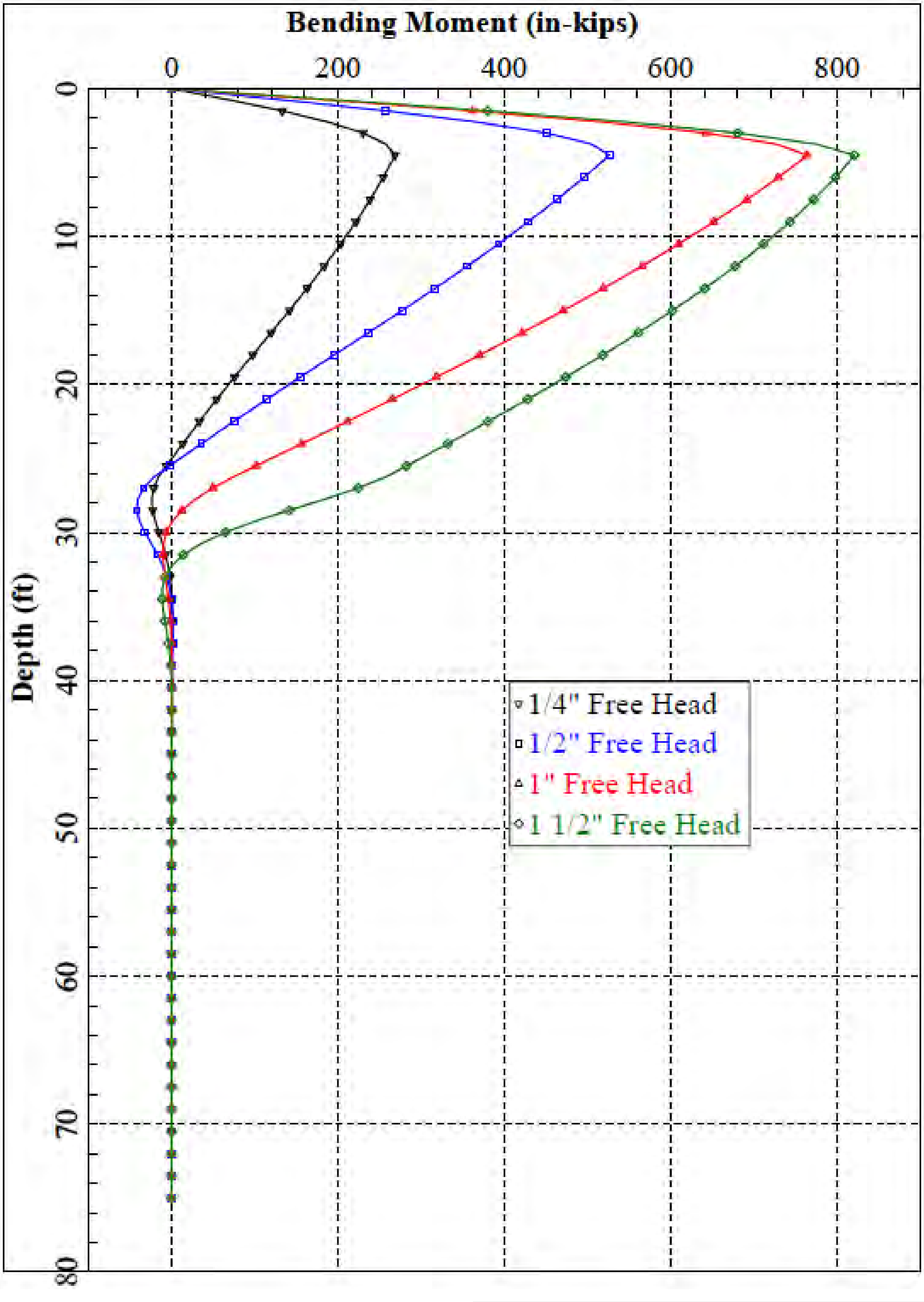
Figure 19



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 37 feet, East Side of Building

UW ICA Basketball Center
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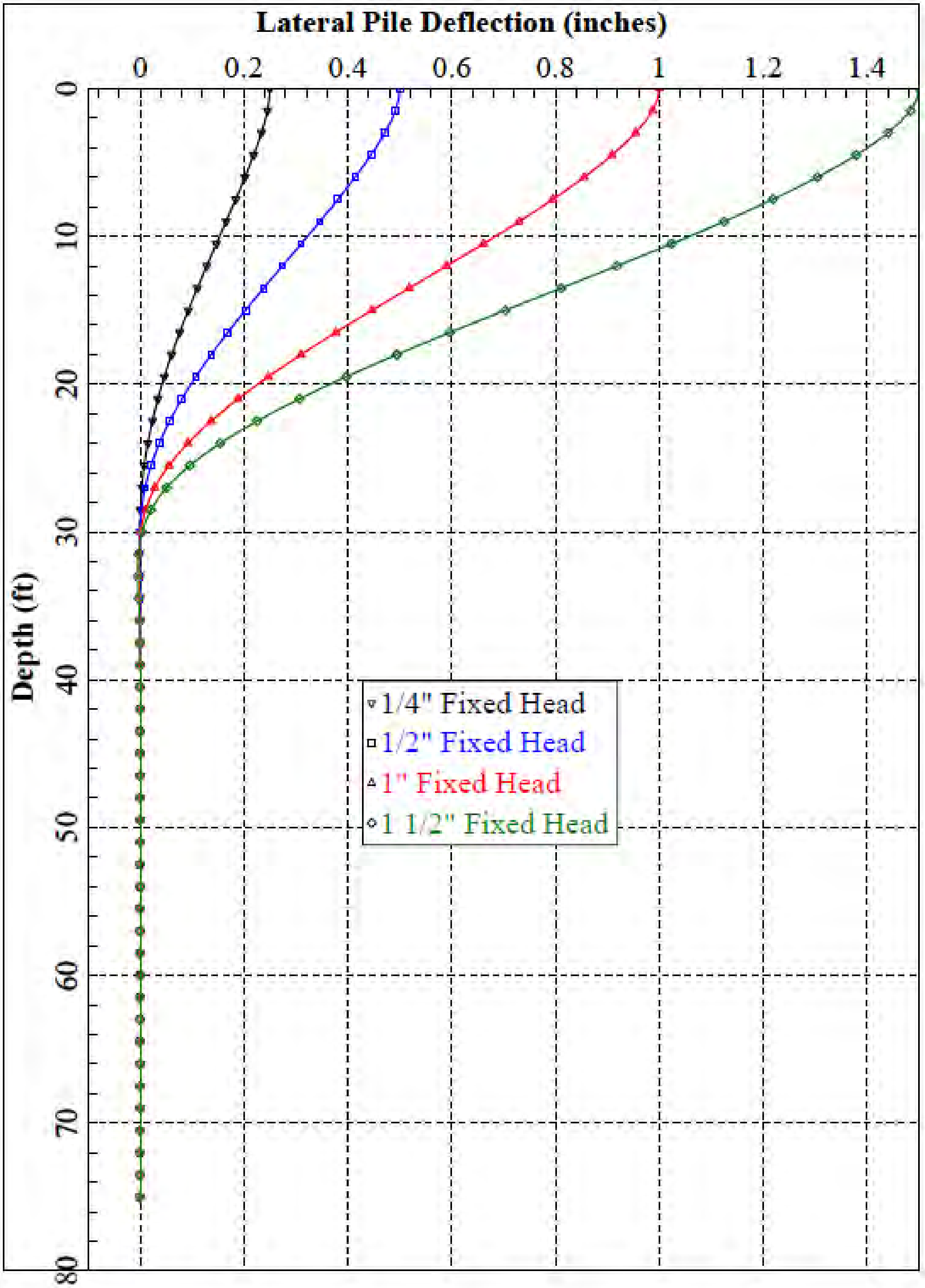
Figure 20



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019
2. Free- and 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 (Fixed Head)
LFF at 37 feet, East Side of Building

UW ICA Basketball Center
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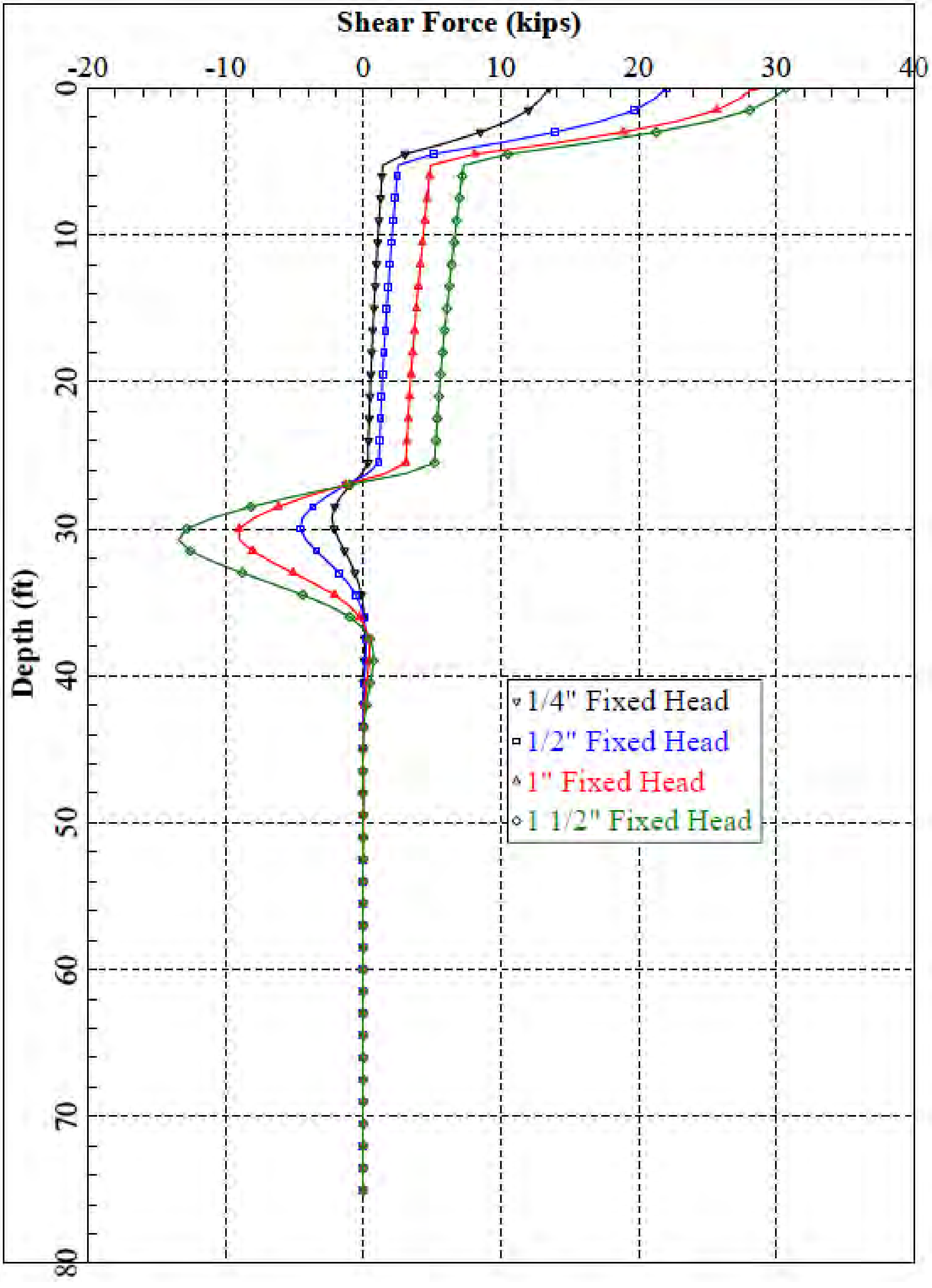
Figure 21



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 37 feet, East Side of Building

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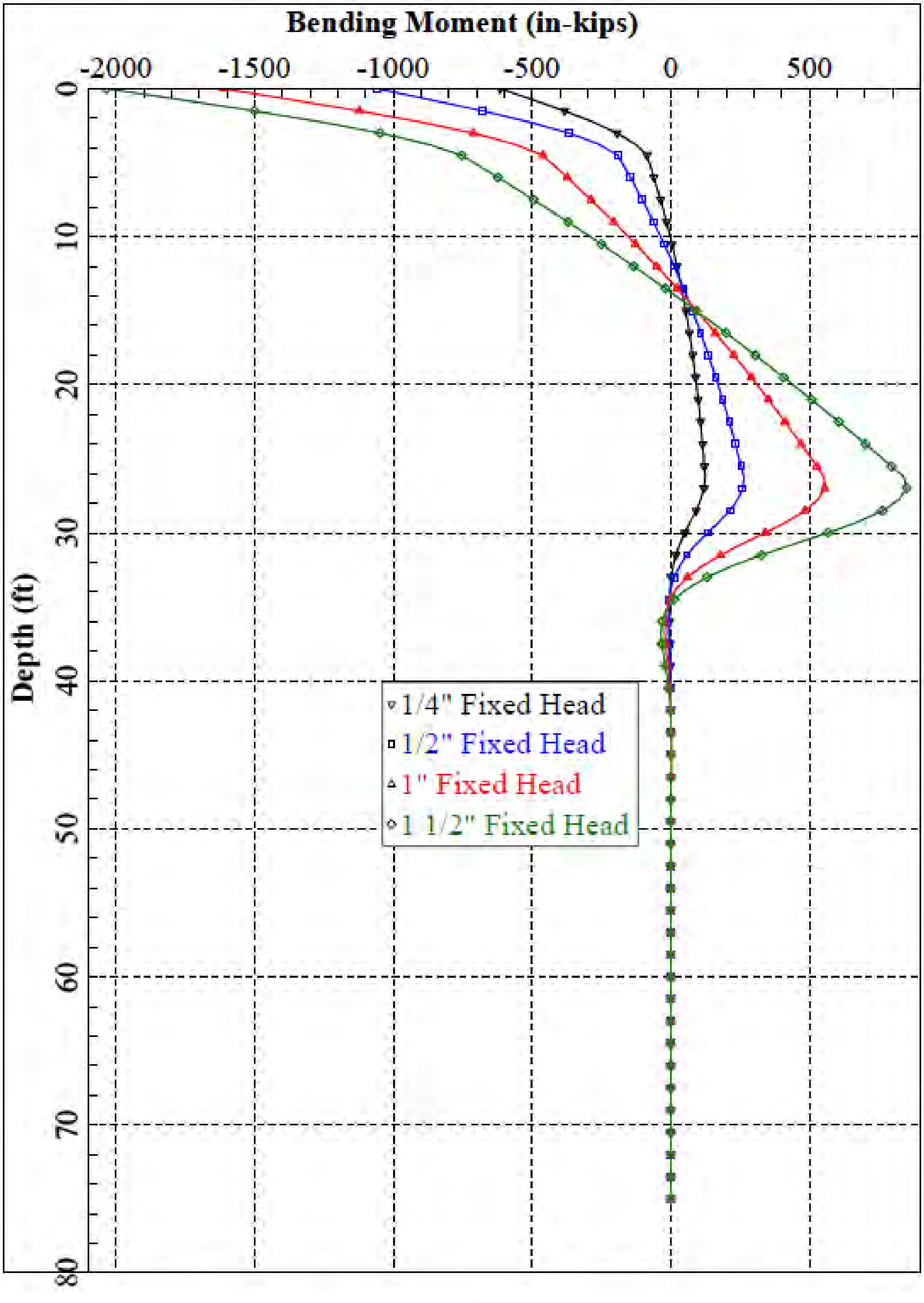
Figure 22



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 37 feet, East Side of Building

UW ICA Basketball Center
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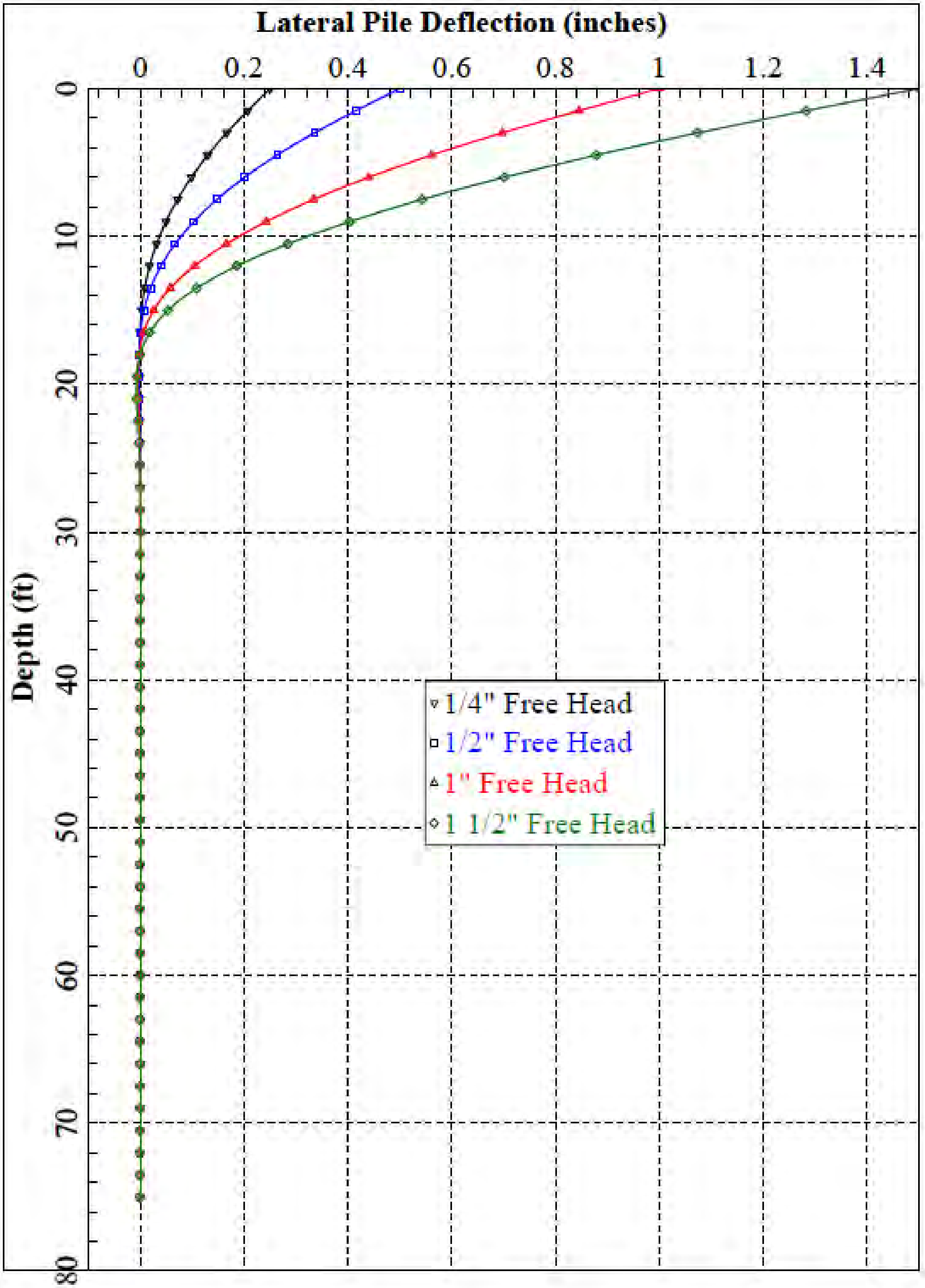
Figure 23



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
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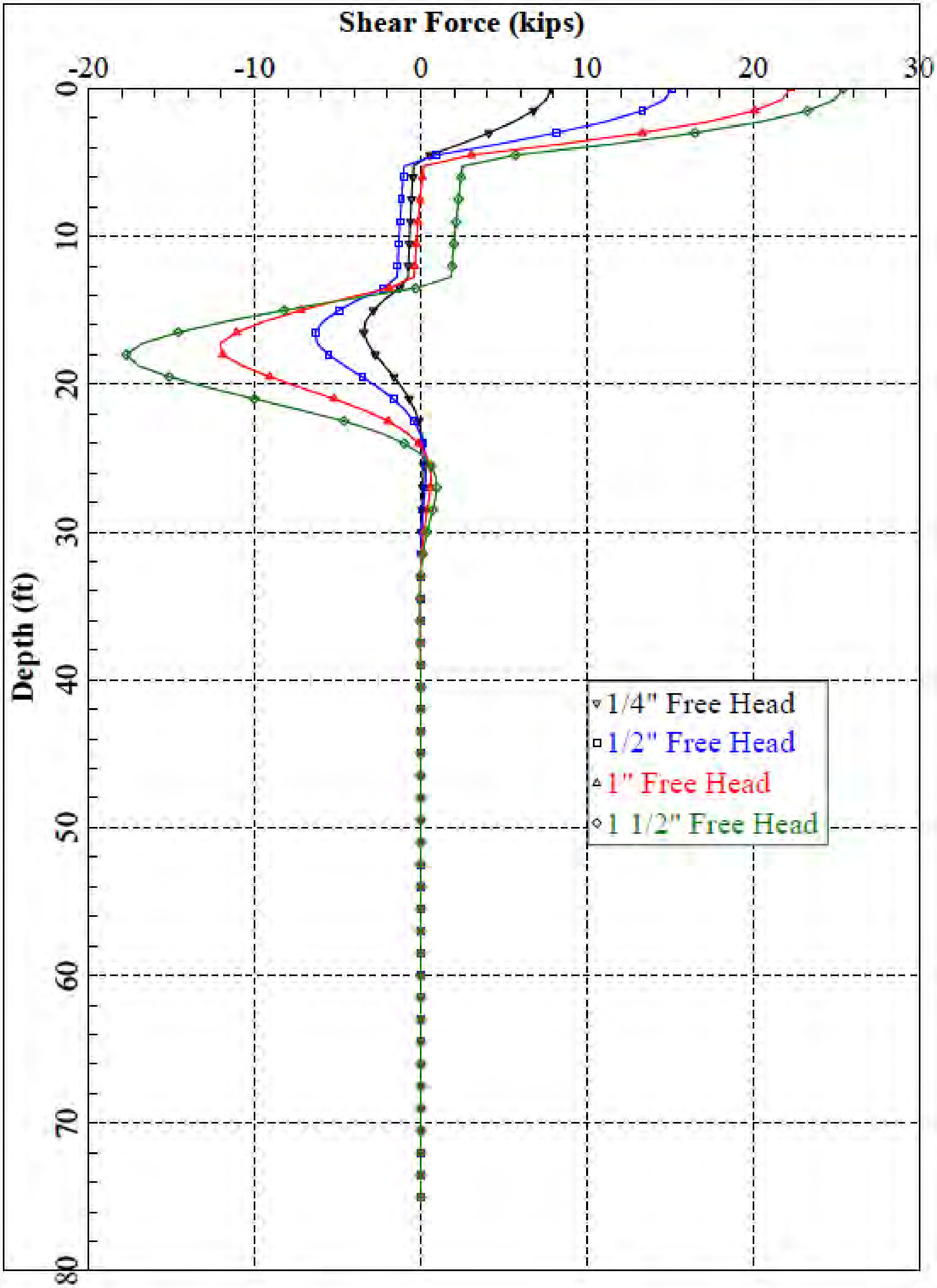
Figure 24



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
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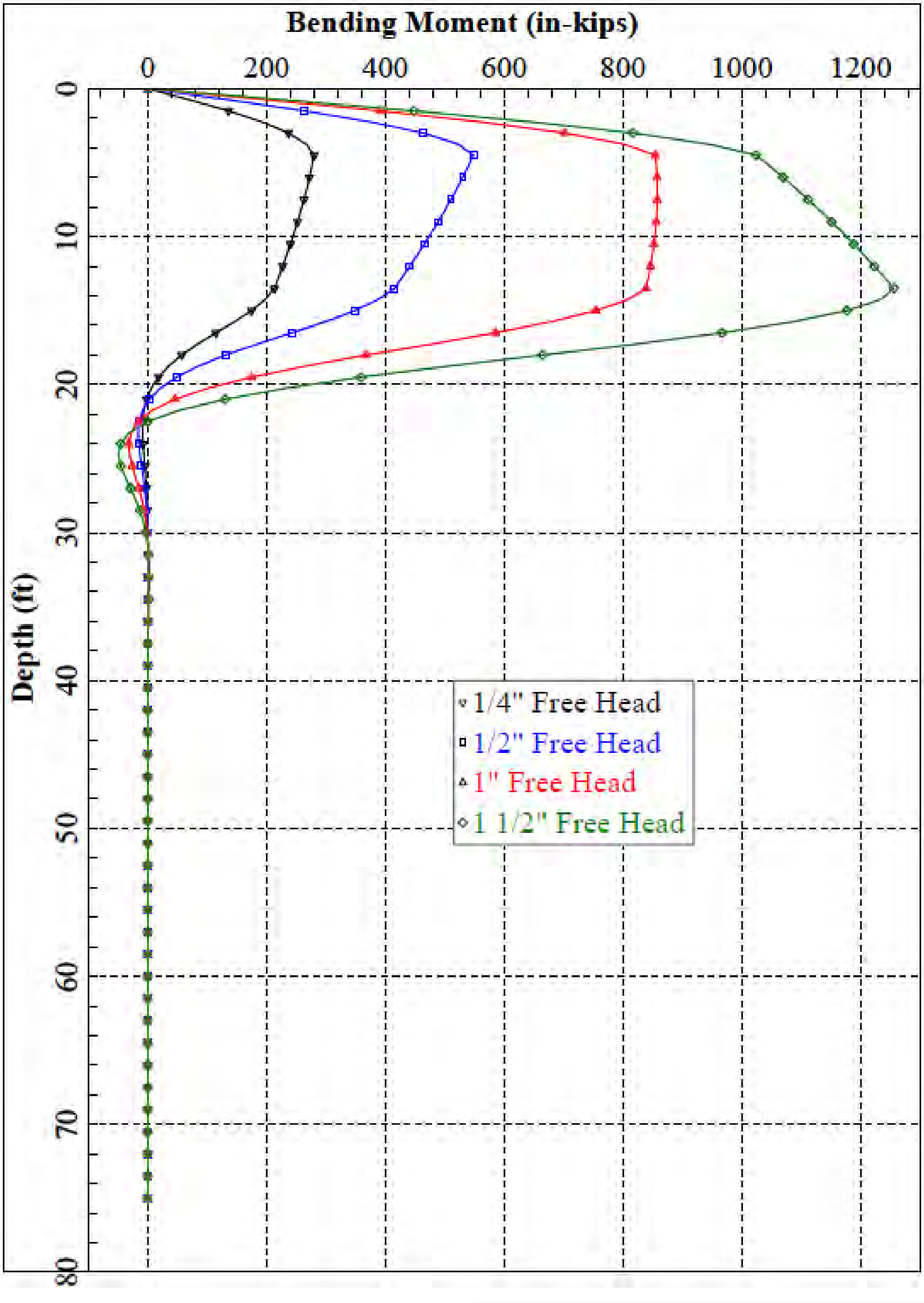
Figure 25



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Free Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
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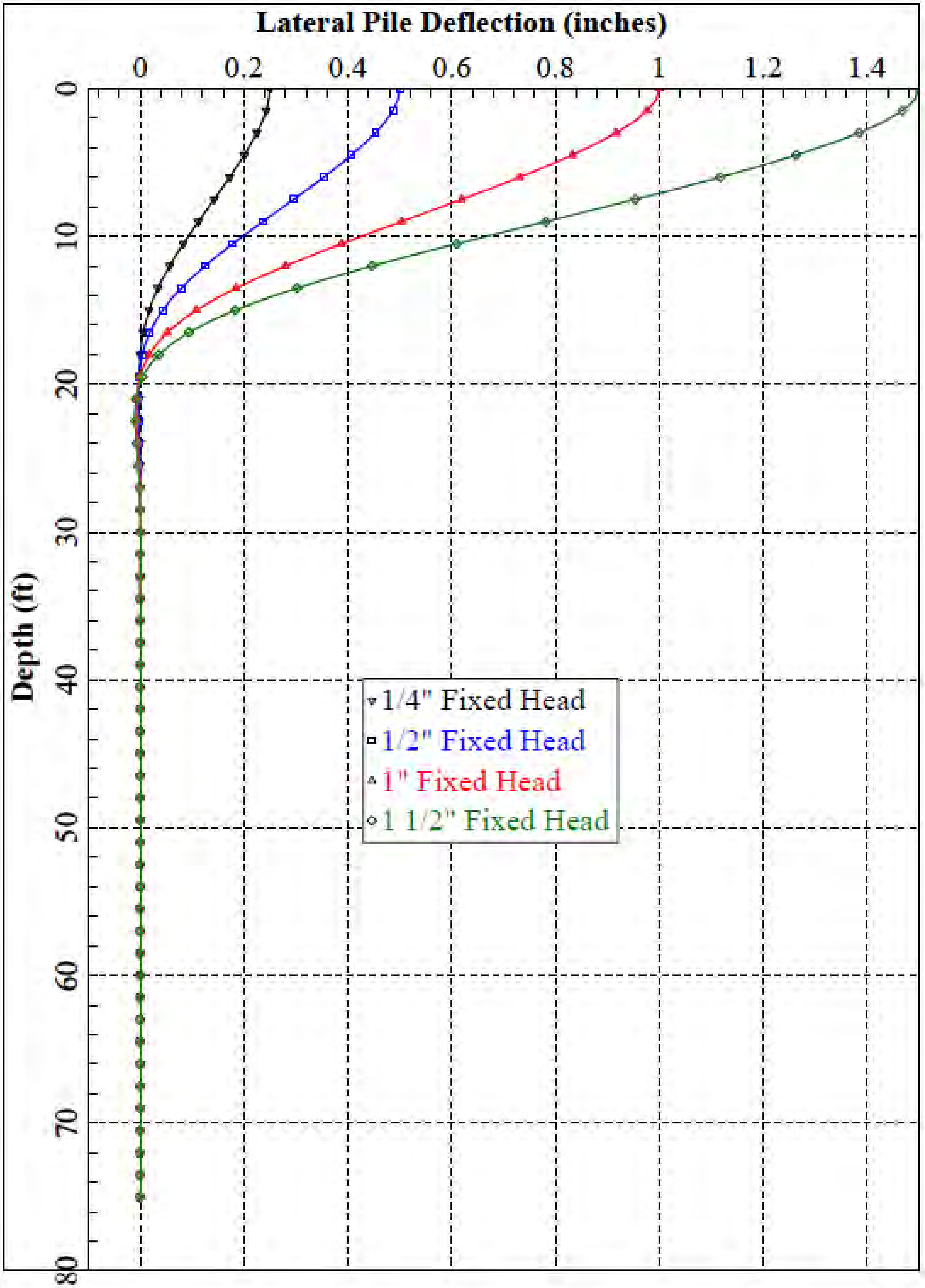
Figure 26



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
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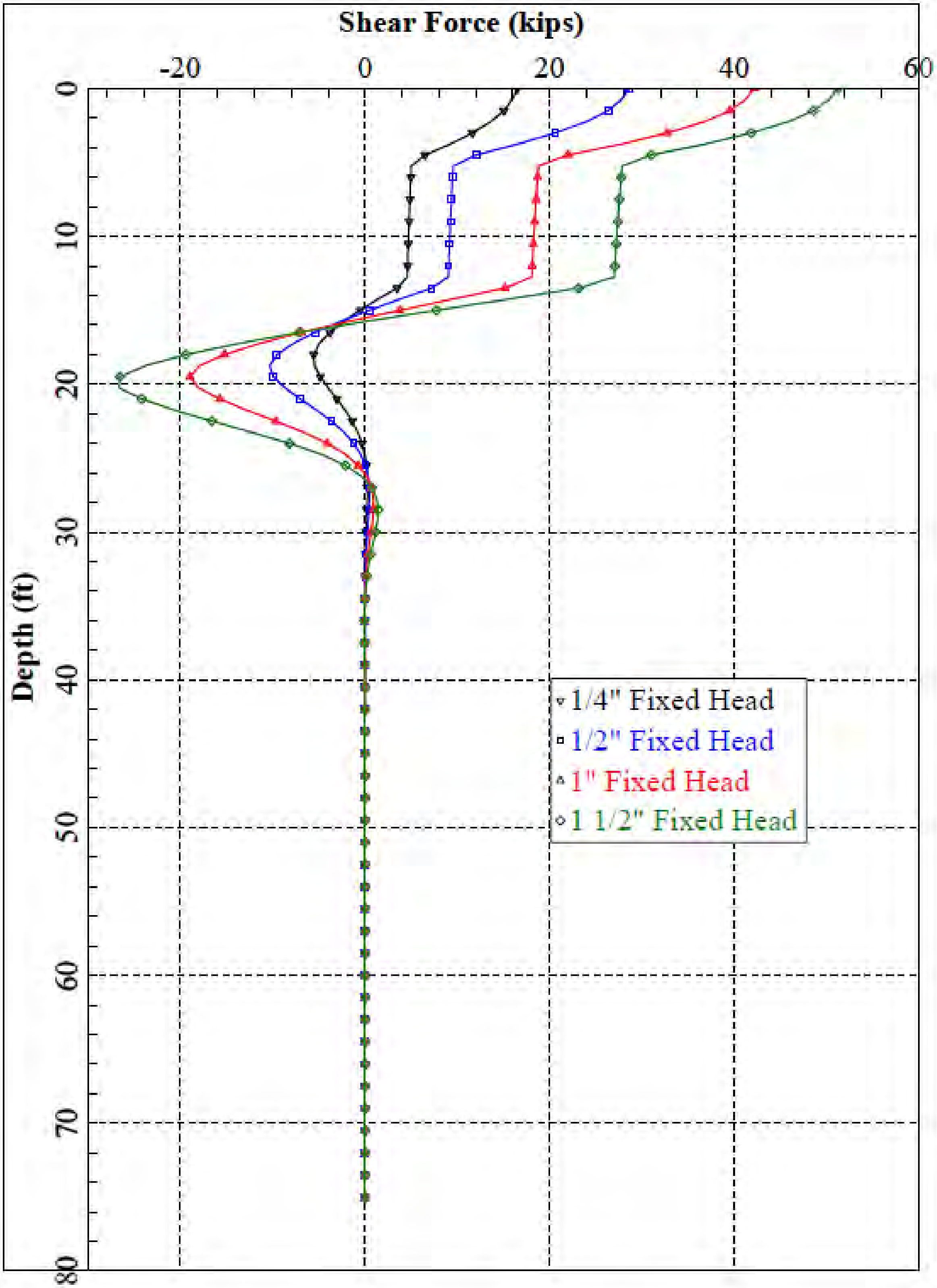
Figure 27



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
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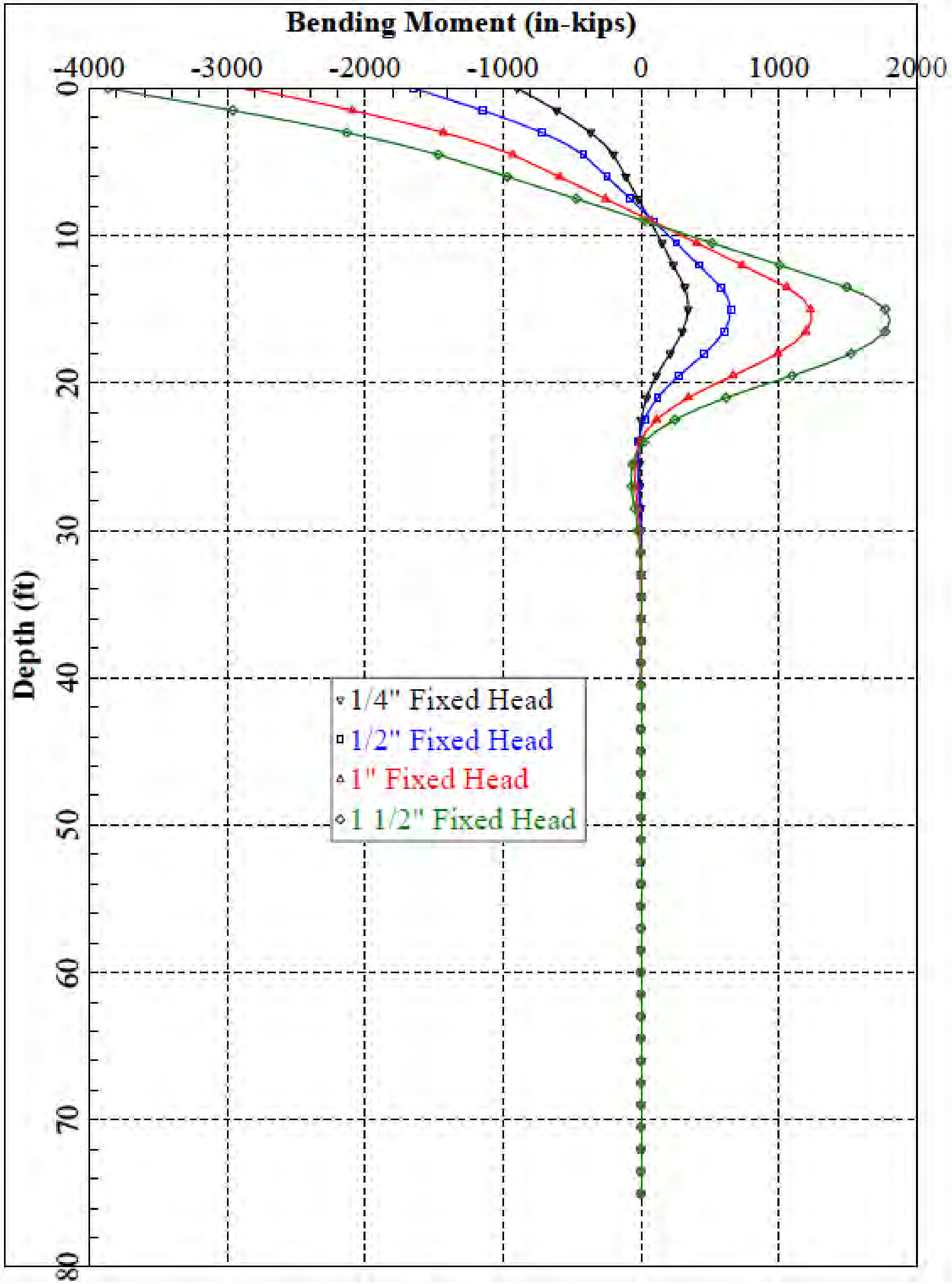
Figure 28



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

2. Free- and 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 (Fixed Head)
LFF at 37 feet, West Side of Building

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Figure 29

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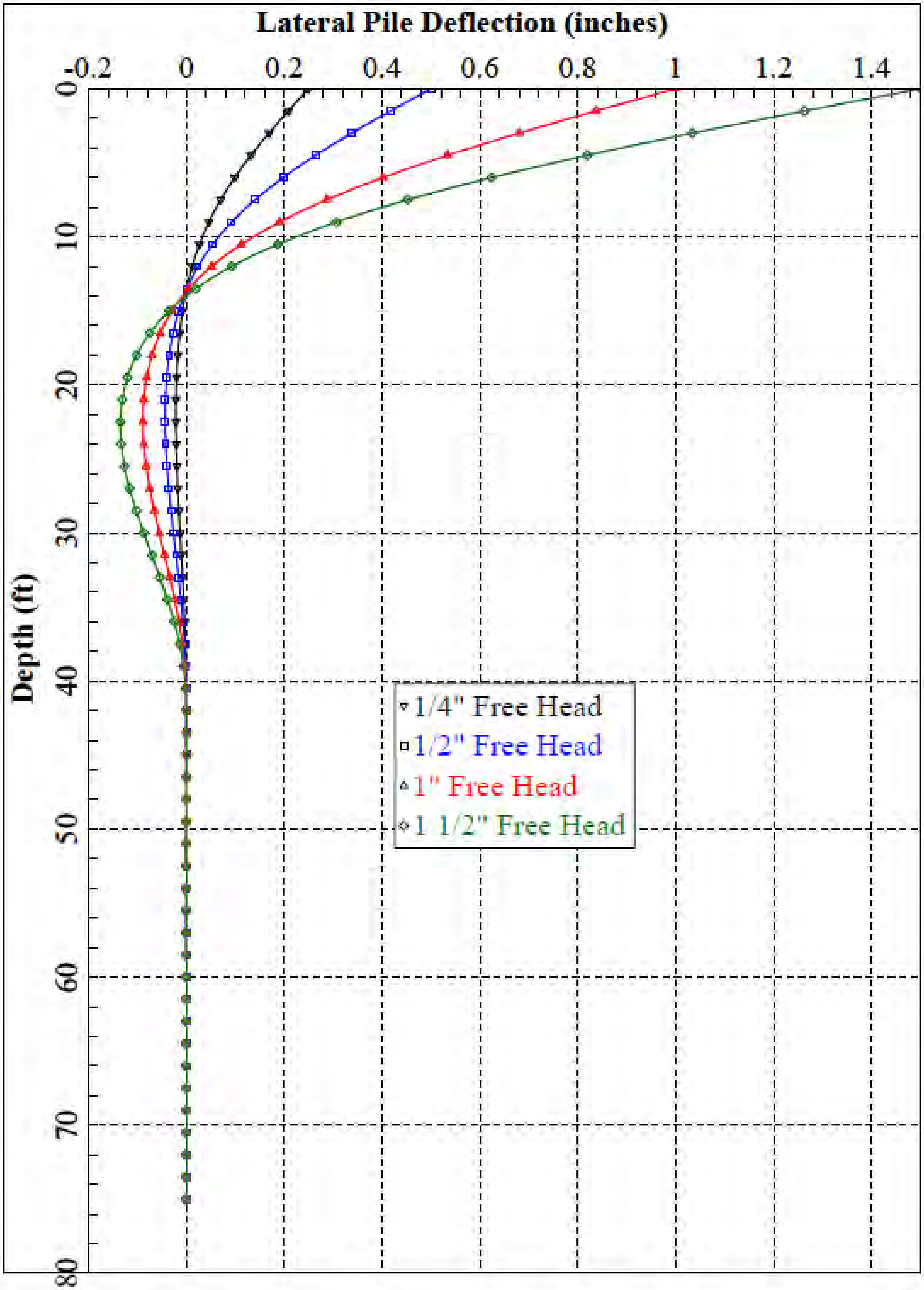

Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Deflection vs Depth (Free Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
Seattle, Washington

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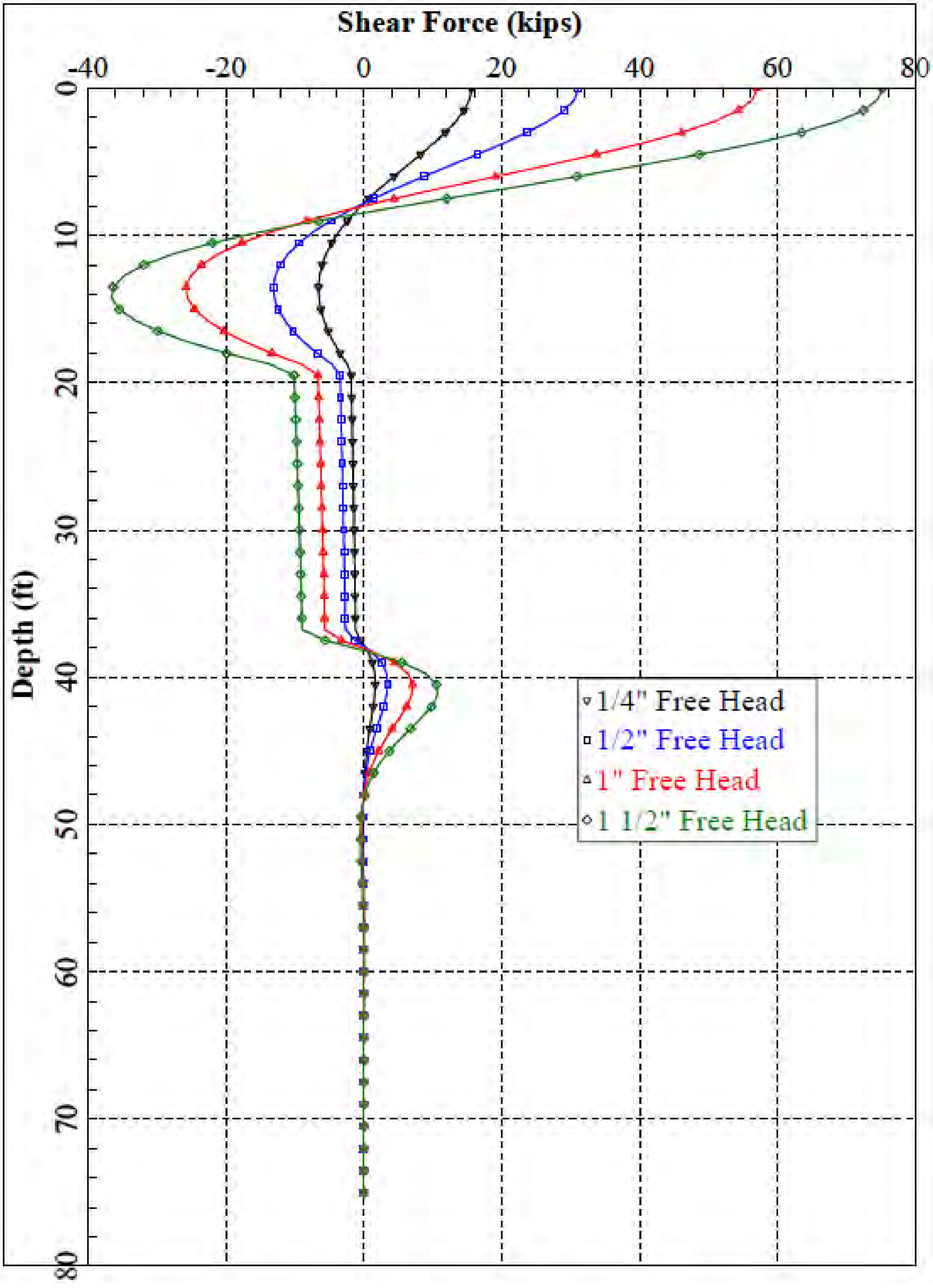
Figure 30



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Shear vs Depth (Free Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
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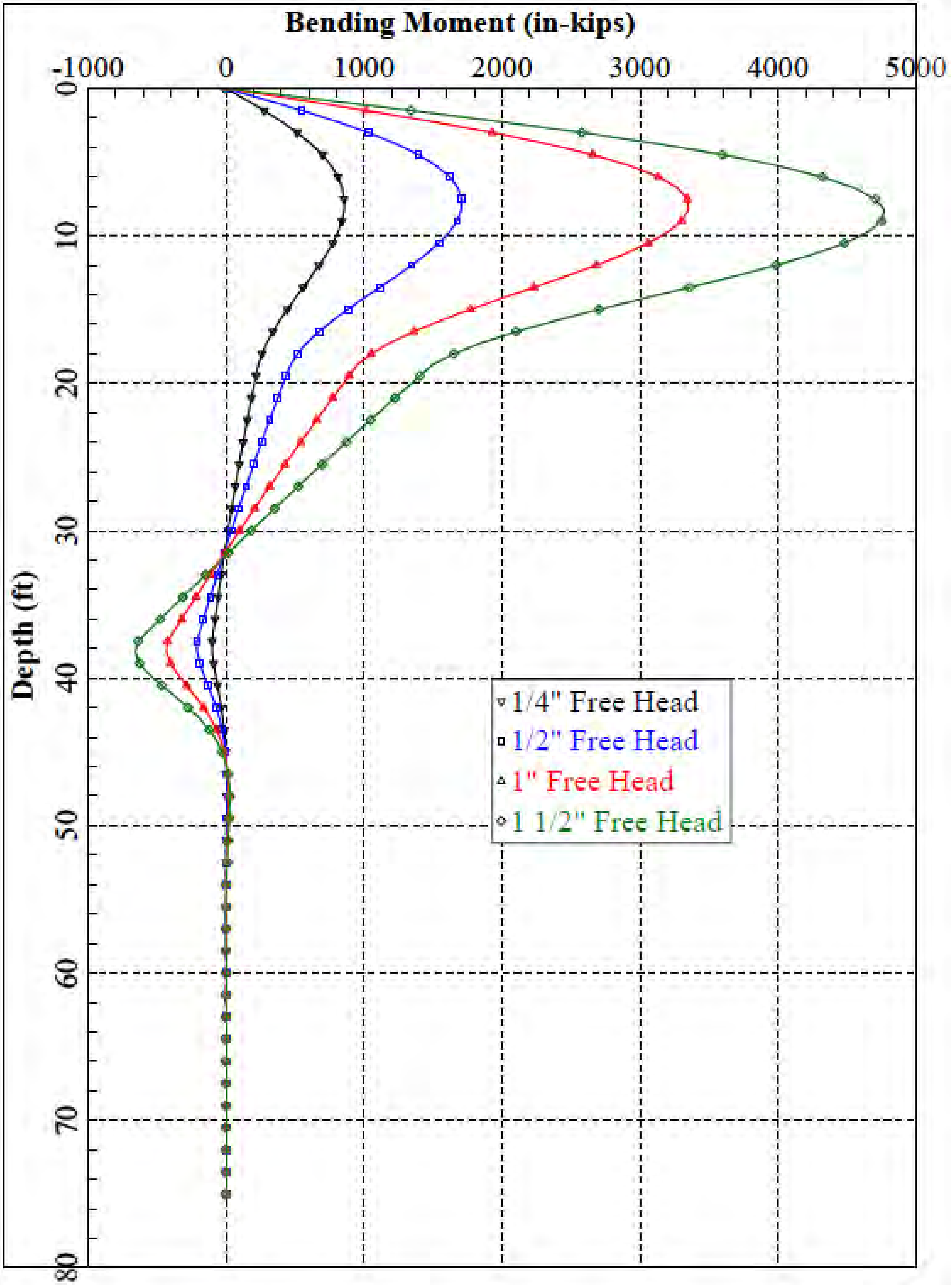
Figure 31



0183-144-00 Date Exported: 06/01/22

Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Moment vs Depth (Free Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
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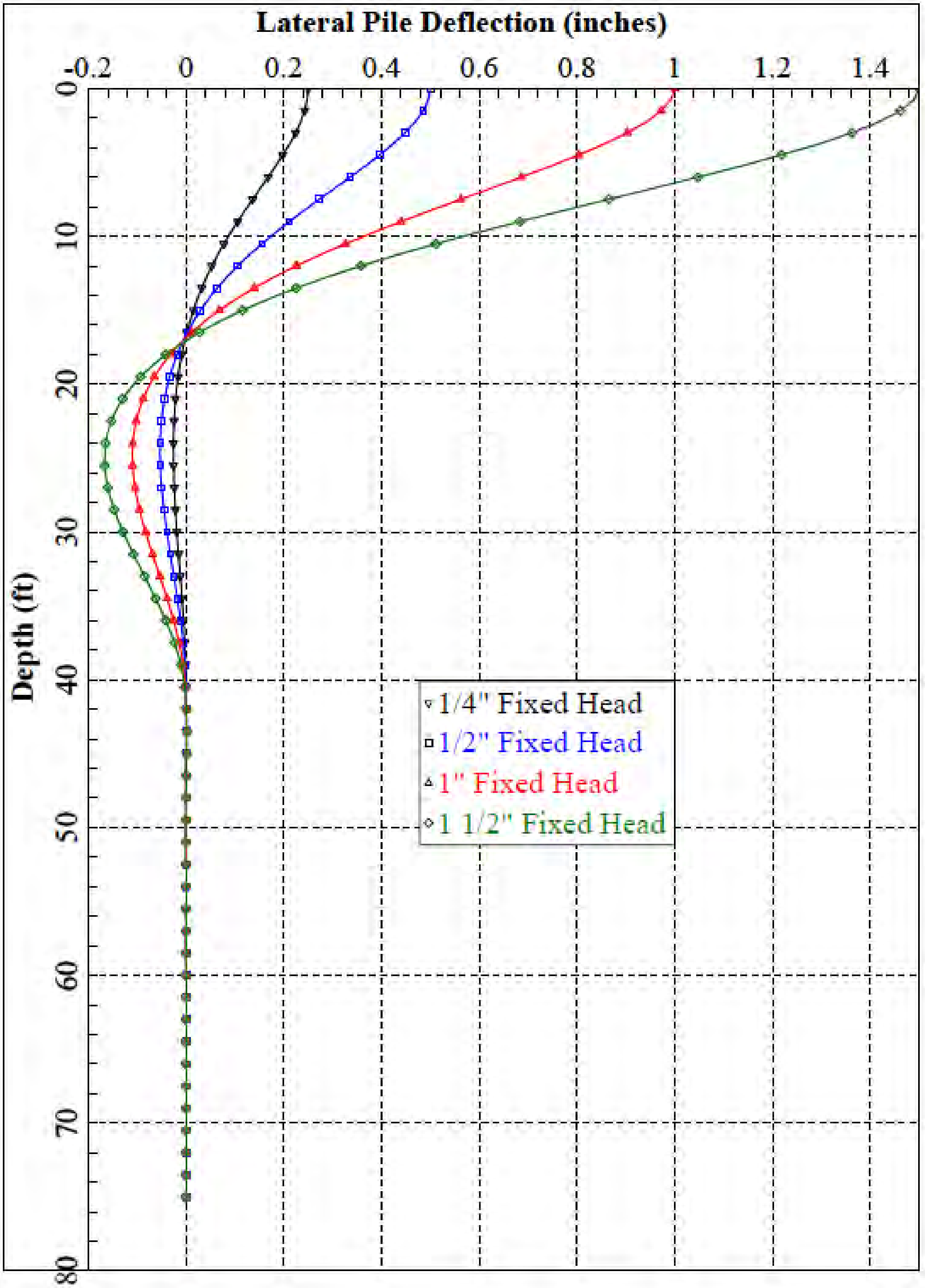
Figure 32



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Deflection vs Depth (Fixed Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
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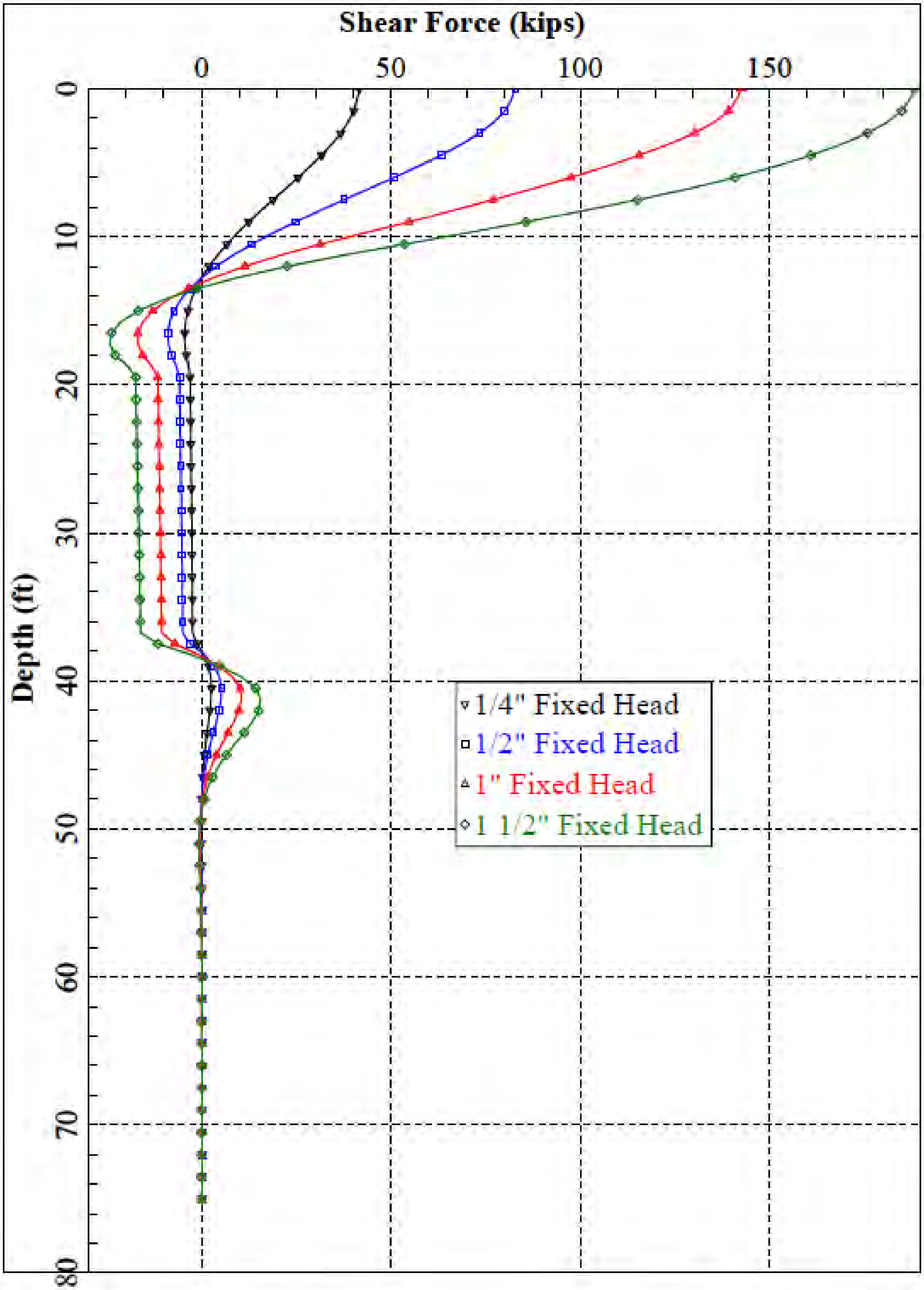
Figure 33



24-inch Augercast Pile
Shear vs Depth (Fixed Head)
LFF at 51 feet, East Side of Building

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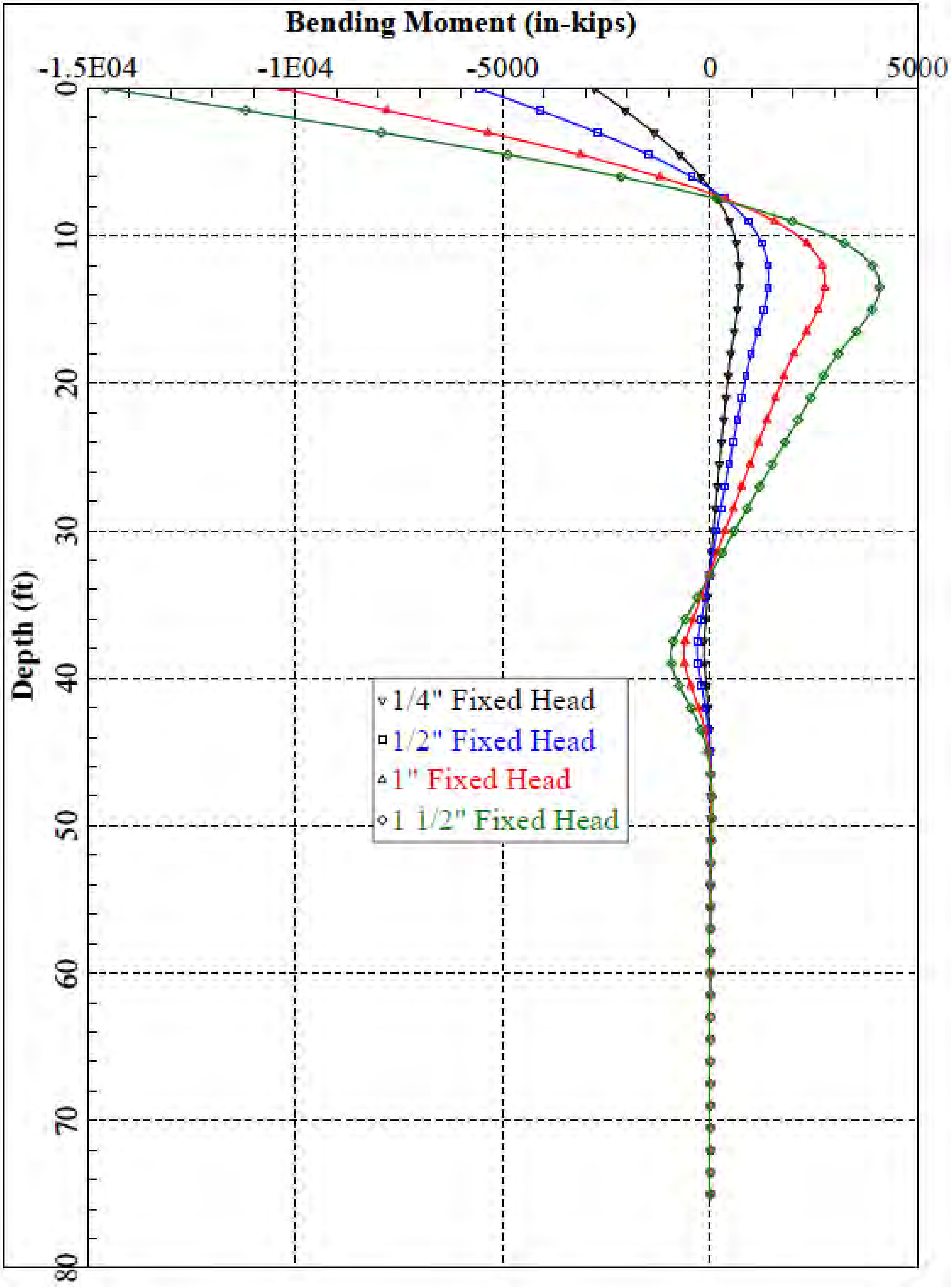
Figure 34

Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Moment vs Depth (Fixed Head)
LFF at 51 feet, East Side of Building

UW ICA Basketball Center
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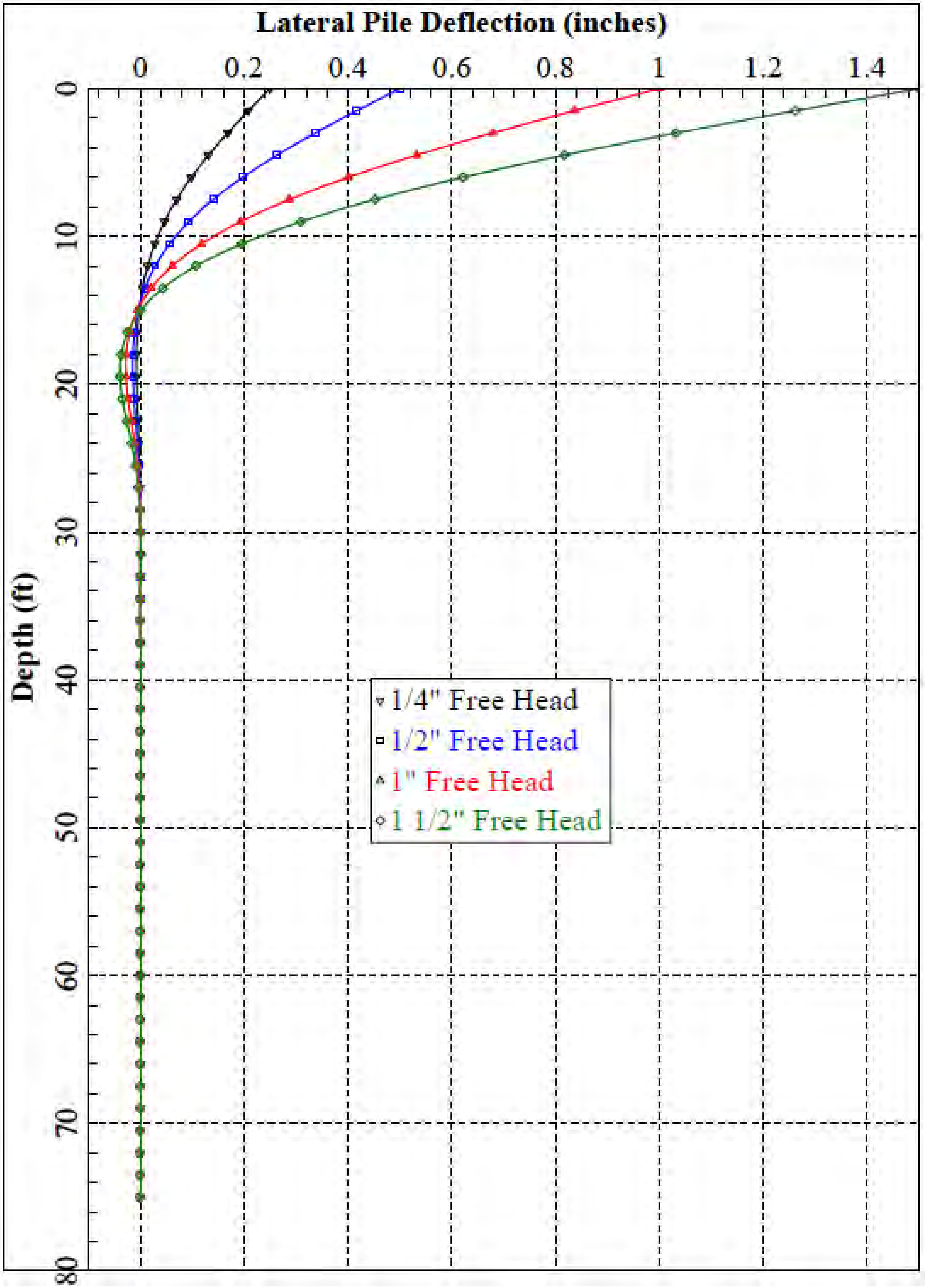
Figure 35



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Deflection vs Depth (Free Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
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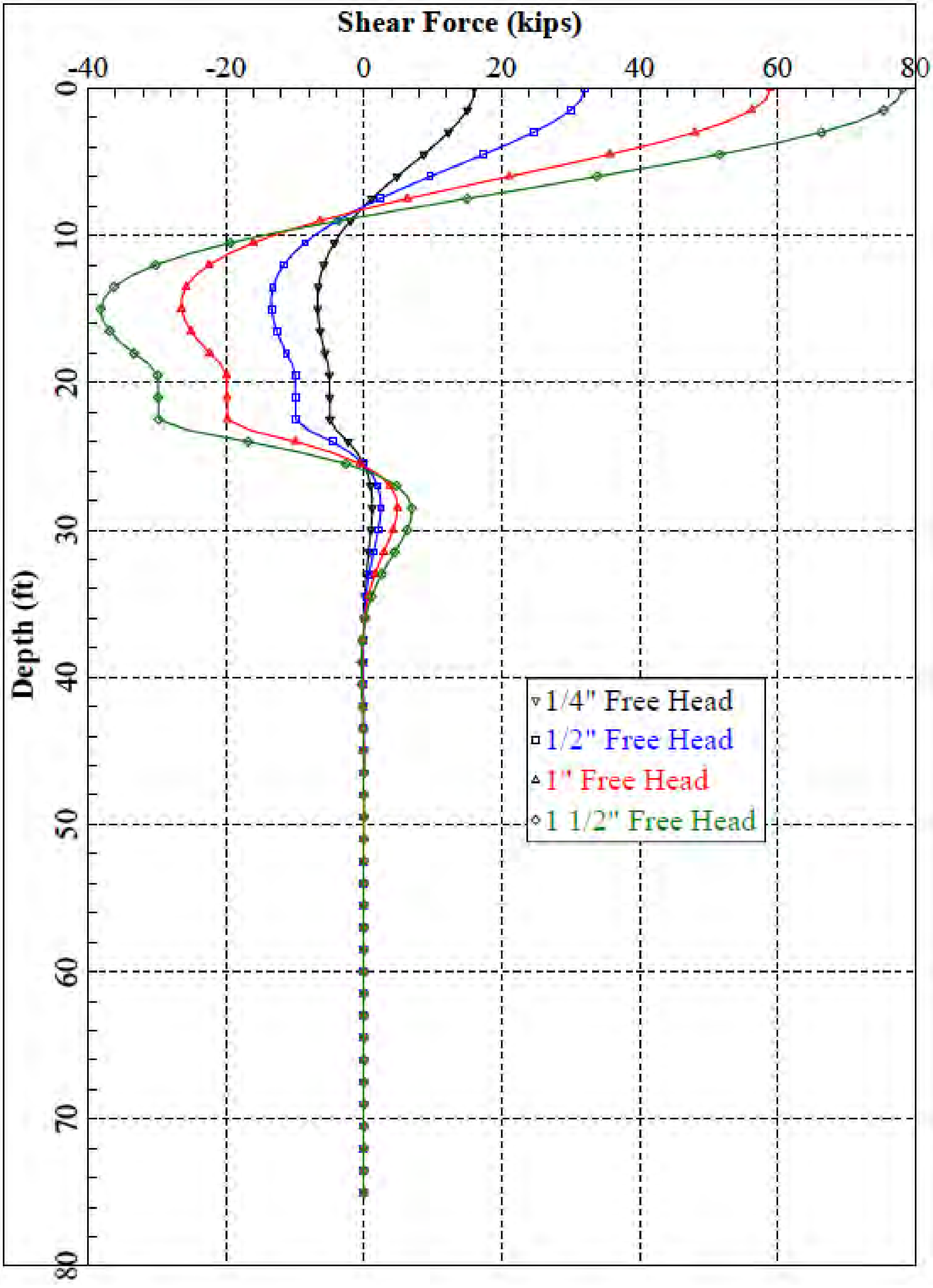
Figure 36



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Shear vs Depth (Free Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
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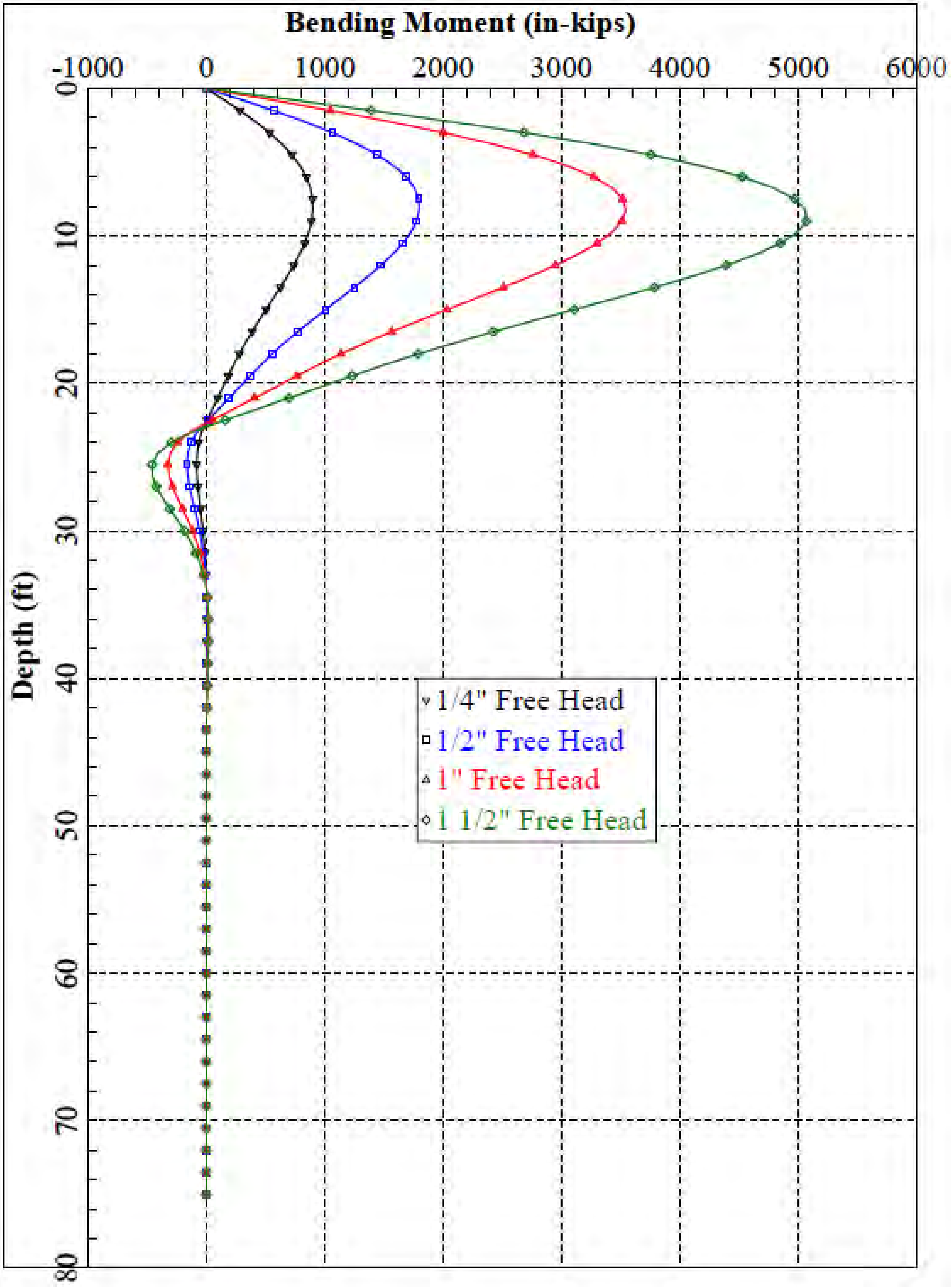
Figure 37



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Moment vs Depth (Free Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
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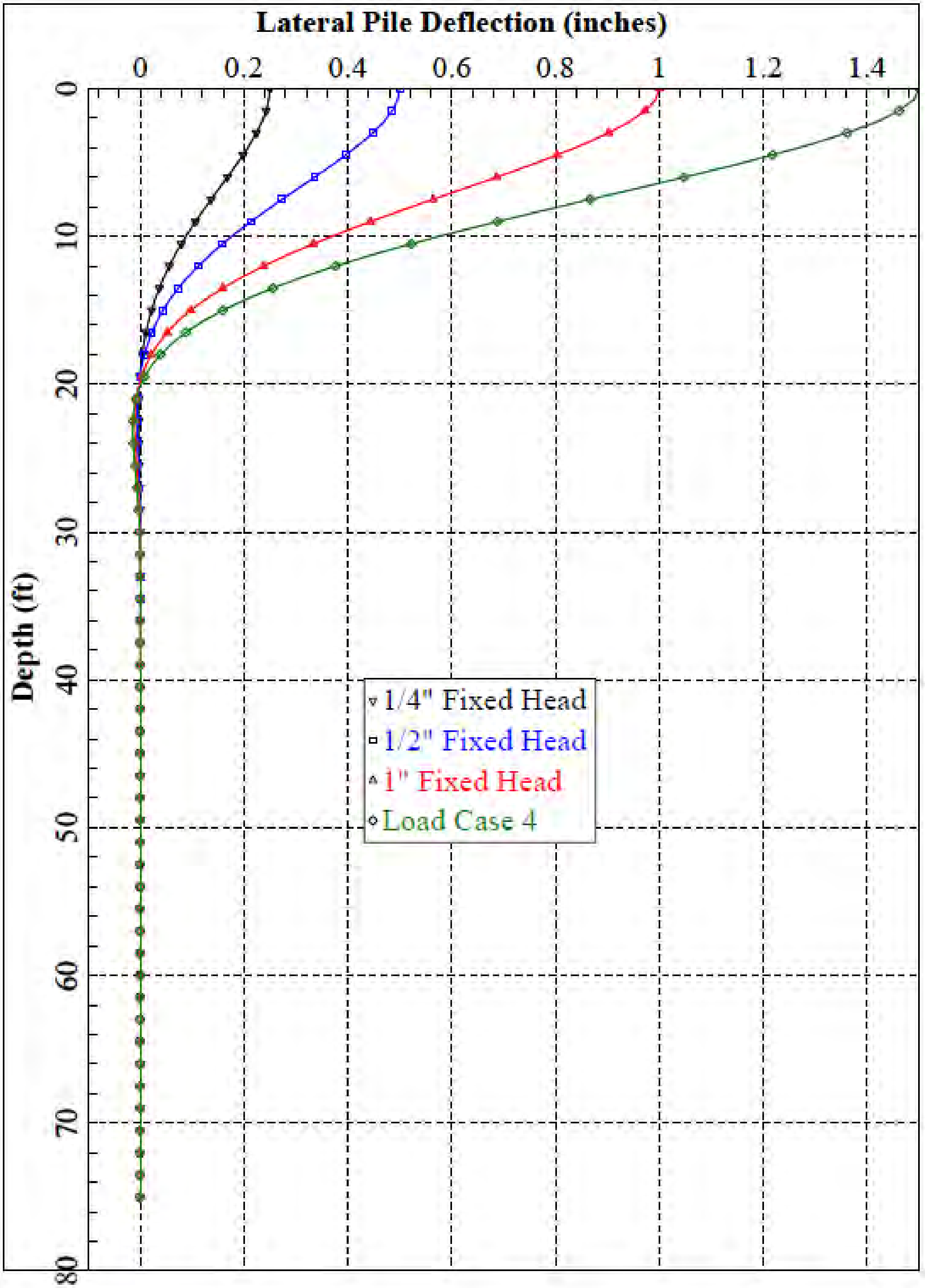
Figure 38



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Deflection vs Depth (Fixed Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
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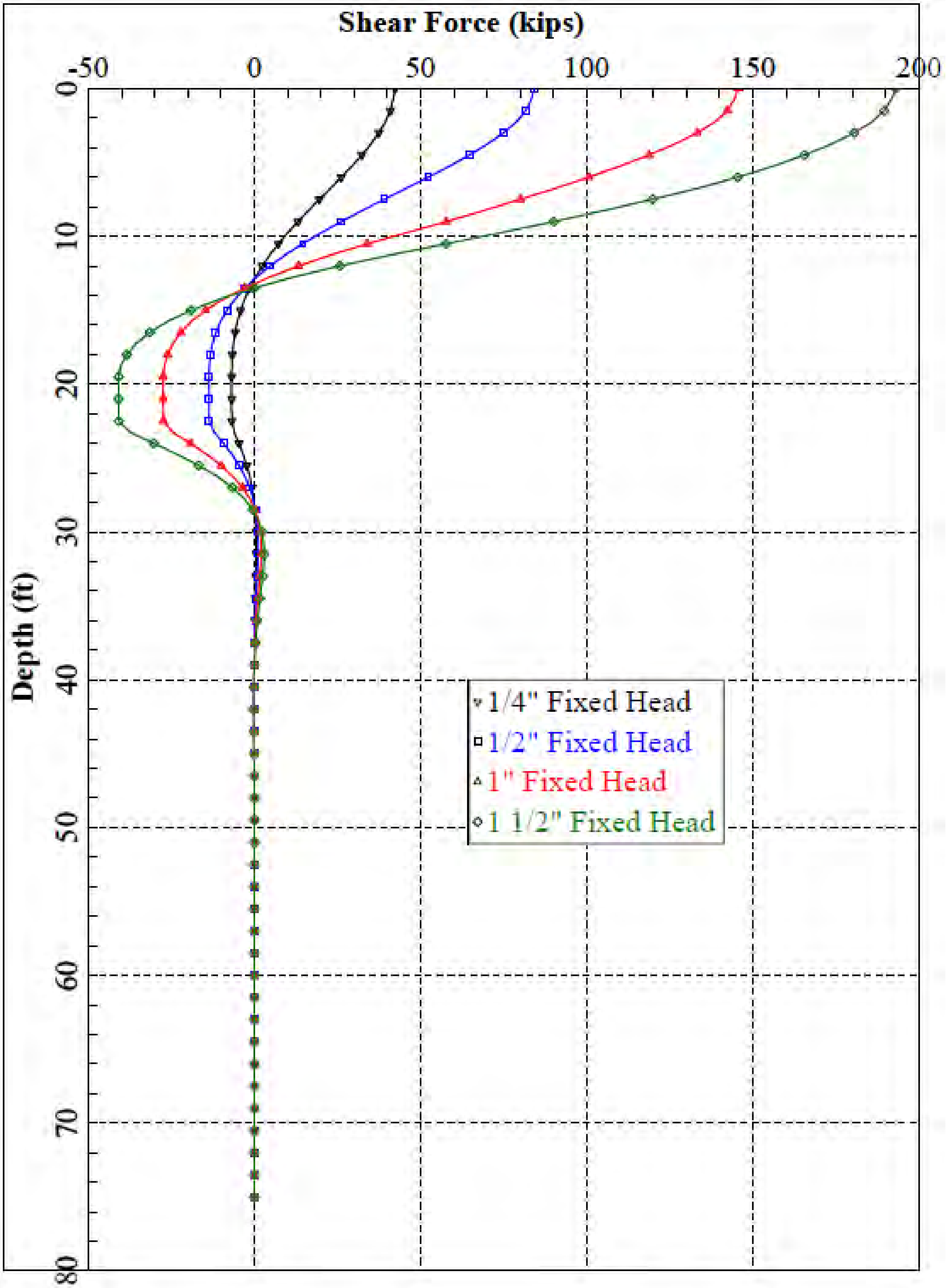
Figure 39



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Shear vs Depth (Fixed Head)
LFF at 51 feet, West Side of Building

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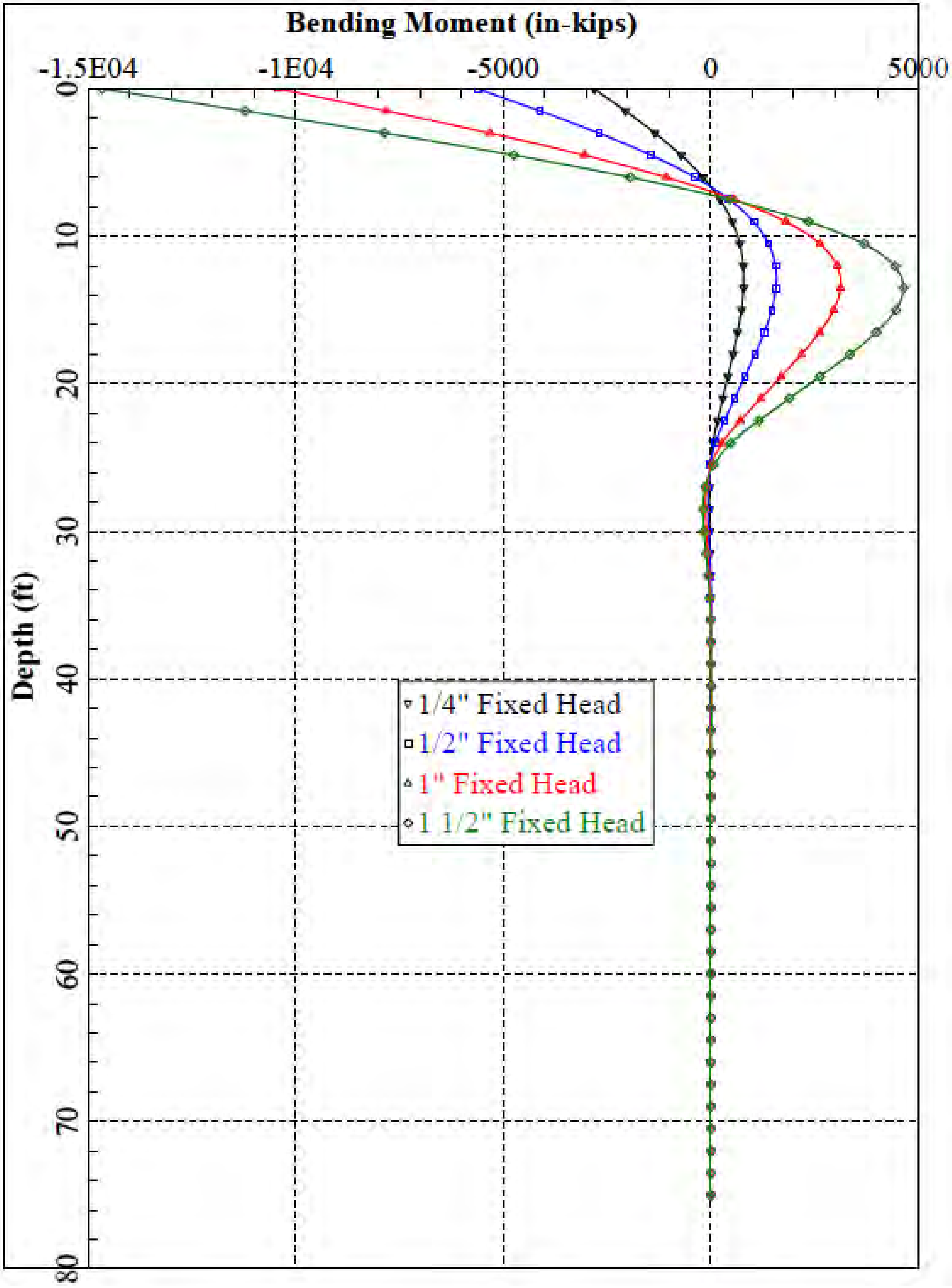
Figure 40



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Moment vs Depth (Fixed Head)
LFF at 51 feet, West Side of Building

UW ICA Basketball Center
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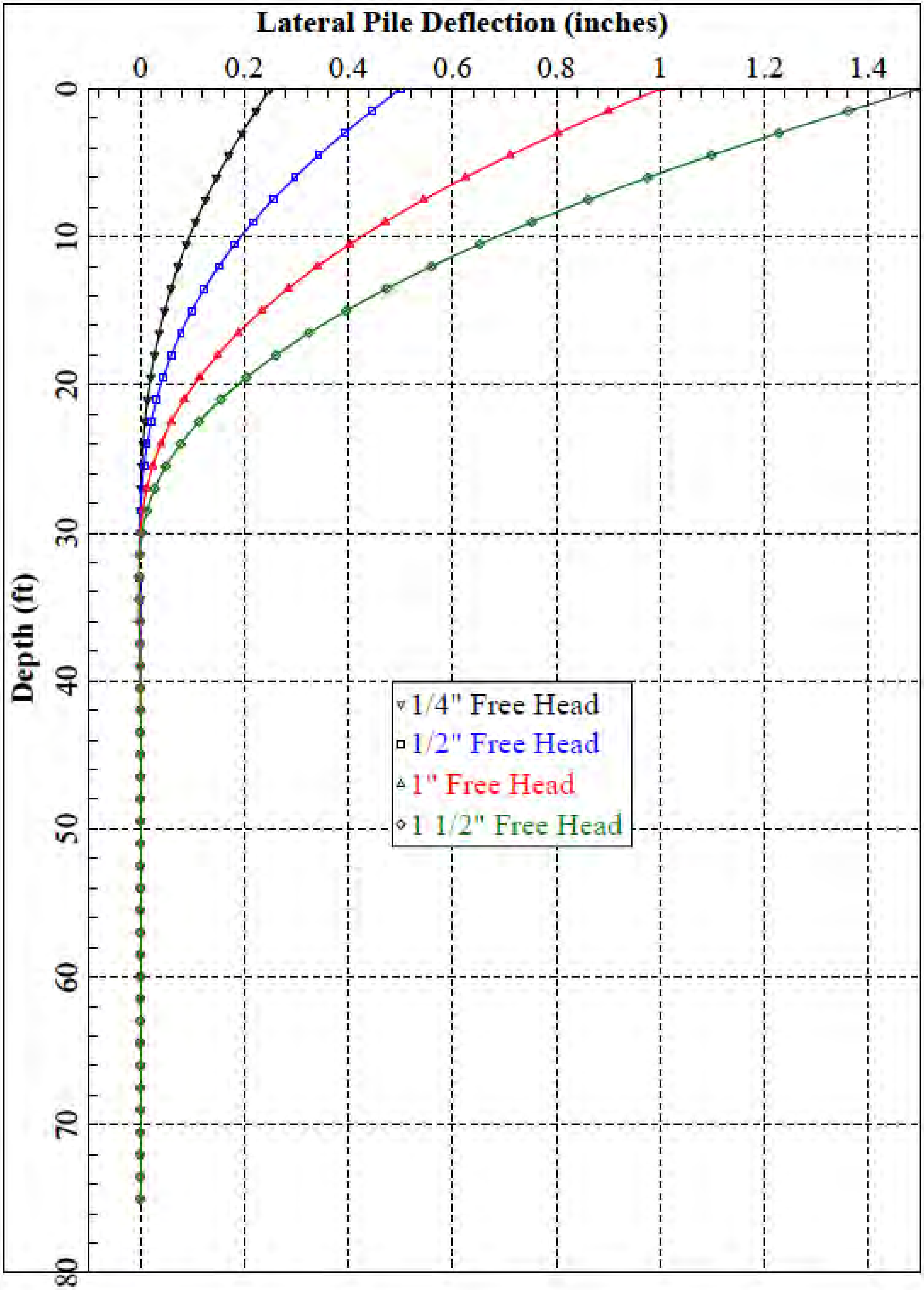
Figure 41



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Deflection vs Depth (Free Head)
LFF at 37 feet, East Side of Building

UW ICA Basketball Center
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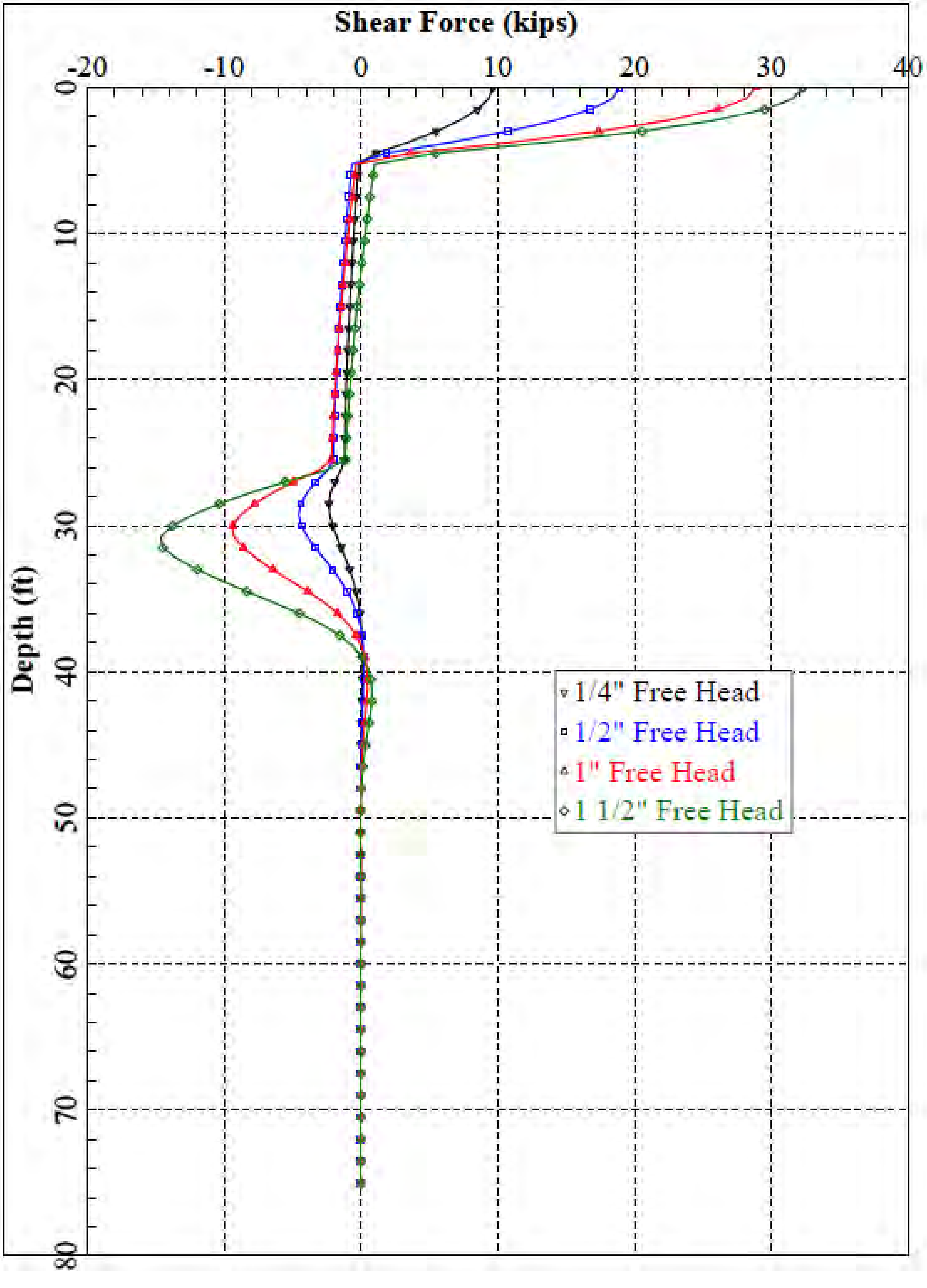
Figure 42



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Shear vs Depth (Free Head)
LFF at 37 feet, East Side of Building

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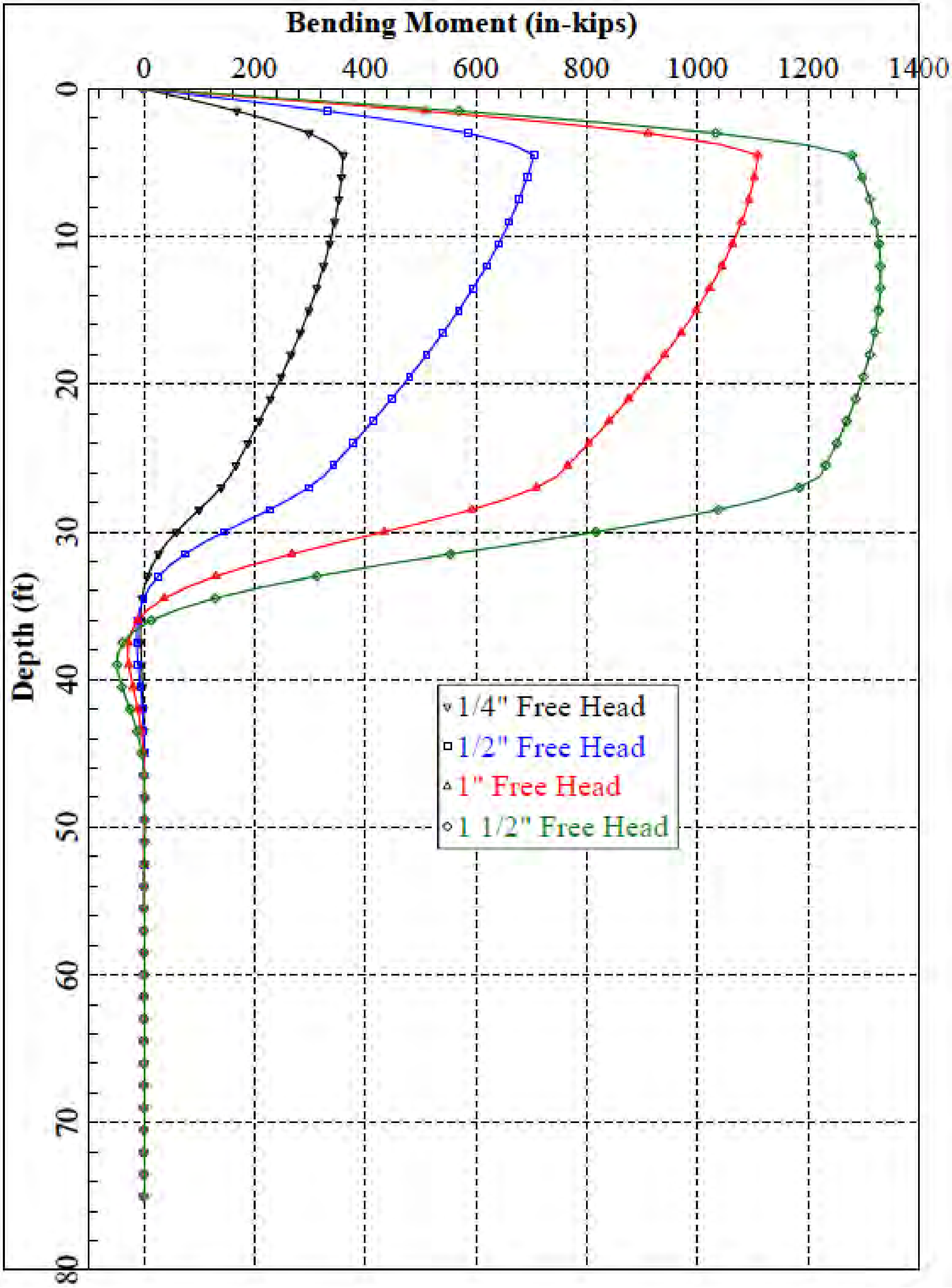
Figure 43



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Moment vs Depth (Free Head)
LFF at 37 feet, East Side of Building

UW ICA Basketball Center
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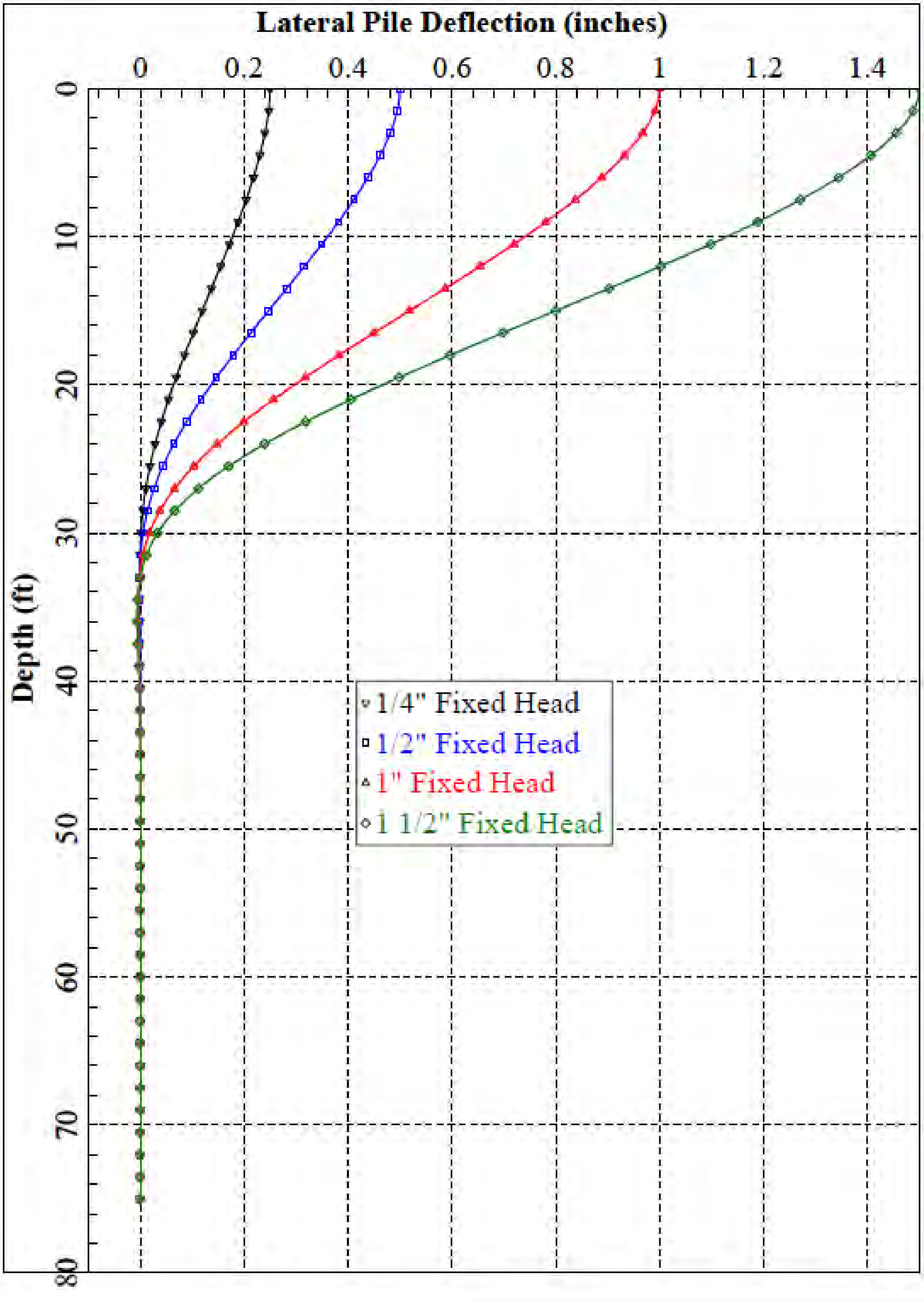
Figure 44



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Deflection vs Depth (Fixed Head)
LFF at 37 feet, East Side of Building

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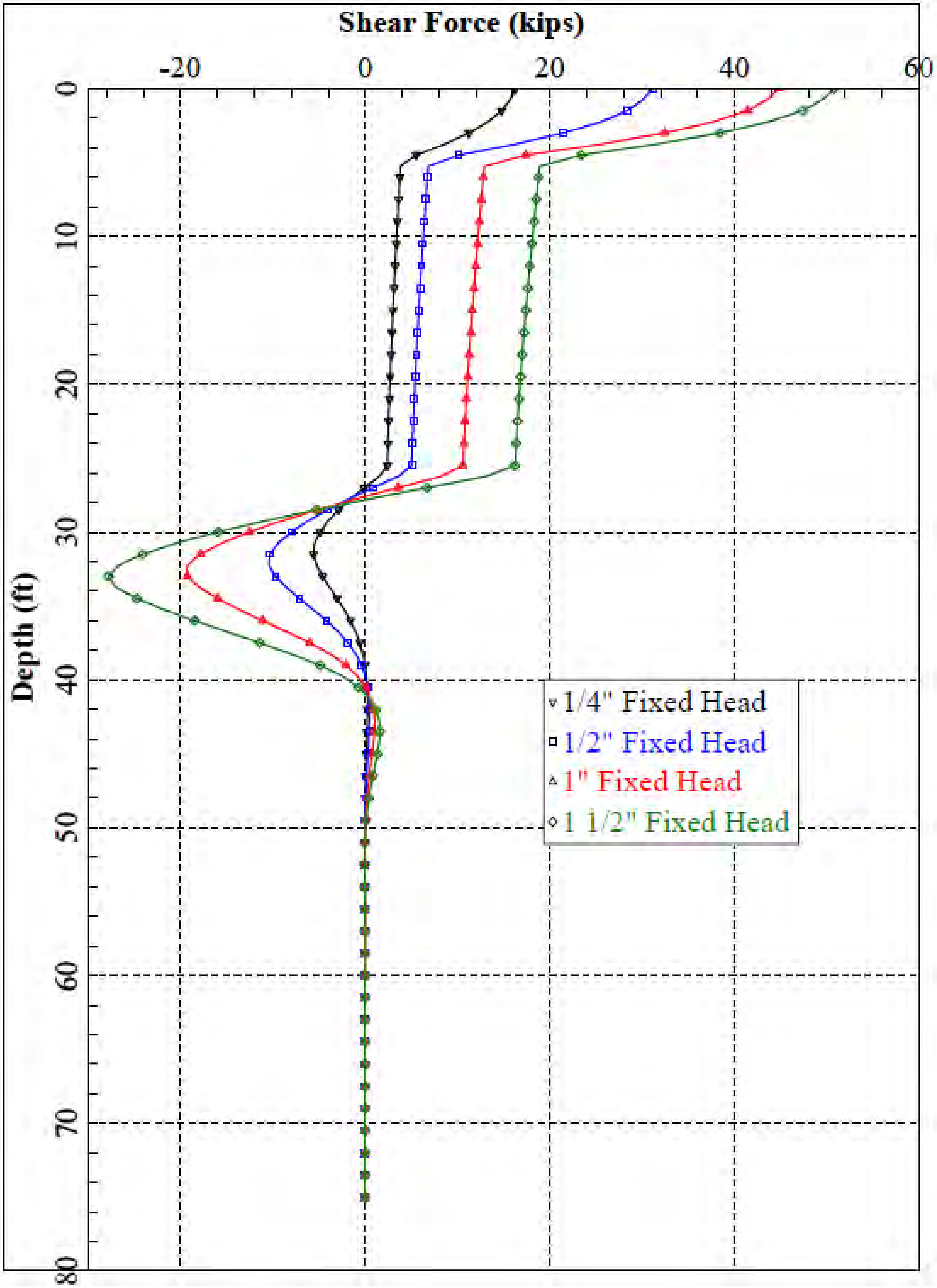
Figure 45



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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

24-inch Augercast Pile
Shear vs Depth (Fixed Head)
LFF at 37 feet, East Side of Building

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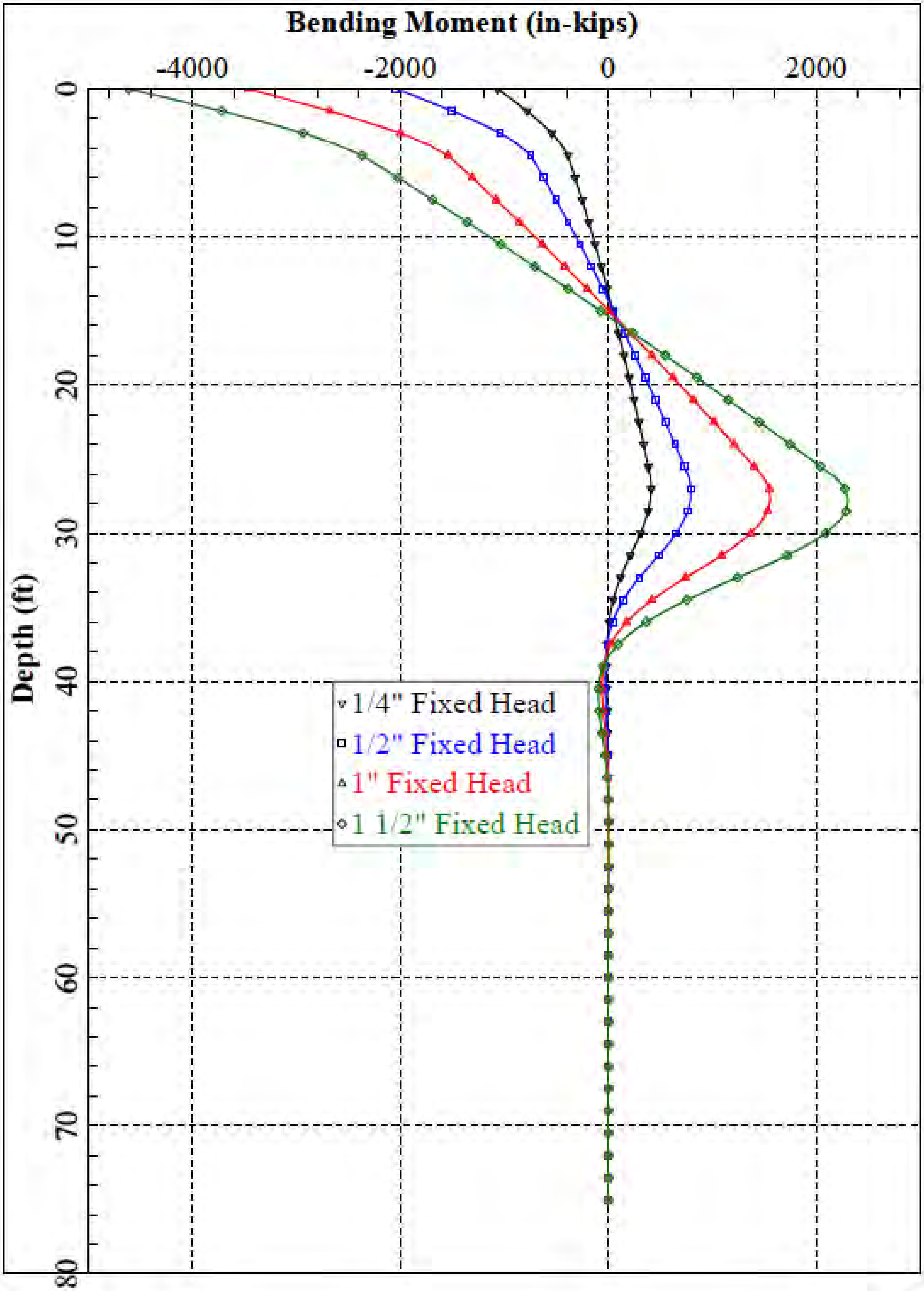
Figure 46



24-inch Augercast Pile
Moment vs Depth (Fixed Head)
LFF at 37 feet, East Side of Building

UW ICA Basketball Center
Seattle, Washington

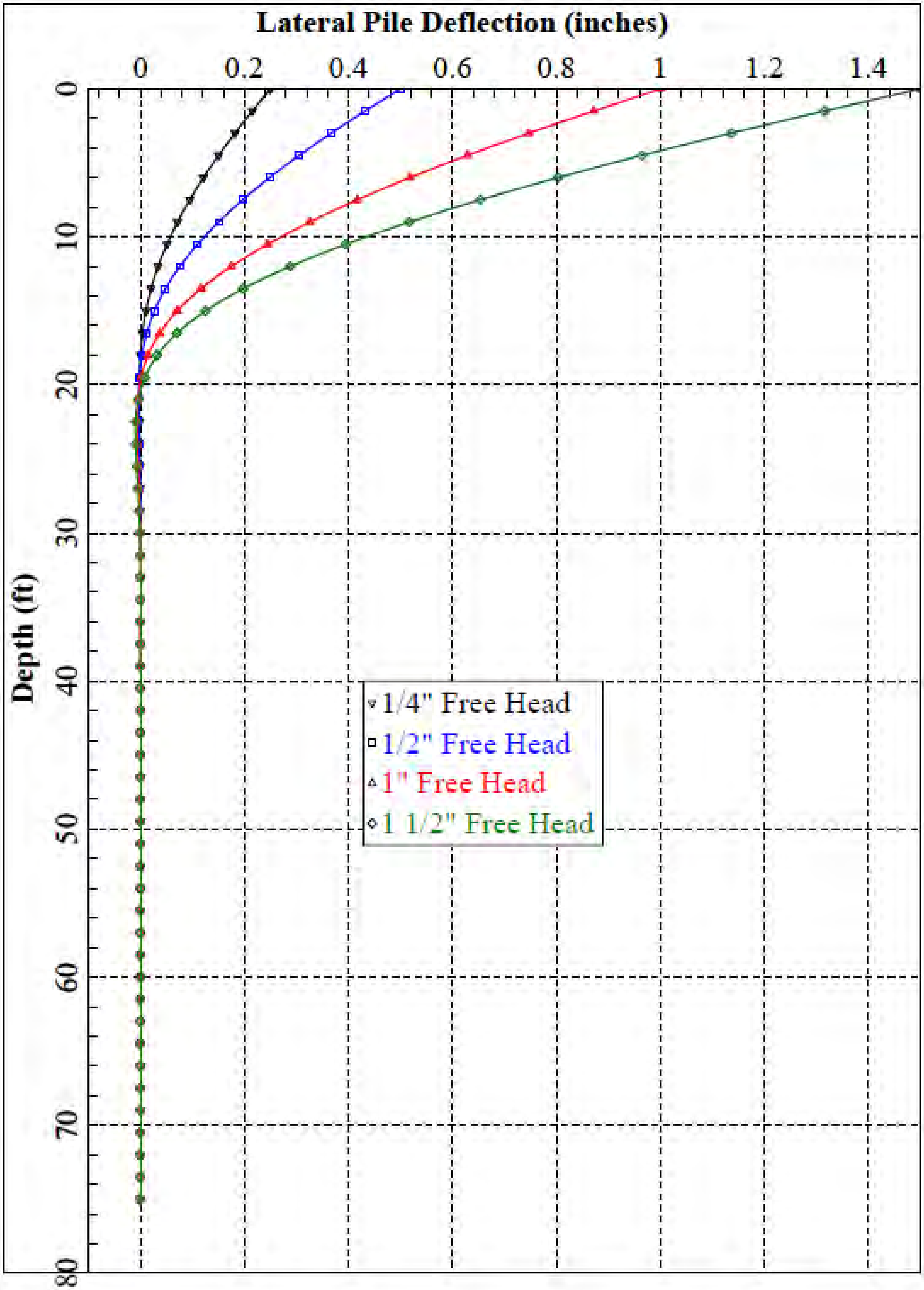
GEOENGINEERS

Figure 47

Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

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



Notes:

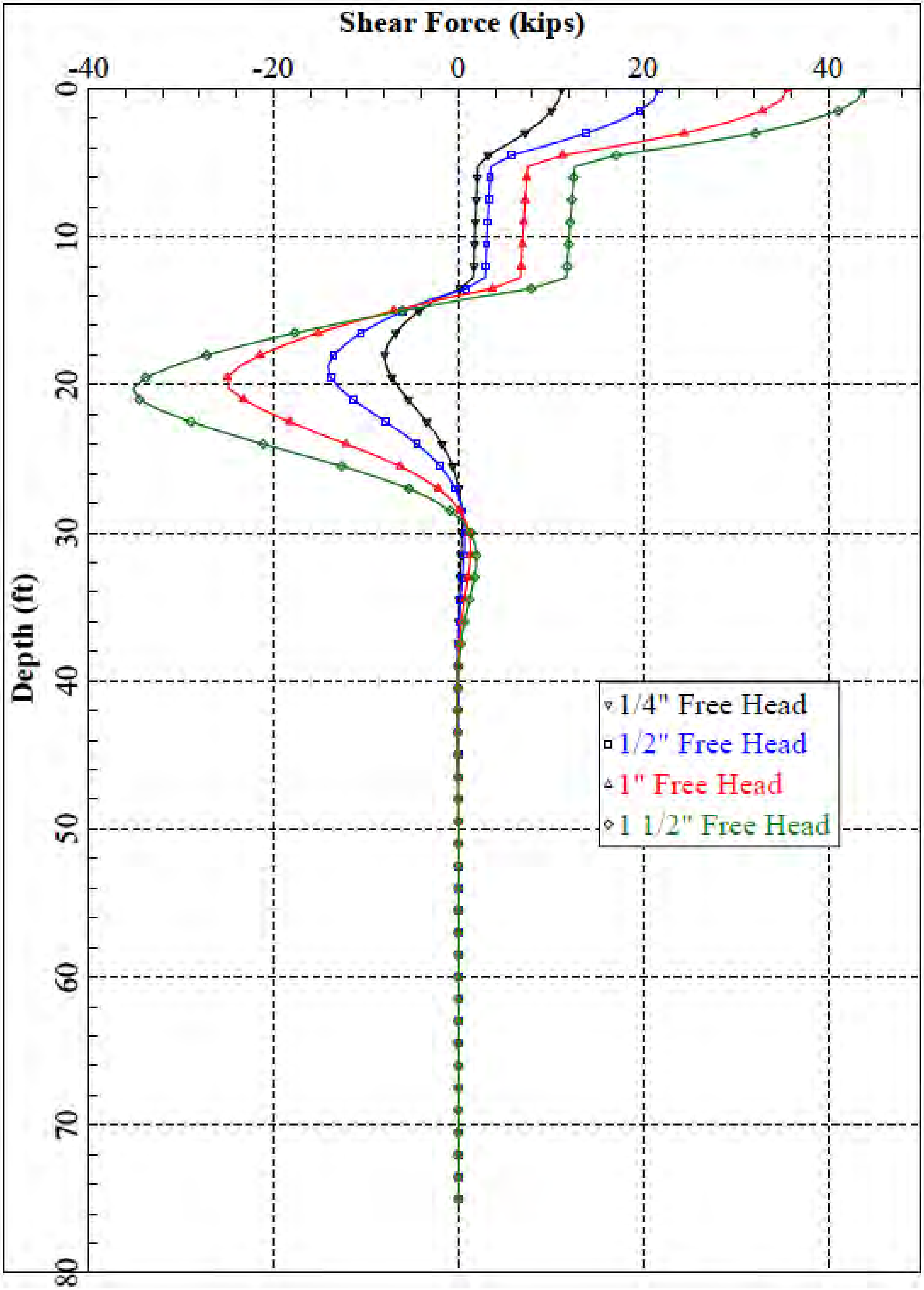
1. Lateral pile capacities were evaluated using LPILE v2019
2. Free- and fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

24-inch Augercast Pile
Deflection vs Depth (Free Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

GEOENGINEERS

Figure 48



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

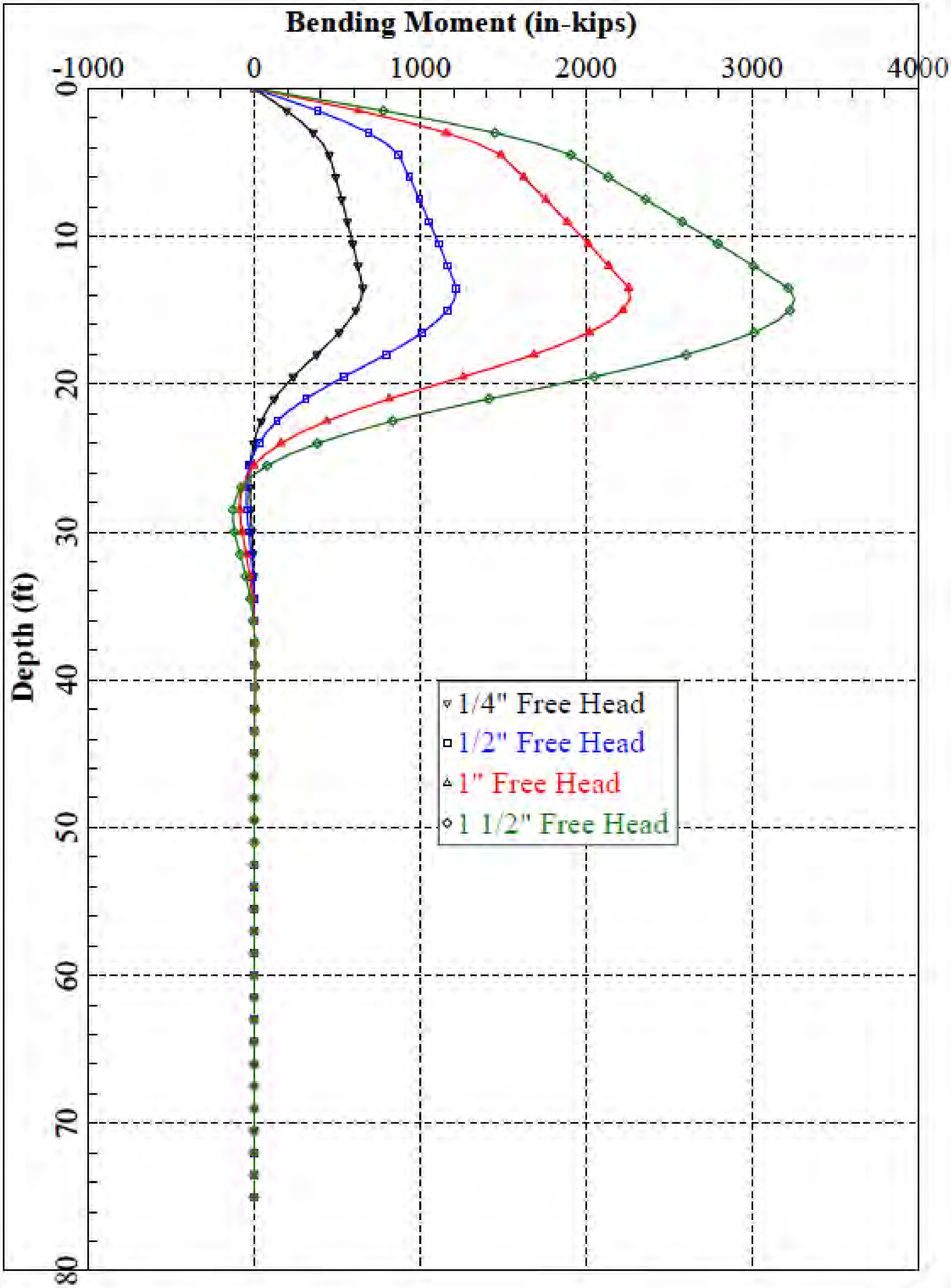
2. Free- and fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

24-inch Augercast Pile
Shear vs Depth (Free Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

GEOENGINEERS

Figure 49



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

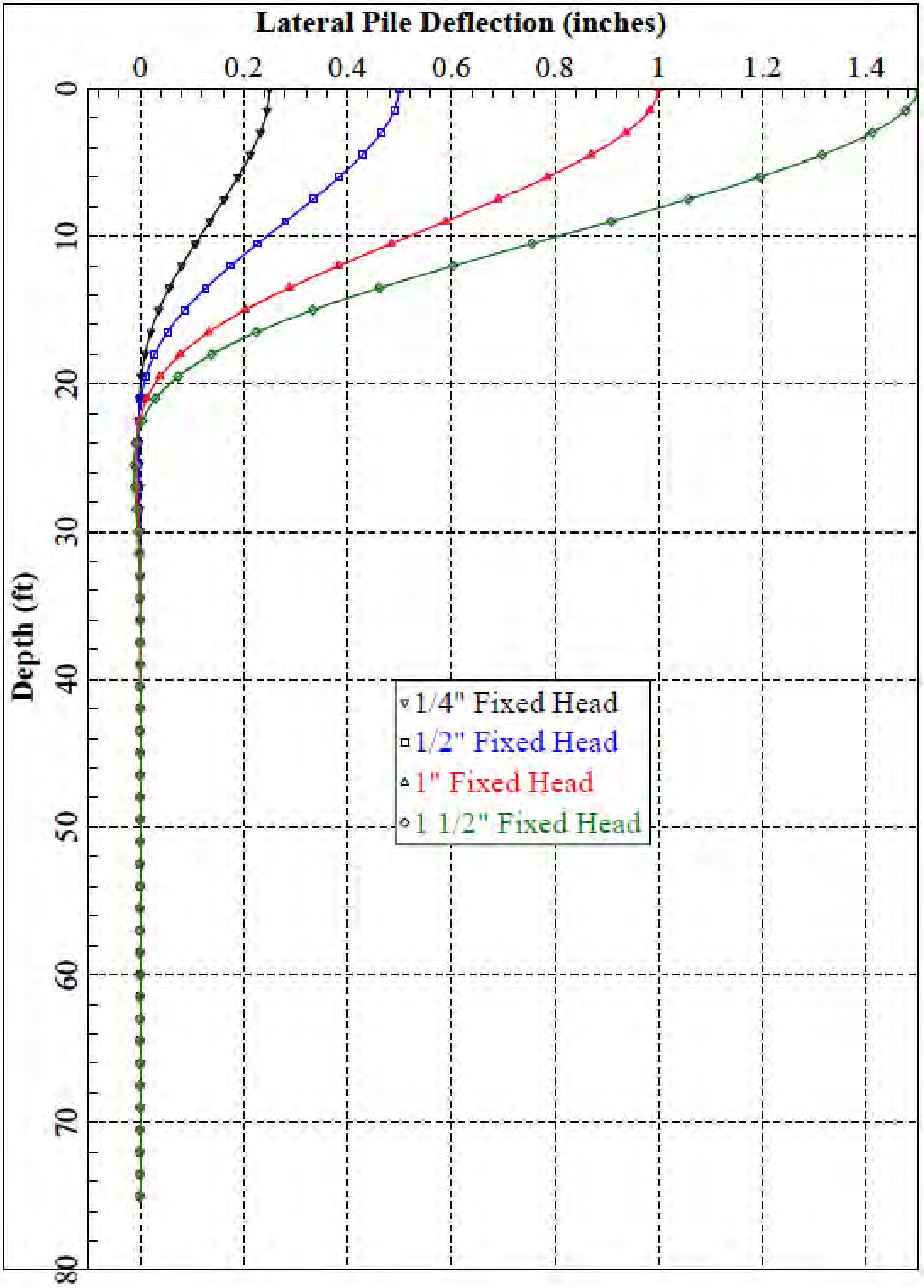
2. Free- and fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

24-inch Augercast Pile
Moment vs Depth (Free Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

GEOENGINEERS

Figure 50



Notes:

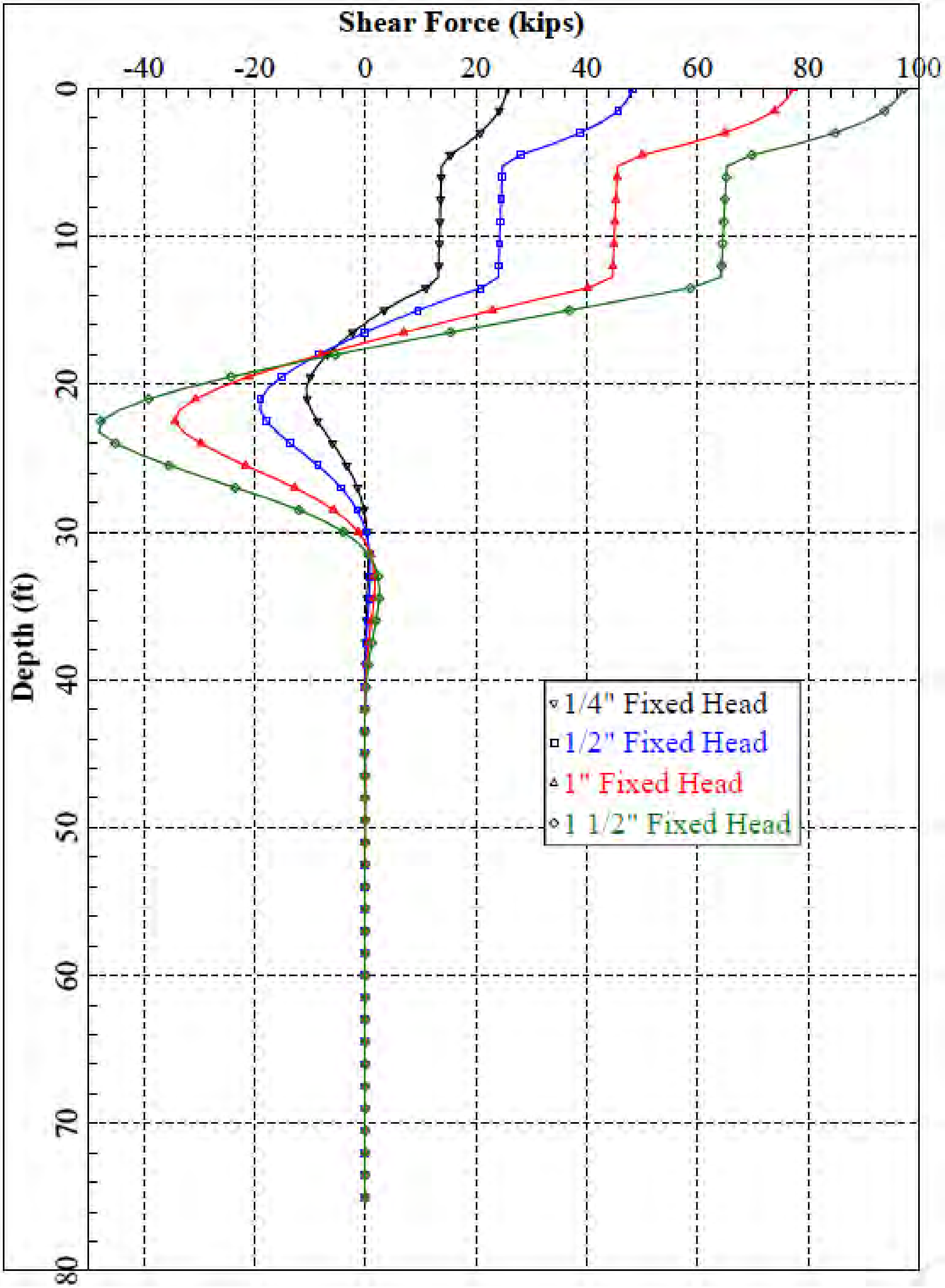
1. Lateral pile capacities were evaluated using LPILE v2019
2. Free- and fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

24-inch Augercast Pile
Deflection vs Depth (Fixed Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

GEOENGINEERS

Figure 51



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

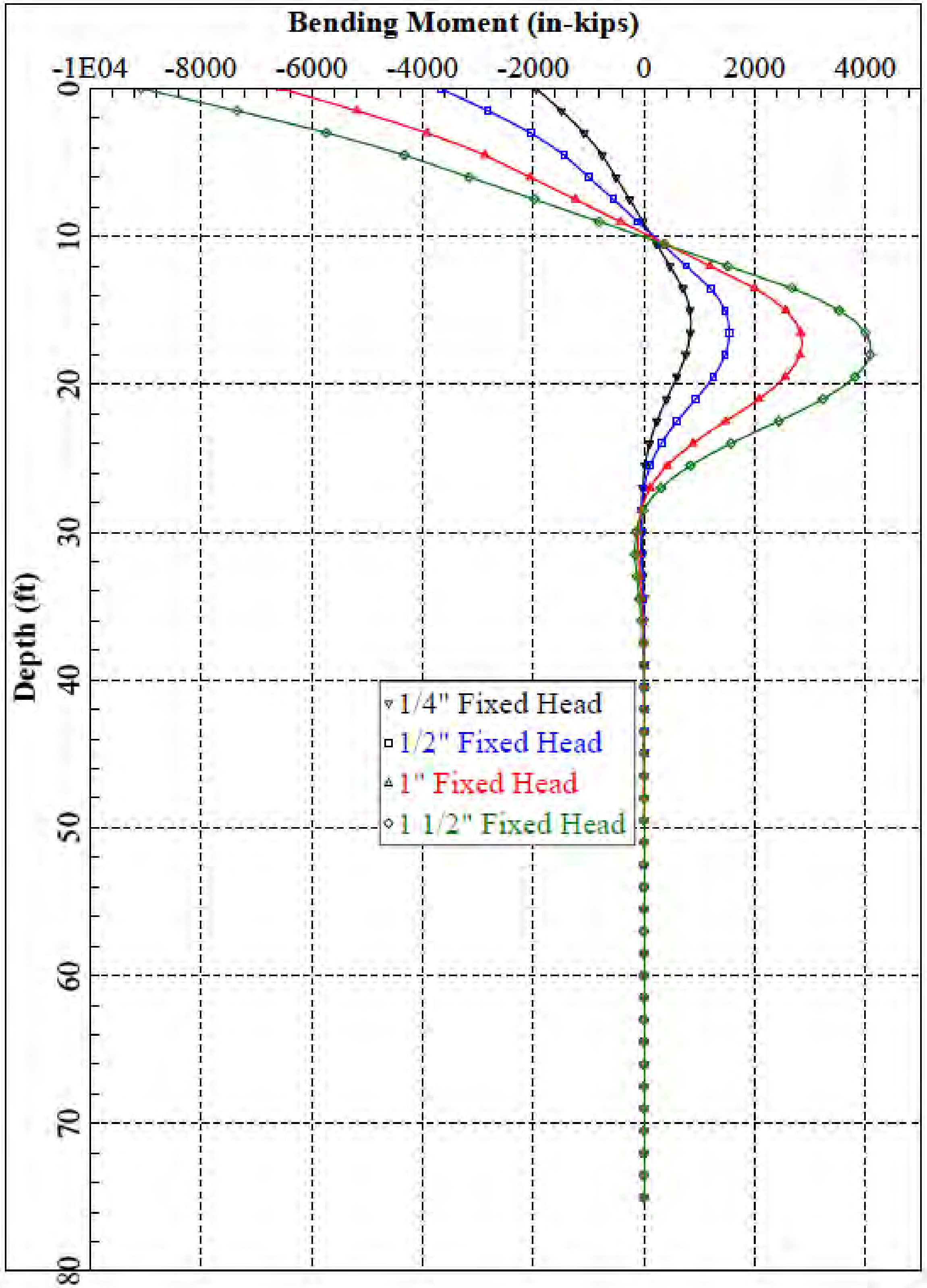
2. Free- and fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

24-inch Augercast Pile
Shear vs Depth (Fixed Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

GEOENGINEERS

Figure 52



Notes:

1. Lateral pile capacities were evaluated using LPILE v2019

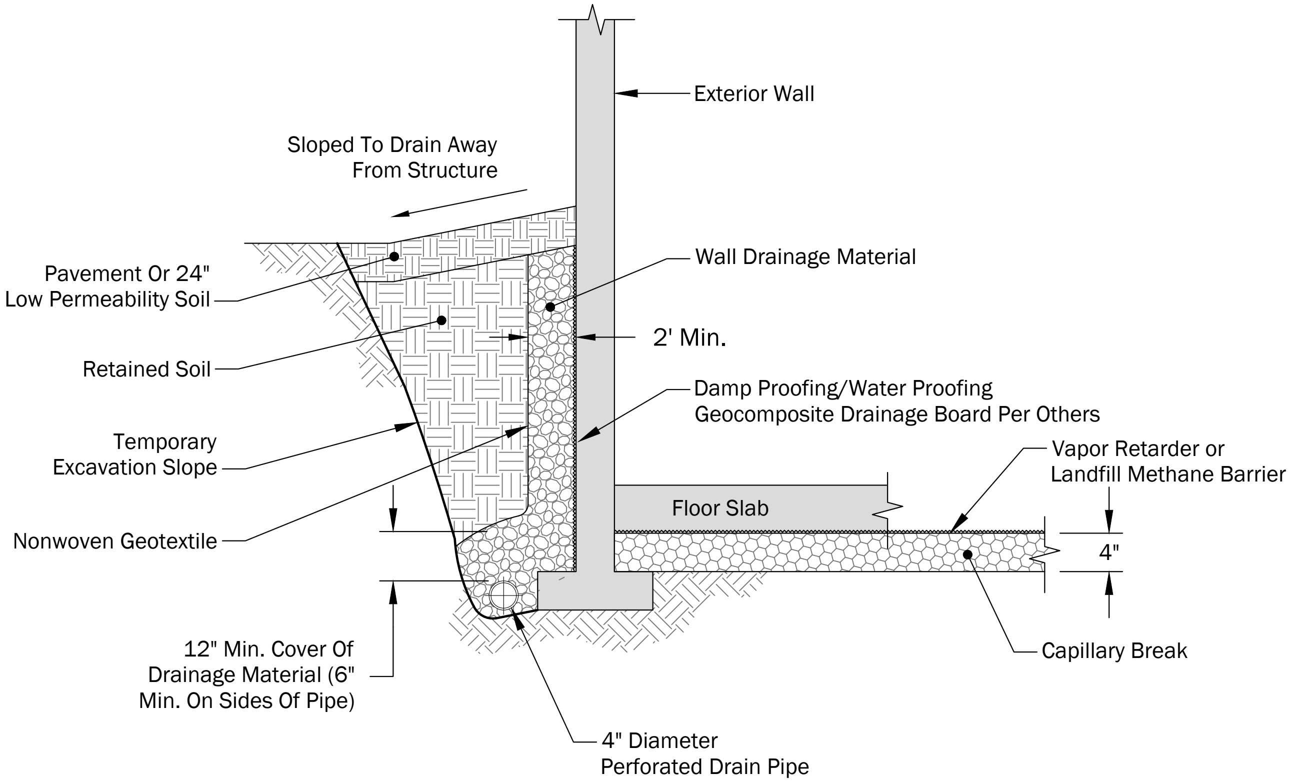
2. Free- and fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.

24-inch Augercast Pile
Moment vs Depth (Fixed Head)
LFF at 37 feet, West Side of Building

UW ICA Basketball Center
Seattle, Washington

GEOENGINEERS

Figure 53



Not To Scale

MATERIALS:

A. WALL DRAINAGE MATERIAL

Shall consist of pea gravel (Seattle Mineral Aggregate Type 9) or washed gravel (Seattle Mineral Aggregate Type 5) 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. However, a minimum of 12 inches of Seattle Mineral Aggregate Type 5 or Type 9 surrounded with a geotextile fabric should be used around the drain pipe with 2 inches under the pipe.

B. RETAINED SOIL

Should consist of imported structural fill, either on-site soil or imported. The backfill should be compacted in loose lifts not exceeding 6 inches. Wall backfill 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 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.

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 ICA Basketball Center
Seattle, Washington

GEOENGINEERS

Figure 54

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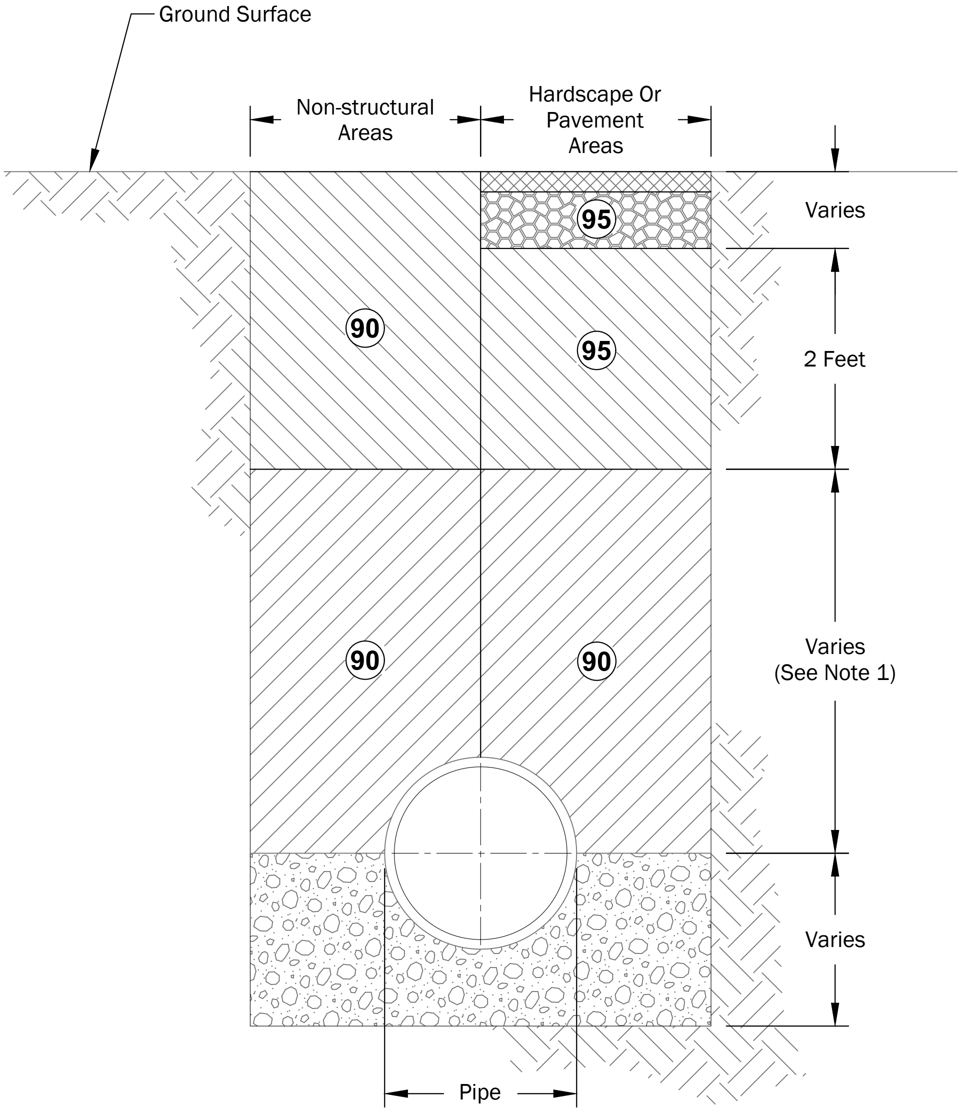


Not To Scale

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 ICA Basketball Center
Seattle, Washington

GeoEngineers

Figure 55

P:\0\0183144\CAD\00\Geotech Report\018314400_F55_Compaction Criteria for Trench Backfill.dwg TAB:F55 Date Exported: 05/31/22 - 16:14 by gregister

APPENDIX A
Field Explorations

APPENDIX A
FIELD EXPLORATIONS

Borings GEI-1 and GEI-2 were completed on February 10, 2022, at the approximate locations shown in Figure 2. The borings were advanced to depths of approximately 51½ and 31½ feet below ground surface (bgs), respectively. The borings were completed using a track mounted Diedrich Turbo D-50 drill rig owned and operated by Advanced Drill Technologies, 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		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	◌	GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
			○	GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▥	GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
			▨	GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	⁘	SW	WELL-GRADED SANDS, GRAVELLY SANDS
			⁘	SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▥	SM	SILTY SANDS, SAND - SILT MIXTURES
			▨	SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	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
	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		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
■	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 / Dames & Moore (D&M)**
☒	**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
UU	Unconsolidated undrained triaxial 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 2/10/2022	End 2/10/2022	Total Depth (ft) 51.5	Logged By CRG Checked By CWM	Driller Advance Drill Technologies, Inc.	Drilling Method Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	39 NAVD88	Top of Casing Elevation (ft)	38.5
Easting (X) Northing (Y)	1278745 241215	Horizontal Datum	WA State Plane North NAD83 (feet)

DOE Well I.D.: BMY 824
A 2-in well was installed on 2/10/2022 to a depth of 25 ft.

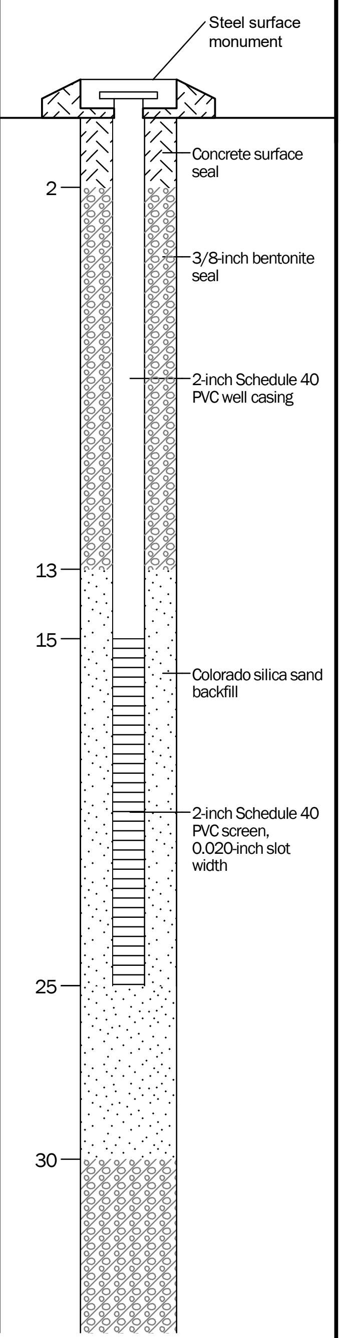
Groundwater

Date Measured	Depth to Water (ft)	Elevation (ft)
3/22/2022	11.0	27.5

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)
	0								AC	Approximately 3 inches asphalt concrete pavement		
									CR	Approximately 3 inches crushed surfacing base course		
									SP-SM	Tan fine to medium sand with gravel and silt, wood debris (medium dense, moist) (fill)		
		☒	16	21		1 SA					7	10
35												
	5	☒	12	13		2 MC			SM	Brown to tan silty fine to coarse sand (medium dense, moist)	9	
		☒	6	12		3				Occasional gravel		
30												
									SM	Gray silty fine to medium sand with occasional gravel (very loose to loose, wet) (alluvium)	14	28
	10	☒	14	7		4 %F	▼					
25												
	15	☒	18	2		5						
									ML	Gray sandy silt (medium stiff, wet)		
20												
	20	☒	14	6		6A						
						6B OC			PT	Dark brown peat with silt and sand (organic content 25 percent)	115	
		☒	16	9		7 %F			ML	Gray sandy silt with occasional gravel, wood debris; slight oxidation staining (stiff, moist)	17	52
									ML	Tan silt with sand and occasional gravel (hard, moist) (pre-Fraser deposits)		
15												
	25	☒	18	58		8						
									SM	Gray silty fine to medium sand with occasional gravel (very dense, wet)		
10												
	30	☒	8	50/4"		9						
									ML	Gray silt with sand (hard, moist to wet)		
5												
	35											

WELL LOG



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal and vertical approximated based on Site survey by Bush, Roed and Hitchings, Inc. dated 4/4/2022.

Log of Boring with Monitoring Well GEI-1

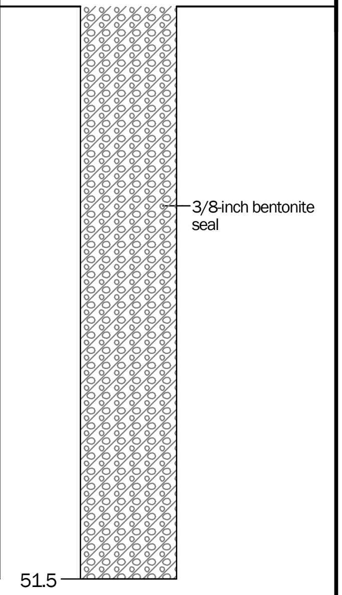
GeoEngineers

Project: UW ICA Basketball Center
Project Location: Seattle, Washington
Project Number: 0183-144-00

Figure A-2
Sheet 1 of 2

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)
	35	☒	8	50/3"		10						
0												
	40	☒	4	50/4"		11						
									ML	Gray-brown sandy silt (hard, moist)		
-5												
	45	☒	17	80/11"		12						
									SM	Gray-tan silty fine to medium sand (very dense, moist)		
-10												
	50	☒	18	81		13						

WELL LOG



Log of Boring with Monitoring Well GEI-1 (continued)

GeoEngineers

Project: UW ICA Basketball Center
Project Location: Seattle, Washington
Project Number: 0183-144-00

Figure A-2
Sheet 2 of 2

Drilled	Start 2/10/2022	End 2/10/2022	Total Depth (ft) 31.5	Logged By CRG Checked By CWM	Driller Advance Drill Technologies, Inc.
Drilling Method	Hollow-stem Auger				
Surface Elevation (ft) Vertical Datum	37 NAVD88	Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Easting (X) Northing (Y)	1278730 241288	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
	0							SOD	Approximately 4 inches sod			
35								SM	Brown silty fine to medium sand, small roots (very loose to loose, moist) (fill)			
		☒	8	6		1 SA				7	36	
	5	☒	8	3		2 MC				17		
30								SM	Gray-brown silty fine to medium sand with occasional gravel (very loose, moist)			
		☒	0	3		3 %F				15	42	No recovery with SPT-sampler; drove California modified to collect sample
								SM	Gray silty fine to medium sand with occasional gravel (very loose, moist) (alluvium)			
	10	☒	4	0		4 %F				15	36	
25												
								SM	Brown silty fine to medium sand with gravel, woody debris (loose to medium dense)			Driller noted harder drilling at approximately 14 feet
	15	☒	4	10		5						
20												
								SM	Gray silty fine to medium sand with occasional gravel (medium dense, wet)			
	20	☒	18	45		6A 6B		SM	Tan silty fine to medium sand (dense, moist) (pre-Fraser deposits)			Driller noted change in density at approximately 20 feet
15												Groundwater observed at approximately 22 feet during drilling
								SM	Gray-tan silty fine to medium sand with occasional gravel (very dense, moist)			
	25	☒	9	50/3"		7						
10								SM	Brown silty fine to medium sand (very dense, moist to wet)			Driller noted gravel at approximately 27 feet
		☒	4	50/4"		8						
	30	☒	18	84		9						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal and vertical approximated based on Site survey by Bush, Roed and Hitchings, Inc. dated 4/4/2022.

Log of Boring GEI-2

GEOENGINEERS

Project: UW ICA Basketball Center
Project Location: Seattle, Washington
Project Number: 0183-144-00

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, organic 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.

Organic Content Determinations

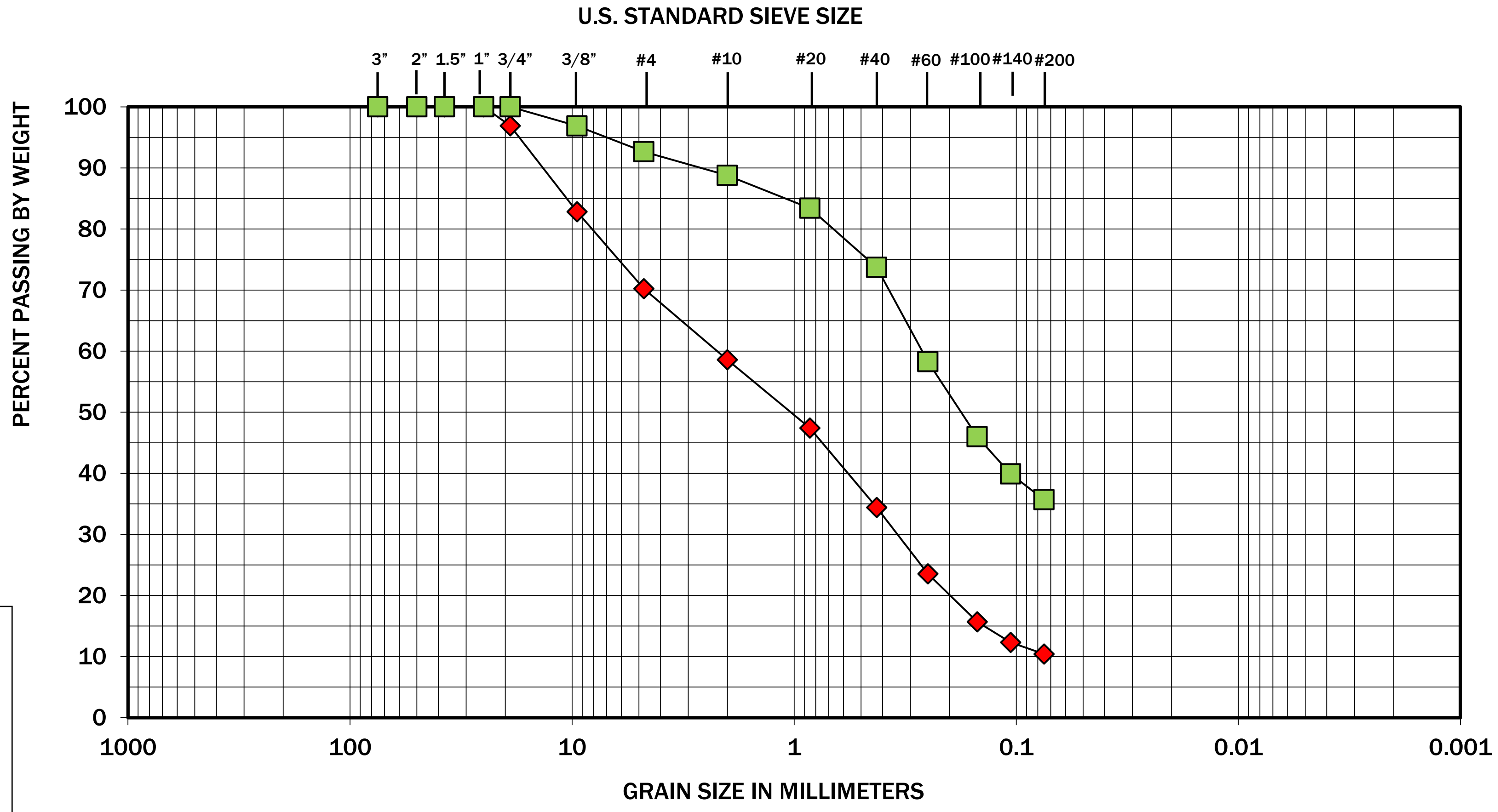
Organic contents were determined in general accordance with ASTM D 2974 for one sample obtained from the borings. The results of these tests are presented on the exploration logs at the respective sample depth in Appendix A.

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 C 136. 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
◆	GEI-1	2.5	7	Poorly graded sand with silt and gravel (SP-SM)
🟩	GEI-2	2.5	17	Silty sand (SM)

Note: This report may not be reproduced, except in full, without written approval of GeoEngineers, Inc. Test results are applicable only to the specific sample on which they were performed, and should not be interpreted as representative of any other samples obtained at other times, depths or locations, or generated by separate operations or processes.

The grain size analysis results were obtained in general accordance with ASTM C 136. GeoEngineers 17425 NE Union Hill Road Ste 250, Redmond, WA 98052

Sieve Analysis Results

UW ICA Basketball
Seattle, Washington

Figure B-1

APPENDIX C
Boring Logs from Previous Studies

APPENDIX C
BORING LOGS FROM PREVIOUS STUDIES

Appendix C includes boring logs from the following previous studies completed in the vicinity of the project site.

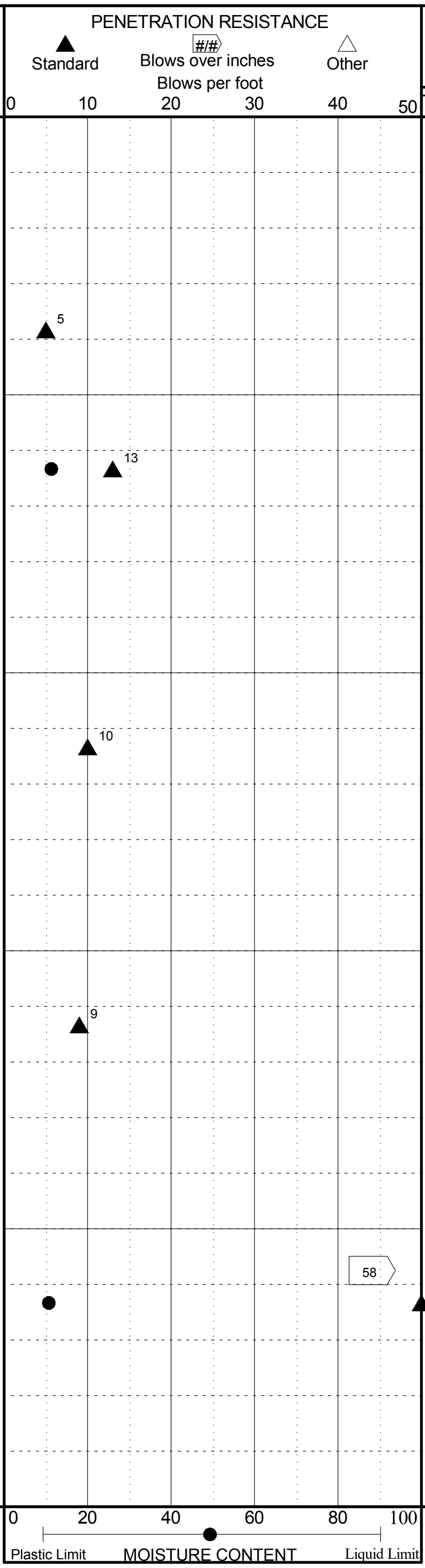
- The logs of four borings (AB-1, AB-2, AB-5, and AB-6) completed by AMEC Environmental & Infrastructures, Inc. in 2012 and 2014;
- The log of two borings (B-1 and B-2) completed by Shannon & Wilson, Inc., in 2006;
- The log of two borings (B-1 and B-2) completed by Terra Associates in 1987;
- The log of four borings (B-1 through B-4) completed by Terra Associates in 1986;
- The log of three borings (1, 2, and 6) completed by Dames & Moore in 1966; and
- The log of two borings (B-2 and B-3) completed by Shannon & Wilson in 1964.

PROJECT: *UW Basketball Practice Facility* JOB No. *2-917-17444-0* BORING No. *AB-1*

Page 1 of 2

Location: NW Corner of Sports Medicine Clinic
Approximate ground surface elevation: 47.0 feet

DEPTH (feet)	Soil Description	SAMPLE NUMBER	GROUND WATER	TESTING
0	4.5 inches asphalt pavement over:		N/E	
	Loose to medium dense, moist, dark gray, silty SAND/ varying to sandy SILT with some gravel and with scattered brick fragments (Fill) SP-SM	S-1		
5		S-2		39
10		S-3		
	Loose, moist, mottled dark brown, silty SAND with scattered to numerous organics; primarily wood (Fill) SM			
15		S-4		
	Very dense, moist, gray, silty, fine to medium SAND with some gravel (Glacial Till) SP-SM			
20		S-5		36
	cuttings become wet			
25				



LEGEND

2.00-inch OD split-spoon sampler

No Recovery

N/E No groundwater encountered

Grain Size Analysis (% fines shown)

11810 North Creek Parkway N
Bothell, WA 98011

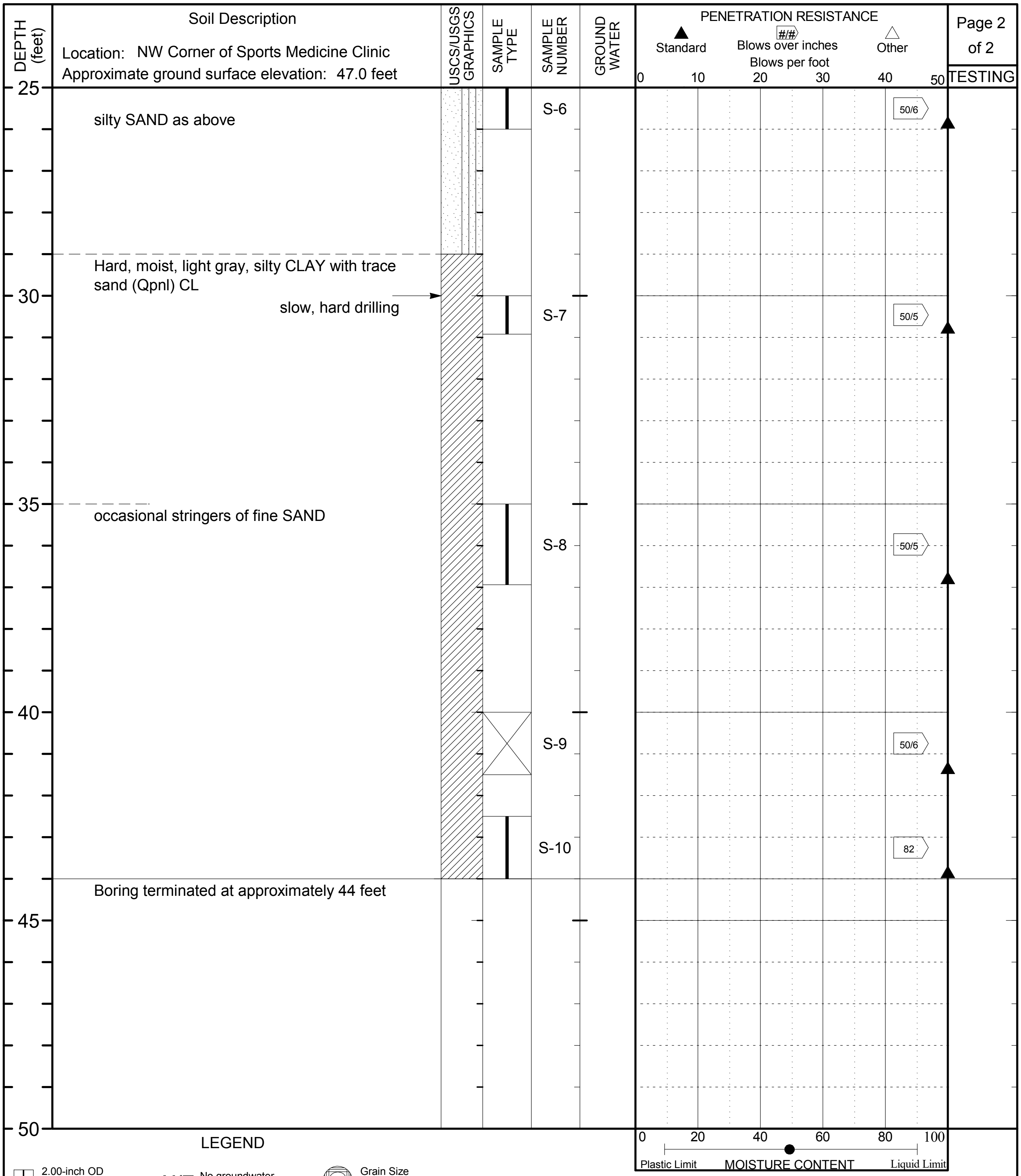
Drilling Method: HSA Hammer Type: Cathead Date drilled: *July 02, 2012* Logged By: *WJL*

Drilled by: *BoreTec*

PROJECT: *UW Basketball Practice Facility* JOB No. *2-917-17444-0* BORING No. *AB-1*

Location: NW Corner of Sports Medicine Clinic
Approximate ground surface elevation: 47.0 feet

Page 2 of 2



DEPTH (feet)	Soil Description	SAMPLE NUMBER	PENETRATION RESISTANCE
25	silty SAND as above	S-6	50/6
29	Hard, moist, light gray, silty CLAY with trace sand (Qpnl) CL		
30	slow, hard drilling	S-7	50/5
35	occasional stringers of fine SAND	S-8	50/5
40		S-9	50/6
42.5		S-10	82
44	Boring terminated at approximately 44 feet		

LEGEND

▯ 2.00-inch OD split-spoon sampler

☒ No Recovery

N/E No groundwater encountered

◎ Grain Size Analysis (% fines shown)

amec

11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *July 02, 2012* Logged By: *WJL*

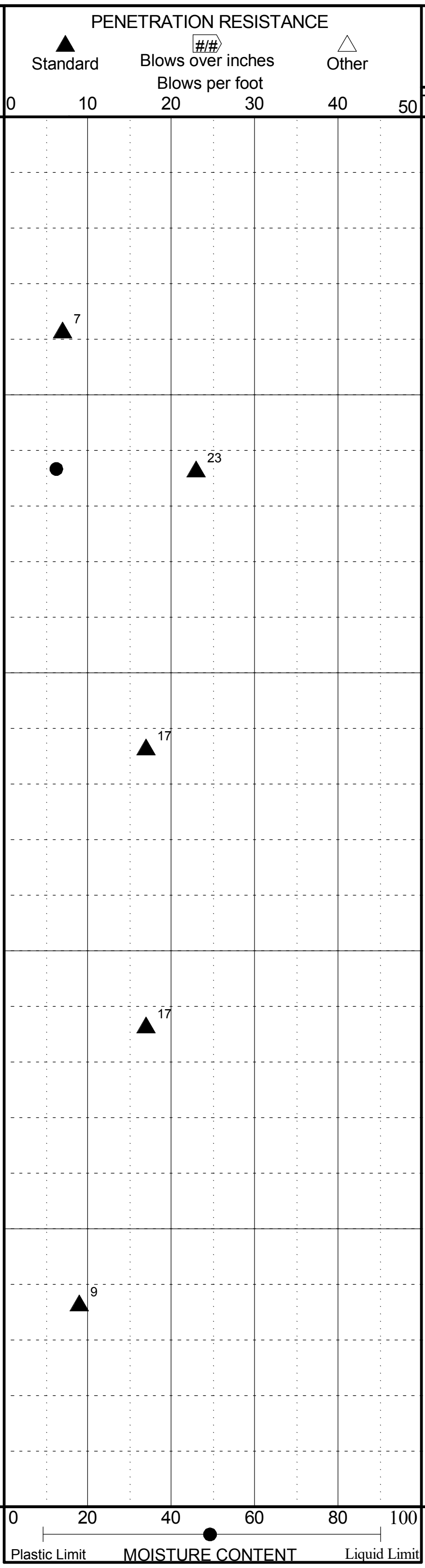
Drilled by: *BoreTec*

PROJECT: *UW Basketball Practice Facility* JOB No. *2-917-17444-0* BORING No. *AB-2*

Page 1 of 2

Location: SW Corner of Sports Medicine Clinic
Approximate ground surface elevation: 49.5 feet

DEPTH (feet)	Soil Description	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	Blows per foot	TESTING
0	4.5 inches asphalt pavement over: Loose to medium dense, moist to wet, gray mottled with tan, silty, fine to medium SAND with some gravel (Fill) SP-SM			N/E		
		2.00-inch OD split-spoon sampler	S-1		7	
5		2.00-inch OD split-spoon sampler	S-2		23	35
10	from cuttings: wet, gray, silty SAND	No Recovery	S-3		17	
15	wood fragments within cuttings	No Recovery	S-4		17	
20	becomes loose, wet, mottled gray/ reddish tan	2.00-inch OD split-spoon sampler	S-5		9	
	Very dense, wet to saturated, gray becoming light brown, fine to medium SAND with some silt (Glacial Till) SP-SM					
25						



LEGEND

- 2.00-inch OD split-spoon sampler
- No Recovery
- N/E No groundwater encountered
- Grain Size Analysis (% fines shown)

11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *July 02, 2012* Logged By: *WJL*

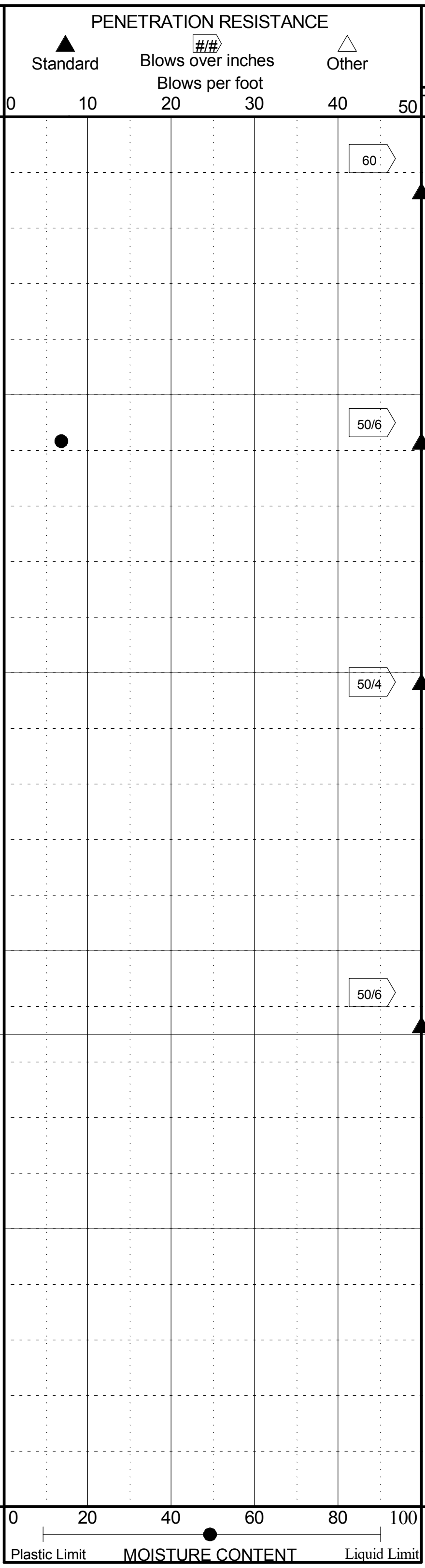
Drilled by: *BoreTec*

PROJECT: *UW Basketball Practice Facility* JOB No. *2-917-17444-0* BORING No. *AB-2*

Page 2 of 2

Location: SW Corner of Sports Medicine Clinic
Approximate ground surface elevation: 49.5 feet

DEPTH (feet)	Soil Description	SAMPLE NUMBER	TESTING
25	SAND with some silt as above	S-6	
30	Very dense, moist, light gray, silty fine SAND/ fine sandy SILT (Advance outwash) SP-SM	S-7	46
35	Hard, moist, gray, silty CLAY (Qpnl) CL	S-8	
40	becomes with trace gravel	S-9	
	Boring terminated at approximately 41.5 feet		
45			
50			



LEGEND

2.00-inch OD split-spoon sampler	N/E No groundwater encountered	Grain Size Analysis (% fines shown)
☒ No Recovery		

amec

11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *July 02, 2012* Logged By: *WJL*

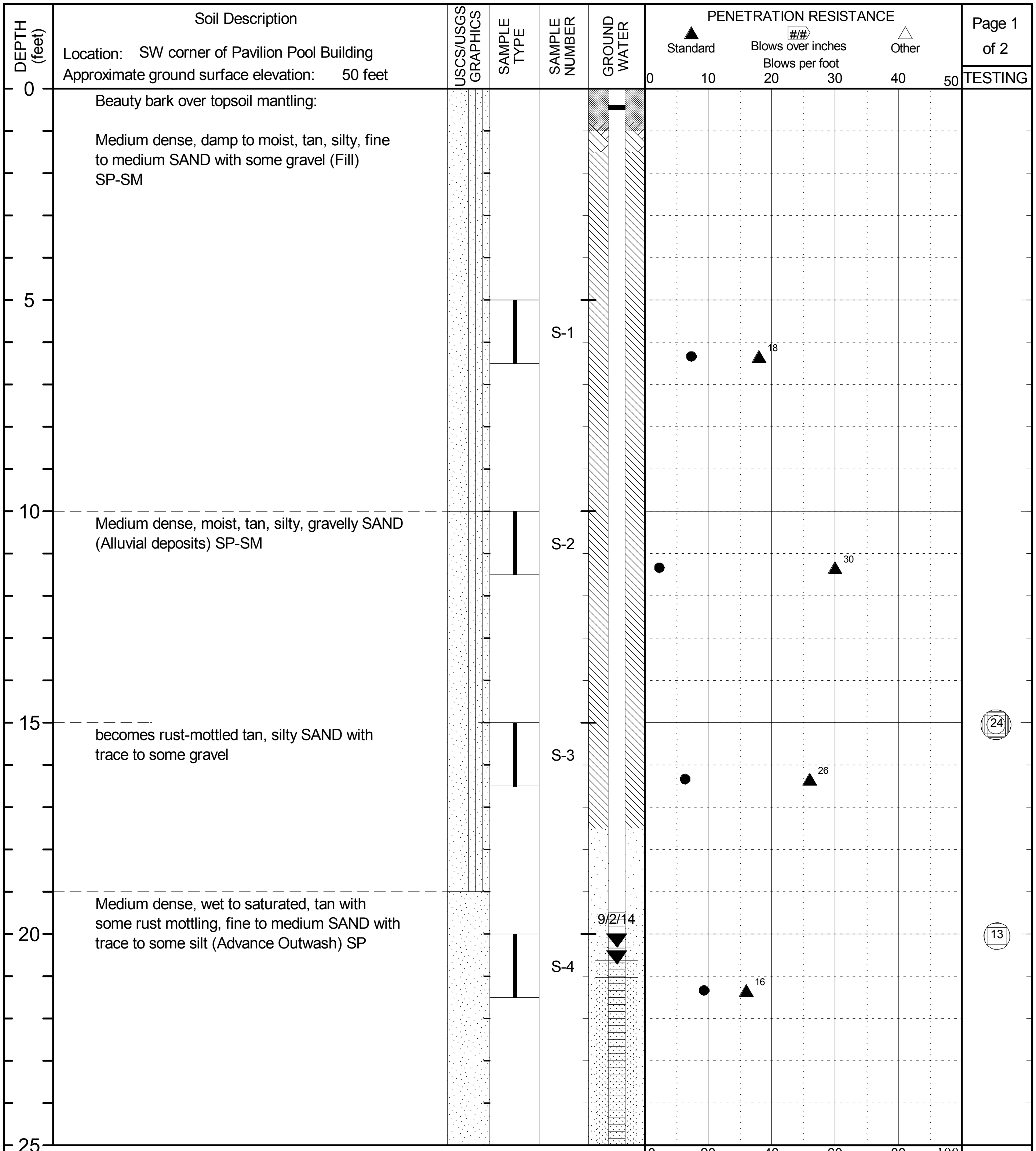
Drilled by: *BoreTec*

BOTHELL_LOG FORMAT 2012 AB1 - AB4.GPJ BOTHELL GEO 2010 B&TP.GDT 8/14/12

PROJECT: *UW Basketball Operations Building* JOB No. *2-917-17444-0* BORING No. *AB-5*

Page 1 of 2

Location: SW corner of Pavilion Pool Building
Approximate ground surface elevation: 50 feet



DEPTH (feet)	Soil Description	SAMPLE NUMBER	PENETRATION RESISTANCE (Blows per foot)	TESTING
0	Beauty bark over topsoil mantling: Medium dense, damp to moist, tan, silty, fine to medium SAND with some gravel (Fill) SP-SM			
5		S-1	18	
10	Medium dense, moist, tan, silty, gravelly SAND (Alluvial deposits) SP-SM	S-2	30	
15	becomes rust-mottled tan, silty SAND with trace to some gravel	S-3	26	24
19	Medium dense, wet to saturated, tan with some rust mottling, fine to medium SAND with trace to some silt (Advance Outwash) SP			
20		S-4	16	13
25				

LEGEND

▯	2.00-inch OD split-spoon sampler
▼	Observed groundwater level
◎	Grain Size Analysis (% fines shown)
○	200 Wash (% fines shown)

Observation well:
Monument
Bentonite Fill with PVC Pipe
Groundwater Level
Sand Fill with Slotted PVC Pipe
Pipe Cap
Slough at Bottom of Hole

11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *August 06, 2014* Logged By: *WJL*

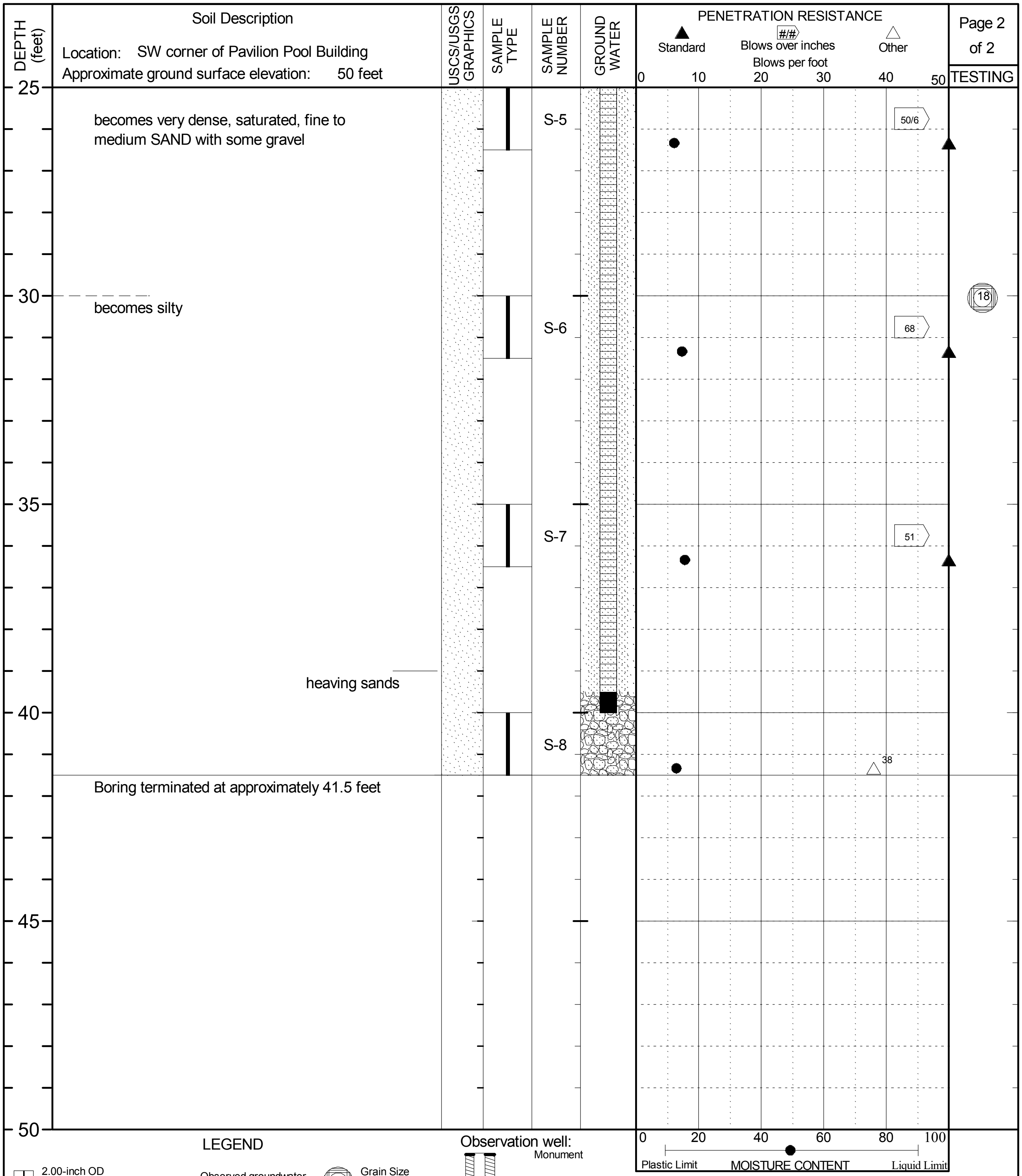
Drilled by: *BoreTec*

PROJECT: *UW Basketball Operations Building* JOB No. *2-917-17444-0* BORING No. *AB-5*

Soil Description

Location: SW corner of Pavilion Pool Building

Approximate ground surface elevation: 50 feet



becomes very dense, saturated, fine to medium SAND with some gravel

becomes silty

heaving sands

Boring terminated at approximately 41.5 feet

LEGEND

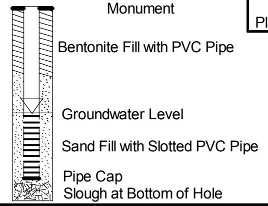
2.00-inch OD split-spoon sampler

Observed groundwater level

Grain Size Analysis (% fines shown)

200 Wash (% fines shown)

Observation well:



amec

11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *August 06, 2014* Logged By: *WJL*

Drilled by: *BoreTec*

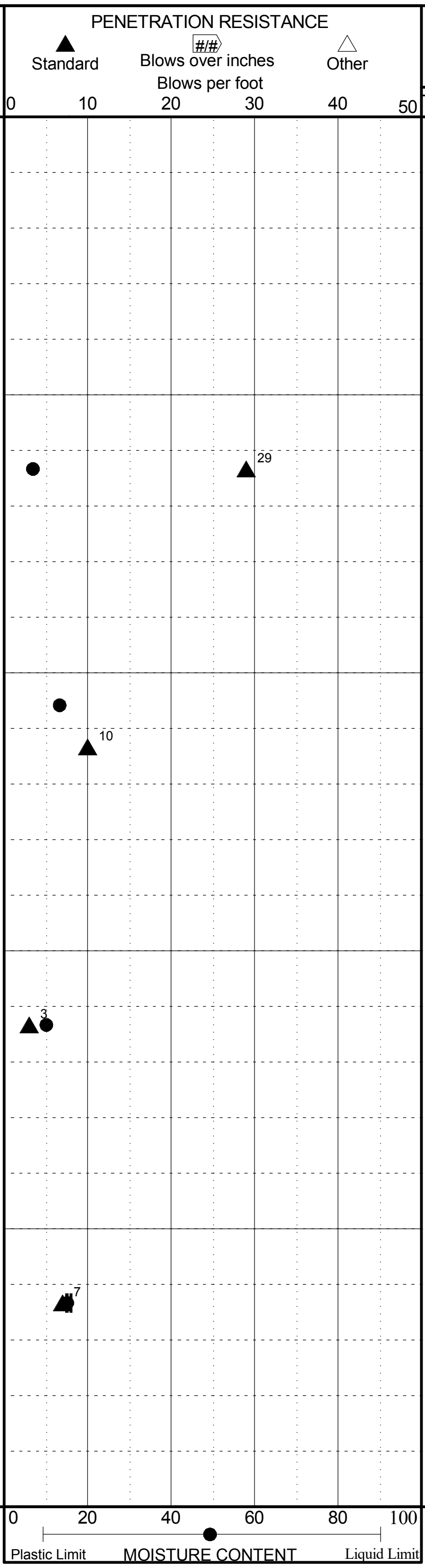
BOTHELL_LOG FORMAT 2012 W/O AB1 - AB6.GPJ BOTHELL GEO 2010 B&TP.GDT 6/22/15

PROJECT: *UW Basketball Operations Building* JOB No. *2-917-17444-0* BORING No. *AB-6*

Location: SE corner of Pavilion Pool Building
Approximate ground surface elevation: 48 feet

Page 1 of 2

DEPTH (feet)	Soil Description	SAMPLE NUMBER	GROUND WATER	TESTING
0	Beauty bark over topsoil mantling: Medium dense, damp to moist, tan, silty, fine to medium SAND with some gravel (Fill) SP-SM			
5		S-1		30
10		S-2a		
	Stiff, moist, dark gray, sandy SILT with trace gravel, occasional organics and a 1-inch thick lense of organic silt (Alluvial deposits) ML	S-2b		
15		S-3		
20	becomes wet to saturated, low plasticity	S-4	ATD	1
25				



LEGEND

- 2.00-inch OD split-spoon sampler
- ATD Groundwater level at time of drilling
- Grain Size Analysis (% fines shown)
- Atterberg Test (PI shown)
- 200 Wash (% fines shown)

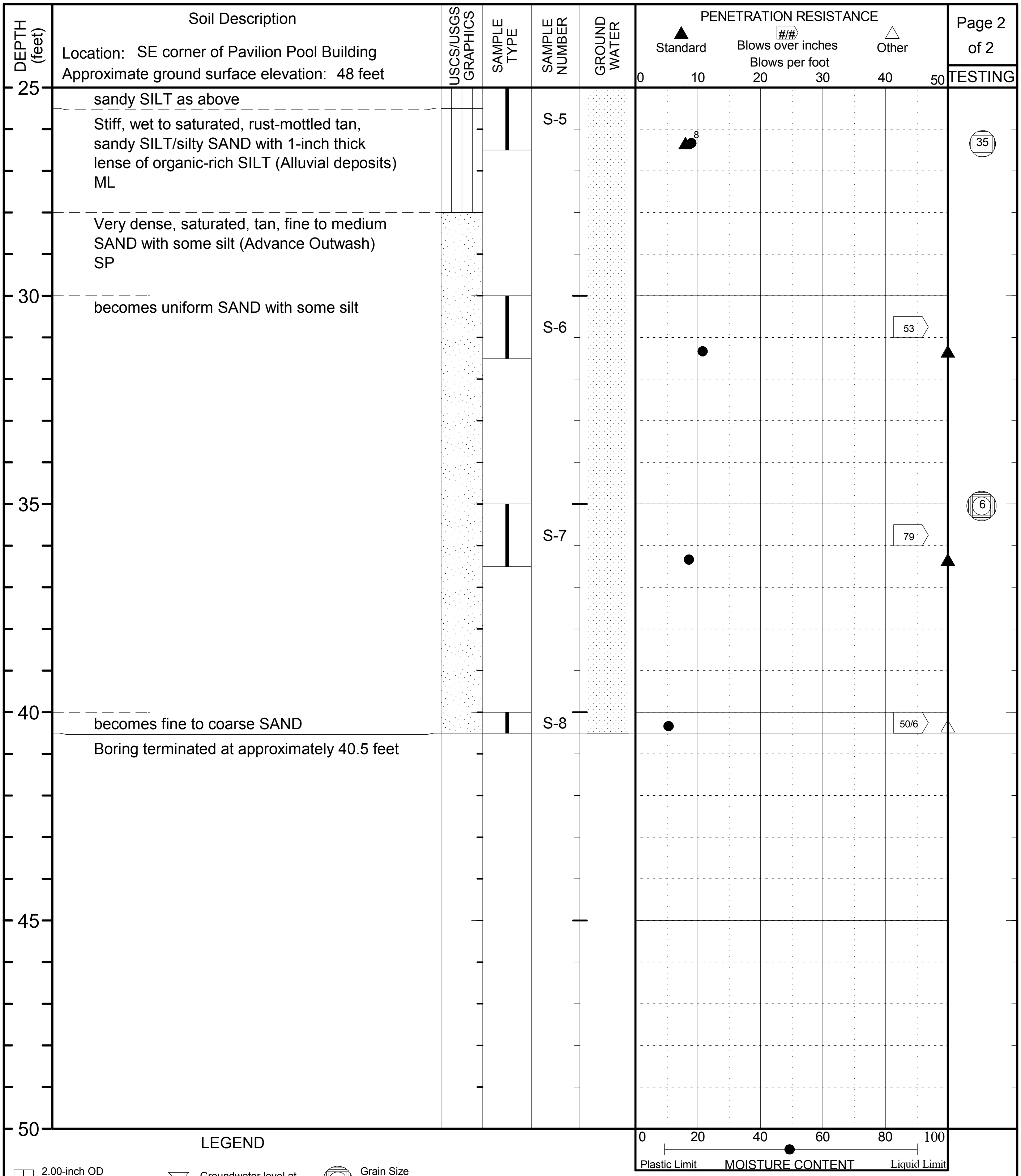
amec

11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *August 06, 2014* Logged By: *WJL*

Drilled by: *BoreTec*

PROJECT: *UW Basketball Operations Building* JOB No. *2-917-17444-0* BORING No. *AB-6*



LEGEND

2.00-inch OD split-spoon sampler

Groundwater level at time of drilling ATD

Grain Size Analysis (% fines shown)

Atterberg Test (PI shown)

200 Wash (% fines shown)

amec

11810 North Creek Parkway N
Bothell, Washington 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *August 06, 2014* Logged By: *WJL*

Drilled by: *BoreTec*

Total Depth: *30.9 ft.*
Top Elevation: *~ 35 ft.*
Vert. Datum: *NAVD 88*
Horiz. Datum:
Northing:
Easting:
Station:
Offset:
Drilling Method: *Mud Rotary*
Drilling Company: *Boart Longyear*
Drill Rig Equipment: *Truck Rig*
Other Comments: *Elevation is approximated from survey map.*
Hole Diam.: *4 in.*
Rod Type: *2 in.*
Hammer Type: *Automatic*

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transition may be gradual.

Depth, ft.

Loose to medium dense, gray to brown, slightly gravelly, silty, fine SAND; moist; (Hf) SM.

12.0

Medium dense to dense, brown, slightly silty, fine to medium SAND, trace of gravel; wet; stratified; scattered peat fragments; (Ha) SP-SM.

18.0

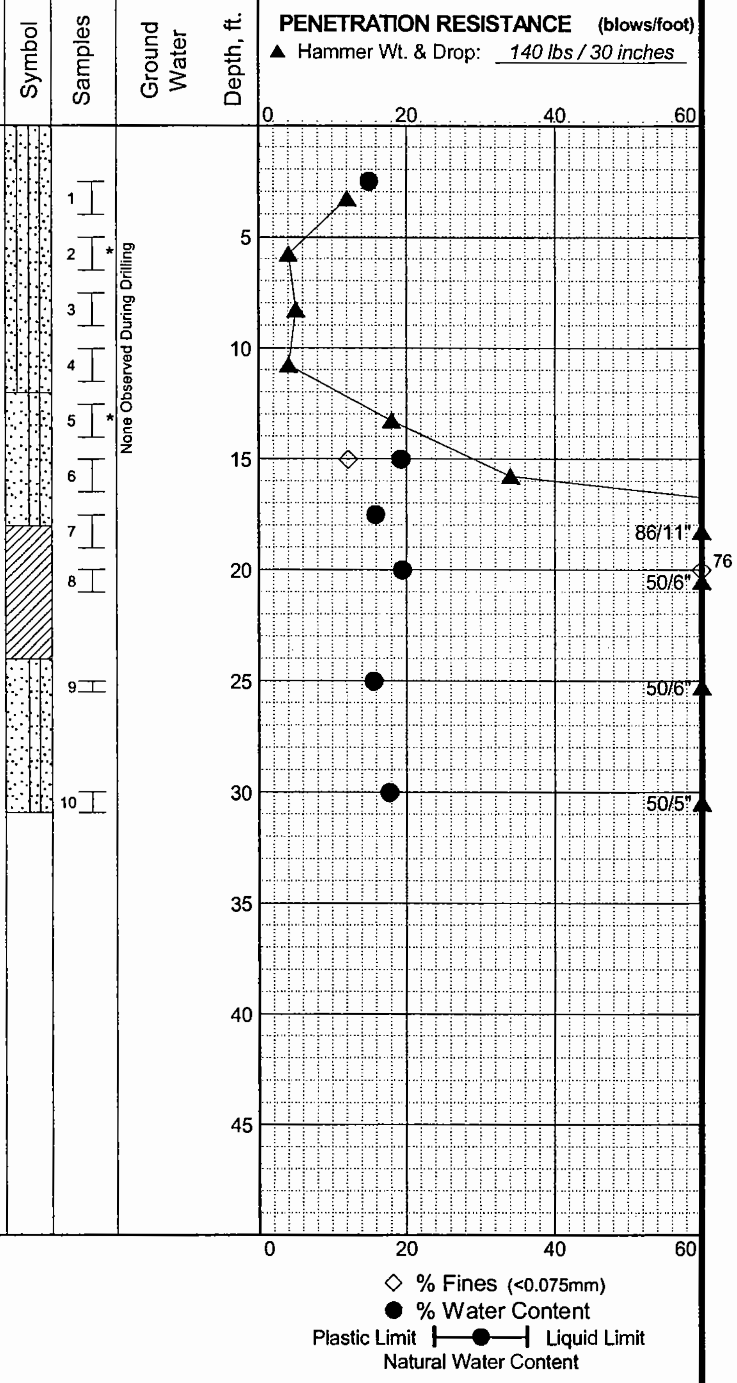
Very dense, gray to gray-blue, fine sandy silty CLAY, trace of gravel; moist; scattered root clasts at 18 feet; scattered iron-oxide stains; scattered pockets of clean, fine to medium sand; (Qvt) SM.

24.0

Very dense, gray-brown, slightly silty, fine to medium SAND, trace of gravel; moist; scattered seams of silt and medium clean sand; (Qva) SP-SM.

30.9

BOTTOM OF BORING
COMPLETED 4/7/2006



LEGEND

* Sample Not Recovered
⌶ Standard Penetration Test

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured using a cloth tape from existing site features and should be considered approximate.

Graves Annex Improvements
University of Washington
Seattle, Washington

LOG OF BORING B-1

May 2006
21-1-20485-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-2

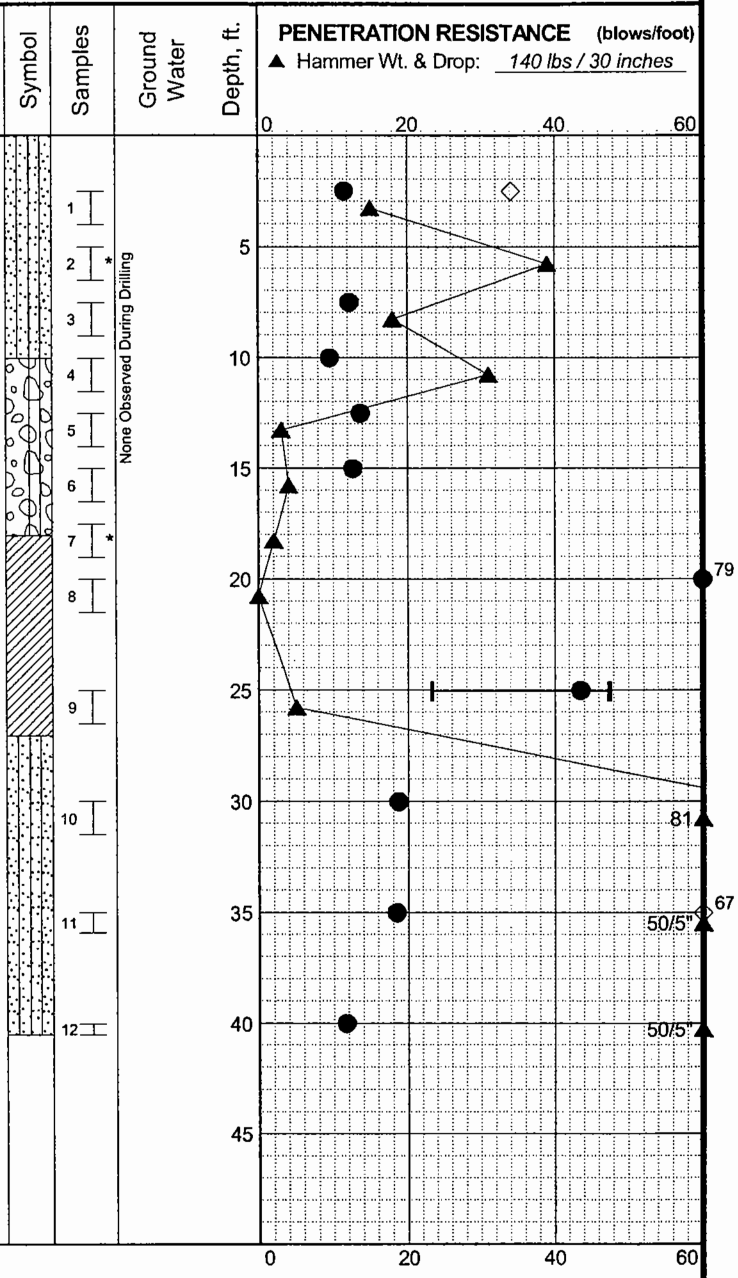
Log: JNB Rev: JNB Typ: LKD

MASTER LOG E 21-20485.GPJ SHAN WIL.GDT 5/5/06

SW06-B-1

Total Depth: 40.5 ft.
Top Elevation: ~ 35 ft.
Vert. Datum: NAVD 88
Horiz. Datum:
Northing:
Easting:
Station:
Offset:
Drilling Method: Mud Rotary
Drilling Company: Boart Longyear
Drill Rig Equipment: Truck Rig
Other Comments: Elevation is approximated from survey map.
Hole Diam.: 4 in.
Rod Type: 2 in.
Hammer Type: Automatic

SOIL DESCRIPTION *Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between soil types, and the transition may be gradual.*	Depth, ft.
Medium dense, gray to brown, slightly gravelly, silty, fine SAND, trace clay; moist; scattered iron-oxide stains and brick fragments; (Hf) SM.	10.0
Very loose to loose, gray to brown, slightly silty, medium to coarse sandy GRAVEL; wet; homogeneous; dense with fine sand and scattered wood fragments at 10 feet; (Ha) GP-GM.	18.0
Soft to medium stiff, brown to gray-black, slightly fine sandy, silty CLAY, trace of gravel; moist; numerous organics; grades sandier from 20 to 22 feet; (Hl/Hp) CL.	27.0
Very dense, light brown to gray, silty, fine SAND and sandy SILT; wet; interbedded; scattered seams of clean medium sand; laminated iron-oxide stains; scattered root clasts at 30 feet; trace of gravel at 40 feet; (Qva) SM/ML.	40.5
BOTTOM OF BORING COMPLETED 4/7/2006	



◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit |—●—| Liquid Limit
Natural Water Content

LEGEND
* Sample Not Recovered
⌶ Standard Penetration Test

NOTES
1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.
4. The hole location was measured using a cloth tape from existing site features and should be considered approximate.

Graves Annex Improvements
University of Washington
Seattle, Washington

LOG OF BORING B-2

May 2006
21-1-20485-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-3

MASTER LOG E 21-20485.GPJ SHAN WIL.GDT 5/5/06
Log: JNB Rev: JNB Typ: LKD

SW06-B-2

BORING NO. 1

Logged By GPM

Date Feb 16, 1987

ELEV. +22.8±

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)
	ML	Gray SILT with sand, some gravel; brown peat @ 4 ft, wet, soft	▽ ▽	I	3	17
	SM	Gray gravelly silty SAND, wet, loose	10	I	10	18
	SP-SM	Gray medium to coarse SAND with chunks of gray till, wet, loose		I	11	11
	ML/SM	Gray SILT with sand, some gravel	20	I	18	11
	SM	Gray silty gravelly SAND, wet; brown peat @ 24 ft		I	11	13
	SM	Gray silty gravelly SAND with peat lenses, loose	30	I	7	10
				II *	21	
	SM	Gray gravelly silty SAND with silt lenses, very dense	40	I	50/4"	16
	SM	Gray silty gravelly SAND with silt lenses, very dense		I	51/6"	9
		Same	50	I	58/6"	12
		Boring completed at depth 48 feet				

GENERAL NOTES FOR BORING LOGS

1. Standard Penetration Test (2.0-inch OD, 1.4-inch ID) indicated thus: I
2. Ring Sample (3.25-inch OD, 2.42-inch ID) indicated thus: II
3. All samplers driven with a 140-pound hammer falling 30 inches.
4. N-values for ring samples have been adjusted to equivalent SPT values.
5. * indicates that the soil sample was lost as the sampler was removed from the borehole.
6. ▽ indicates the highest and the lowest groundwater levels observed.

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BORING LOG
INDOOR TENNIS FACILITY
UNIVERSITY OF WASHINGTON

Proj. No. 457 | Date 3/87 | Figure 4

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		I	51/6"	10
			10			
	SM	Same, with lenses of silt		I	24	16
				II*	4	
			20			
	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		I	10	10
			30			
	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
			40			
	SP	Gray brown slightly silty gravelly SAND				
	SM	Gray brown silty gravelly SAND		I	32	13
		Same		I	50/5"	12
			50			
		Boring completed at depth 48 feet				

See General Notes on Figure 4

TERRA ASSOCIATES

Geotechnical Consultants

BORING LOG

INDOOR TENNIS FACILITY
UNIVERSITY OF WASHINGTON

Proj. No. 457 | Date 3/87 | Figure 5

BORING NO. 1

Logged By DW
Date 2-28-86

ELEV. +26.6

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
		6" Black Topsoil					
	SM	Reddish/brown to brown, gravelly, silty SAND to silty SAND with gravel with trace of organics, loose to medium dense, damp to wet. (fill)		I	10		
			5				
				I	26	10	
			10				
	SM	Brown, gravelly, silty SAND, dense, wet.	▼	3-3-86 I	61	9	
			15				
	ML	Tan, fine, sandy SILT, hard, moist.		I	88/11"	14	
			20				
	SM/SP	Grey/tan, gravelly, silty SAND with lenses of clean sand; grades to tan silty SAND, with gravel, very dense, wet.		I	52/6"	12	
			25				
				I	54-4"	12	
			30				
				I	50-5"	11	
			35				
				I	50/2"		

Boring terminated at 37'-8".
Water observation well installed.
Static groundwater level observed at 12'10" on March 3, 1986
Groundwater level at 7.5 feet on April 1, 1986.

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Geotechnical Consultants

BORING LOG
Bandshack Site
University of Washington
Seattle, Washington

Proj. No. 277	Date March '86	Figure 4

TA86-B-1

BORING NO. 2

Logged By DW
Date 3-3-86

ELEV. +36.5

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
		1" AC over CRB					
				I	7	10	
	SM ML	Brown/black, silty SAND with gravel, some brick and organics, changes to grey, fine, sandy SILT, loose, wet (Fill)	5				
				I	7	12	
			10				
				I	4	11	
			15				
				II	2	5.8	
	PT	Brown peat, soft, wet.	20 ▼	3-3-86			
	ML	Grey, clayey, sandy SILT, soft, wet.		I	10	33	q_u=1.25
	SM SP	Grey, silty SAND with gravel and clay, grades to slightly, silty, gravelly SAND and clean, fine to medium SAND, medium dense, becomes very dense, wet.	25				
				I	40	11	
			30				
				I	83/10"	13	
			35				
				I	78/11"	14	

Boring terminated at 38'-11".
Water observation well installed.
Static groundwater level observed at 20 feet at time of drilling and on April 1, 1986.

TERRA ASSOCIATES
Geotechnical Consultants

BORING LOG
Bandshack Site
University of Washington
Seattle, Washington

Proj. No. 277
Date March '86
Figure 5

TA86-B-2

BORING NO. 3

Logged By DW
Date 3-3-86

ELEV. 39.8

Graph	US CS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
	SM ML	Grey/tan, silty SAND with gravel to sandy SILT with gravel, loose to medium dense, damp to wet. (Fill)	5	I	6	9	
			10	II	5	15	109 pcf
			15	I	15	8	
			20	II	2	12	
			25 ▼	I	8	12	
	PT OL	Brown, woody PEAT with wood chuncks and organic SILT with clay, stiff, moist.	30	I	5	130 154	27 pcf q_u=.75
	SM/SP	Grey, silty, gravelly SAND with clean sand lenses and seams of sandy SILT, medium dense to dense, damp.	35	I	30	13	
			40	I	25	20	
	ML	Grey, gravelly, sandy SILT, very dense, moist.	45	I	50/2"	16	
	SP	Brown, clean SAND with gravel, very dense, wet.	50	I	50/3"	20	
	ML	Blue/grey, sandy SILT with clay and some gravel, very dense, moist.	55	I	50/3"	14	
			60	I	50/3"	13	
				I	50/4"		

Boring terminated at 62'-10".
Water observation well installed.
Static groundwater level observed at 25 feet at time of drilling.
Groundwater level at 22.5 feet on April 1, 1986.

TERRA ASSOCIATES
Geotechnical Consultants

BORING LOG
Bandshack Site
University of Washington
Seattle, Washington

Proj. No. 277	**Date** March '86	**Figure** 6

BORING NO. 4

Logged By DW
Date 2-28-86

ELEV. 26.4

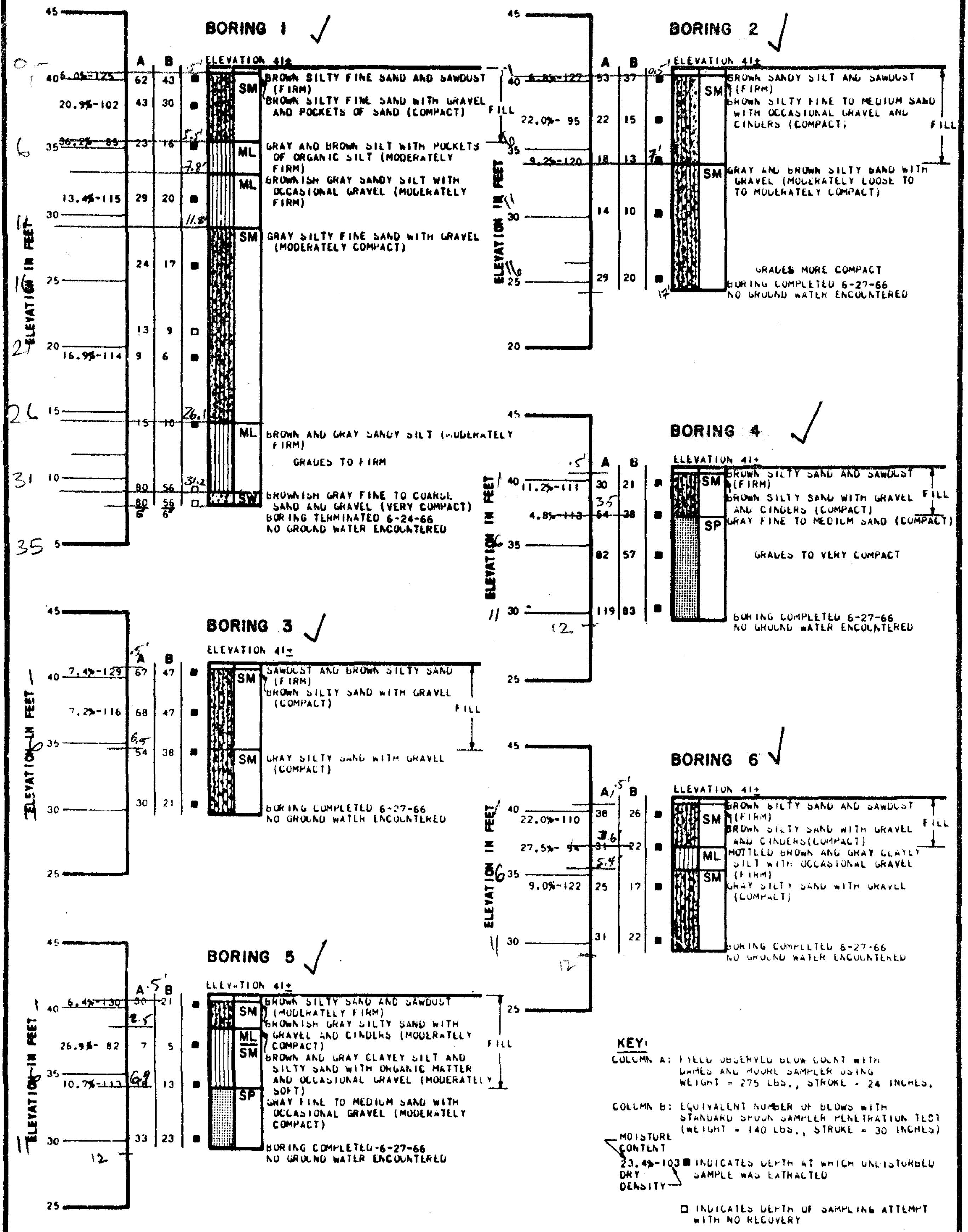
Graph	USCS	Soil Description	Depth (ft.)	Sample	(N) Blows Ft.	W (%)	
▥	SM	1-1/2" AC over 1" CRM					
				I	9		
			5				
		Brown to grey, silty, fine to medium SAND with some gravel to gravelly, silty SAND with trace of organics, loose, moist. (Fill)		I	8	18	
			10				
				I	6	17	
			15				
				I	12	11	
▒	OL PT	Black, organic SILT and PEAT stiff, moist.	20				
▥	SP SM			II	20	40	80.6 pcf
			25				
		Brown, clean, fine to medium SAND, grades to gravelly, silty SAND, very dense, moist. (Till like)		I	58/6"	16	
			30				
				I	50/4"	12	
			35				
				I	50/4"	10	

Boring terminated at 37'-10".
No static groundwater level observed at time of drilling.

TERRA ASSOCIATES
Geotechnical Consultants

BORING LOG
Bandshack Site
University of Washington
Seattle, Washington

Proj. No. 277 | Date March '86 | Figure 7



KEY:

COLUMN A: FIELD OBSERVED BLOW COUNT WITH DAMES AND MOORE SAMPLER USING WEIGHT = 275 LBS., STROKE = 24 INCHES.

COLUMN B: EQUIVALENT NUMBER OF BLOWS WITH STANDARD SPOON SAMPLER PENETRATION TEST (WEIGHT = 140 LBS., STROKE = 30 INCHES)

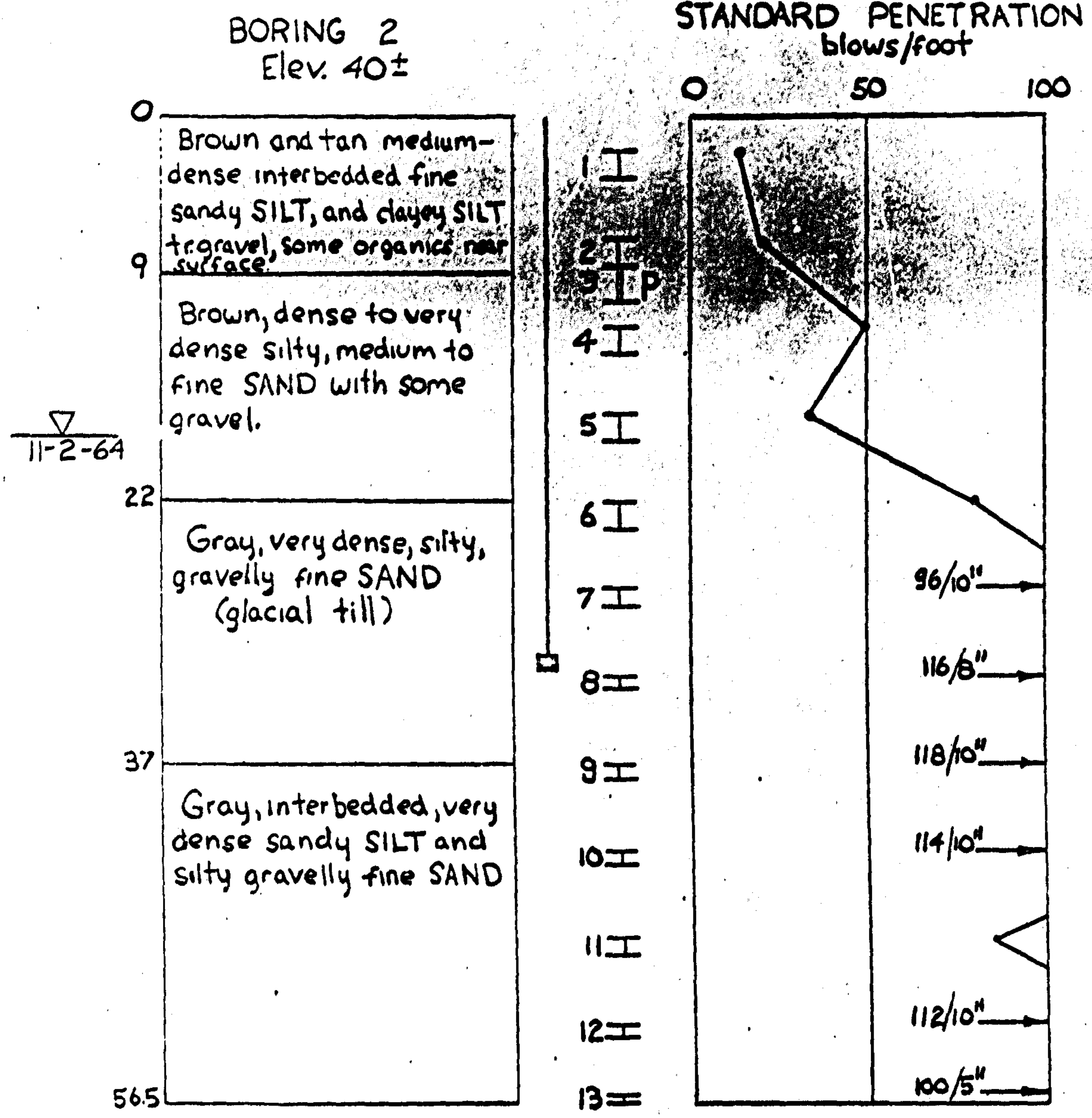
MOISTURE CONTENT
23.4%-103 ■ INDICATES DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED
DRY DENSITY

☐ INDICATES DEPTH OF SAMPLING ATTEMPT WITH NO RECOVERY

LOG OF BORINGS

SOILS INVESTIGATION
SUPPORT OF FLOOR SLAB
EDMUNDSON PAVILION
U. OF W. P. O. NO. 77865-L
JULY 7, 1966
DAMES & MOORE

NOTE:
ELEVATIONS REFER TO CITY OF SEATTLE DATUM.



LEGEND

I 2" splitspoon sample
II 2" shelby sample
P sampler pushed
▽ ground water level
⊥ observation well

NOTE

Standard penetration blow count indicates no. of blows of a 140# hammer falling 30" required to drive sampler 12" unless otherwise shown.

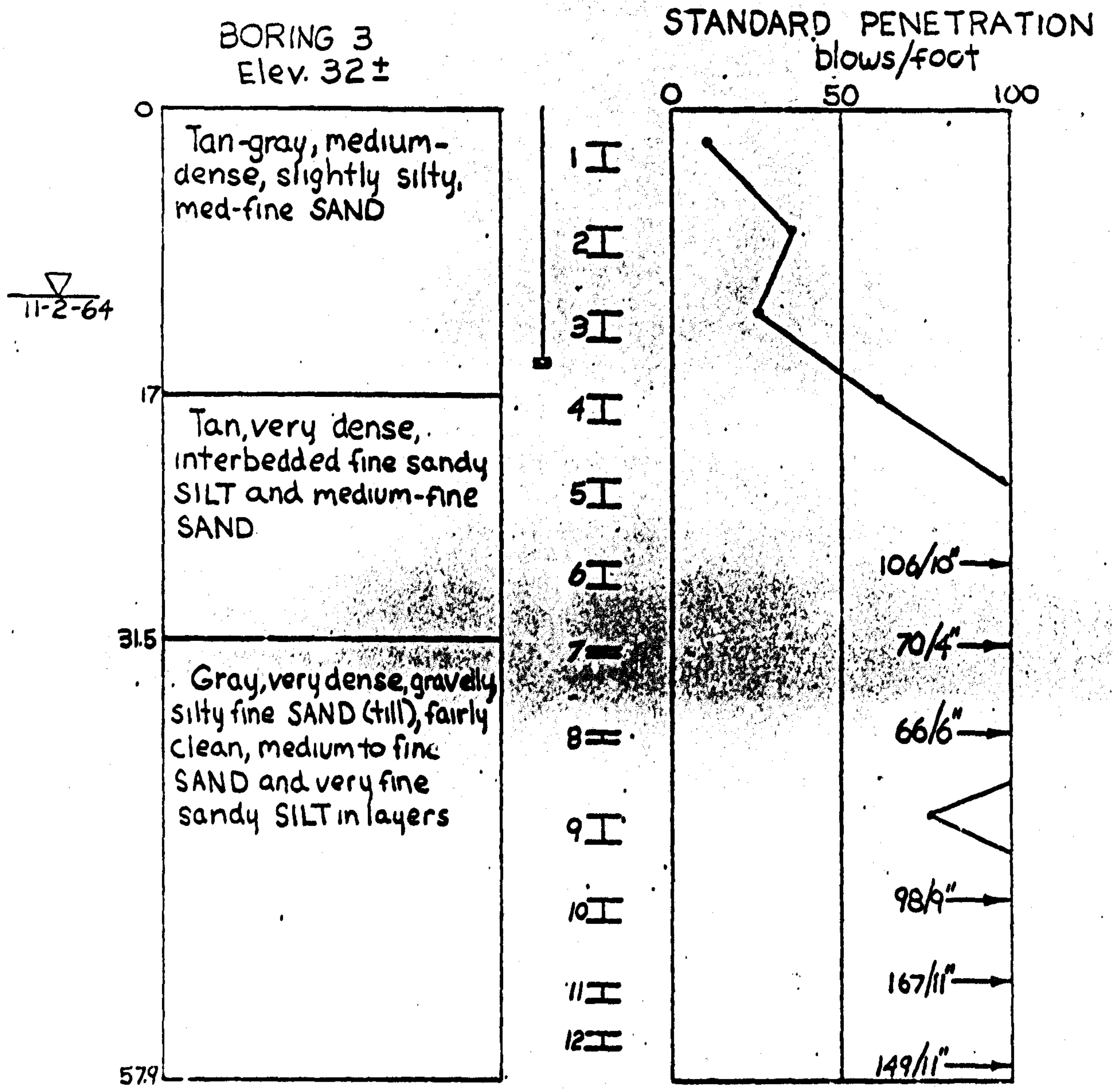
UNIVERSITY OF WASHINGTON
PROJECT-X

BORING 2

W-64-272 October, 1964

SHANNON & WILSON
SOIL MECHANICS & FOUNDATION ENGINEERS

FIG. 5



LEGEND

- I 2" split spoon sample
- ▽ ground water level
- ⊔ observation well

NOTE

Standard penetration blow count indicates no. of blows of a 140# hammer falling 30" required to drive sampler 12" unless otherwise shown.

UNIVERSITY OF WASHINGTON
PROJECT-X

BORING 3

W-64-272 OCTOBER, 1964

SHANNON & WILSON
SOIL MECHANICS & FOUNDATION ENGINEERS

APPENDIX D
Shoring Monitoring Program

APPENDIX D
SHORING MONITORING PROGRAM

Preconstruction Survey

A shoring monitoring program should be established to monitor the performance of the temporary shoring walls and to provide early detection of deflections that could potentially damage nearby improvements. We recommend that a preconstruction survey of adjacent improvements, such as streets, utilities and buildings, be performed prior to commencing construction. The preconstruction survey should include a video or photographic survey of the condition of existing improvements to establish the preconstruction condition, with special attention to existing cracks in streets or buildings.

Optical Survey

The shoring monitoring program should include an optical survey monitoring program. The recommended frequency of monitoring should vary as a function of the stage of construction as presented in the following table.

Construction Stage	Monitoring Frequency
During excavation and until wall movements have stabilized	Twice weekly
During excavation if lateral wall movements exceed 1 inch and until wall movements have stabilized	Three times per week
After excavation is complete and wall movements have stabilized, and before the floors of the building reach the top of the excavation	Twice monthly

Monitoring should include vertical and horizontal survey measurements accurate to at least 0.01 feet. A baseline reading of the monitoring points should be completed prior to beginning excavation. The survey data should be provided to GeoEngineers for review within 24 hours.

For shoring walls, we recommend that optical survey points be established along the top of the shoring walls and at adjacent buildings. The survey points along the top of the shoring wall should be spaced every other soldier pile and every 25 feet for adjacent buildings. GeoEngineers recommends that a survey monitoring plan be developed for GeoEngineers' review prior to establishing the survey points in the field. If lateral wall movements are observed to be in excess of ½ inch between successive readings or if total wall movements exceed 1 inch, construction of the shoring walls should be stopped to determine the cause of the movement and to establish the type and extent of remedial measures required.

APPENDIX E
Report Limitations and Guidelines for Use

APPENDIX E
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 UW ICA Basketball Training/Operations and Health and High Performance (H2P) 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;

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[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 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

GHG 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.

Basketball Training Facility and H2P 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) Embodied	Energy	Transportation	**Lifespan Emissions (MTCO2e)**
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		45.0	39	733	150	**41489**
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: **41489**

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

Arborist Report

Project No. TS -8488

Arborist Report

To:	Gensler, C/O Francesly Sierra
Site:	UW ICA Basketball Facilities 3800 Montlake Blvd NE, Seattle, WA 98195, USA
Re:	Tree Inventory for Development
Date:	June 16, 2022
Project Arborist:	Joseph Sutton-Holcomb ISA Certified Arborist #PN-8397AM Municipal Specialist, Qualified Tree Risk Assessor
Reviewed By:	George White ISA Certified Arborist #PN-8908A ISA Qualified Tree Risk Assessor
Referenced Documents:	Limited Topographic Survey Exhibit: Basketball OPS & H2P Center (Bush Roed & Hitchings, 03/16/2022)
Attached:	Table of trees Annotated Survey with Tree Numbers

Summary

Tree Solutions inventoried and assessed 59 trees within the specified scope area at near the University of Washington ICA Basketball Facilities.

Based on city of Seattle Municipal Code (SMC), trees measuring 6 inches or greater in diameter at standard height (DSH) are required to be assessed for development projects. I used tree numbers from the existing University of Washington tree inventory to identify each tree. The majority of the assessed trees are not physically tagged in the field

Of the trees assessed, two trees (649 and 595) met the exceptional tree criteria outlined in the Seattle Director's Rule 16-2008.

I found no exceptional tree groves on-site (Figure 1). The City defines an exceptional grove as eight (8) or more trees each with a diameter measuring 12 inches or greater with continuously overlapping canopies.

There were no adjacent trees that required documentation for this property. Trees on neighboring properties would be documented if they appeared to be greater than 6-inches diameter and their driplines extended over the property line.

Tree Solutions has reviewed a preliminary site plan and tree removal diagram for permitting related to the State Environmental Policy Act (SEPA). The preliminary site plan shows 33 regulated trees proposed for removal. No exceptional trees are proposed for removal.

Assignment and Scope of Work

This report documents the visit by Joseph Sutton-Holcomb and George White of Tree Solutions Inc. on April 29, 2022, to the above referenced site. We were asked to complete a tree inventory and assessment by Francesly Sierra of Gensler in preparation for construction related to replacement of basketball facilities.

Observations

Site

The inventoried area is between 2602 Snohomish Ln S and 3833 Walla Walla Rd. The majority of the inventoried trees are in a parking lot between those two addresses, or in proximity to the Snohomish Ln N, which is north of the two addresses. Some trees are located to the south of these two addresses, in proximity to Snohomish Ln S. See the site map included in this report for the exact dimensions of the scope area.

The site is zoned as a major institution (MIO-37-LR1) and is generally governed by the University of Washington Master Plan.

ECAs on the site include a liquefaction prone area (ECA5) on the northeastern extent of the site, a historical landfill (ECA7) on the entirety of the site, and a peat settlement area (ECA11) on the entirety of the site.

Trees

Detailed information about each tree inventoried are available in the attached table of trees. I have included an annotated survey of the site to serve as the site map.

Tagging

Some of the inventoried trees were previously tagged by the University of Washington. The majority of the inventoried trees did not have tags, and Tree Solutions did not retag trees using the University of Washington ID numbers or new ID numbers. Tree Solutions used GIS data from the University of Washington to annotate the provided site survey with the UW ID numbers.

Tree Data

The trees inventoried on this site were primarily non-native deciduous trees planted by the University of Washington. Many of the trees are growing in limited soil volumes and have limited space for their crowns due to infrastructure conflicts such as buildings, right-of-ways, and pedestrian paths.

Tree species inventoried consisted primarily of red oak (*Quercus rubra*) and scarlet oak (*Quercus coccinea*). Other species inventoried include Tulip tree (*Liriodendron tulipifera)* European hornbeam (*Carpinus betulus* ‘Fastigiata’), Japanese snow drop (*Styrax japonicus*) and redbud (*Cercis canadensis*), as well as a number of other species. Specific information about each tree is documented in the attached table of trees.

The majority of the inventoried trees ranged from good to fair in health and structural condition. Two trees (535 and 544) were rated to be in poor health condition. We inventoried no trees in poor structural condition.

Many inventoried trees, while not in poor health or structural condition, may be short-lived due to limited soil volumes and serious infrastructure conflicts. For example, many of the oak trees in the parking lot are planted in very small concrete planters. Limited soil volumes for large stature trees like these tend to shorten tree life expectancy and damage the infrastructure, as the trees must continually grow larger and have access to increasing volumes of water and soil in order to remain good health and vigor.

Several trees below the regulated size threshold for the City of Seattle are shown on the survey. These trees are identified as “non-regulated” on the annotated survey attached this report.

Discussion – Construction Impacts

This report is preliminary as we have not reviewed a complete set design or construction plans for this area. This report should be updated once construction plans are available.

We have reviewed a preliminary site plan and tree removal diagram associated with SEPA permitting.

Tree Removals

The preliminary plans we reviewed show 33 regulated trees proposed for removal. No exceptional trees are proposed for removal.

All proposed removals are either in proximity to the existing building proposed for demolition, or planted in the parking lot to the east of the building, which will be used for equipment and vehicle access, as well as staging area for construction materials.

Several trees below the regulated threshold for the City of Seattle are also proposed for removal. These trees are identified on the site plan as “non-regulated” and indicated for removal for informational purposes.

Tree Retention

Several trees in proximity to the existing basketball facility are of higher retention value due to the fact that they were planted in larger soil volumes and thus have developed into better specimens relative to trees in the vicinity planted in smaller soil volumes. These trees should be prioritized for retention the greatest extent feasible. They are identified below.

Trees 500, 501, 502, 503, 504, 505

A group of oak trees on the eastern edge of the existing parking lot.

Trees 578, 579, 580, 581, 582, 583

A group of oak trees on the western edge of the existing parking lot. Their proximity to the building may make retention challenging, however, they are growing approximately 20 feet from the existing foundation and protecting some of them may be feasible depending on the proposed footprint of the new facility. Preliminary plans show these trees proposed for removal.

Trees 585, 586, 587, 588, 589
A group of tulip trees growing in a triangular planting bed to the south of the existing facility. Tree 585 may be difficult to retain depending on the scope of proposed demolition due to its proximity to the existing building, but this is a group of healthy large stature trees growing in a relatively large volume of soil. Preliminary plans show these trees proposed for removal.

Trees 590, 591, 592, 593, 594
Another group of tulip trees growing to the south of the existing facility, a short distance east from trees 585-589. These trees are of similar age and condition to that group and are growing in a similar soil volume. Preliminary plans show these trees proposed for removal.

Tree Protection
All retained trees must be protected to the tree protection specifications outlined in appendix F. This includes the establishment of Tree Protection Areas (TPAs) with tree protection fencing, and may require alternative excavation, soil/canopy protection, and arborist monitoring. Plans should account for the feasibility of tree protection measures.

Recommendations

- When construction plans are available, Tree Solutions should review impacts to retained site trees and update this arborist report to discuss tree protection protocols.
- Regulated trees removed from the site to accommodate construction shall be replaced at a 2:1 ratio consistent with University of Washington policy.
- Site planning around exceptional trees must follow requirements outlined in SMC 25.11.050. [1]
- Site planning around trees in critical areas must follow requirements in SMC 25.09.070.[2]
- All pruning should be conducted by an ISA certified arborist and following ANSI A300 specifications.[3]

Respectfully Submitted,

Joseph Sutton-Holcomb
Tree Solutions Inc.

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

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

[3] Accredited Standards Committee A300 (ASC 300). ANSI A300 (Part 1) Tree, Shrub, and Other Woody Plant Management – Standard Practices (Pruning). Londonderry: Tree Care Industry Association, 2017.

Appendix A **Glossary**

ANSI A300: American National Standards Institute (ANSI) standards for tree care

DBH or DSH: diameter at breast or standard height; the diameter of the trunk measured 54 inches (4.5 feet) above grade (Council of Tree and Landscape Appraisers 2019)

ISA: International Society of Arboriculture

Regulated Tree: A tree required by municipal code to be identified in an arborist report.

Visual Tree Assessment (VTA): method of evaluating structural defects and stability in trees by noting the pattern of growth. Developed by Claus Mattheck (Harris, *et al* 1999)

Appendix B **References**

Accredited Standards Committee A300 (ASC 300). ANSI A300 (Part 1) Tree, Shrub, and Other Woody Plant Management – Standard Practices (Pruning). Londonderry: Tree Care Industry Association, 2017.

Council of Tree and Landscape Appraisers, Guide for Plant Appraisal, 10th Edition, Second Printing. Atlanta, GA: The International Society of Arboriculture (ISA), 2019.

Mattheck, Claus and Helge Breloer, The Body Language of Trees.: A Handbook for Failure Analysis. London: HMSO, 1994.

Seattle Municipal Code 25.09.070. Standards for Trees and Vegetation in Critical Areas.

Seattle Municipal Code 25.11.050. General Provisions for Exceptional Trees.

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

Appendix C **Site Map**

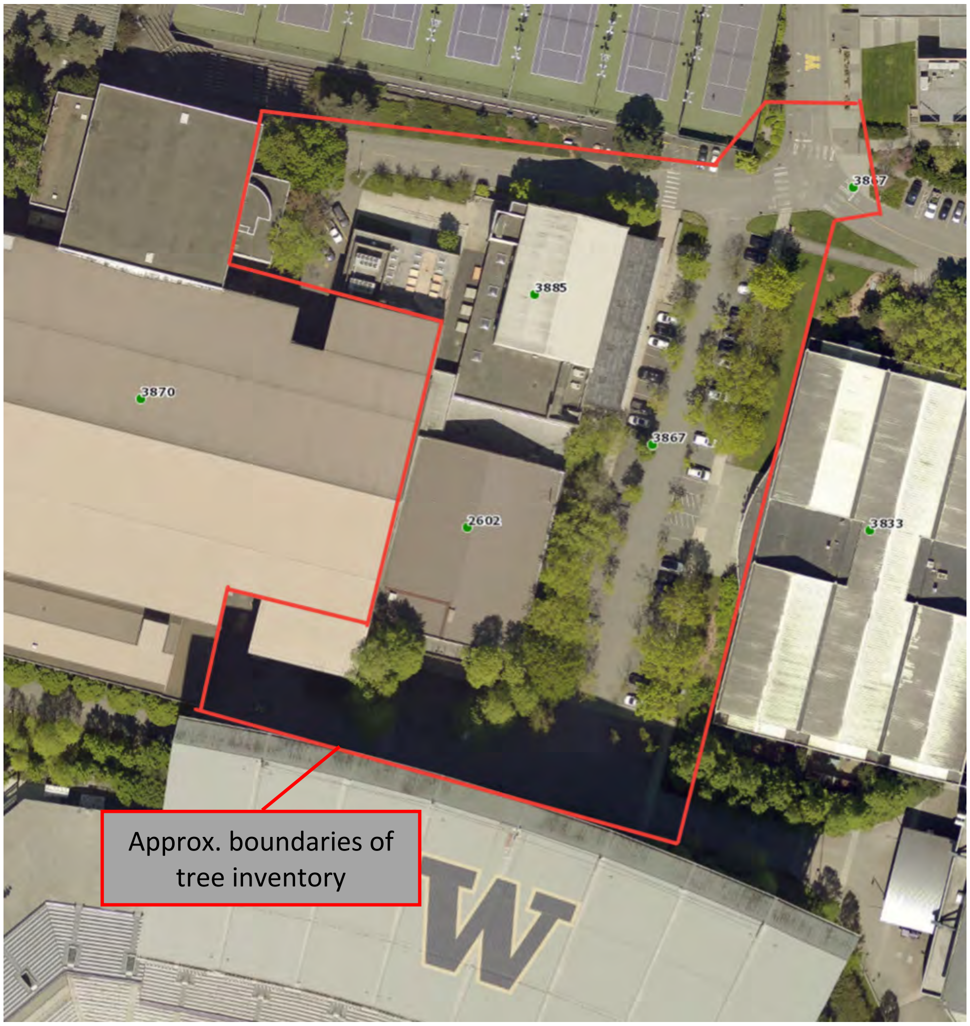


Figure 1. An aerial image of the site with the approximate tree inventory boundaries shown (Source: Seattle Dept. of Construction & Inspections GIS, accessed Sept 1, 2021).

Appendix D **Photographs**

Photo 1. A view of the existing parking lot, which is planted with numerous oak trees. Note the small size and decreased vigor of the trees in the small planters and the larger size of the oaks growing in larger soil volumes in the background.

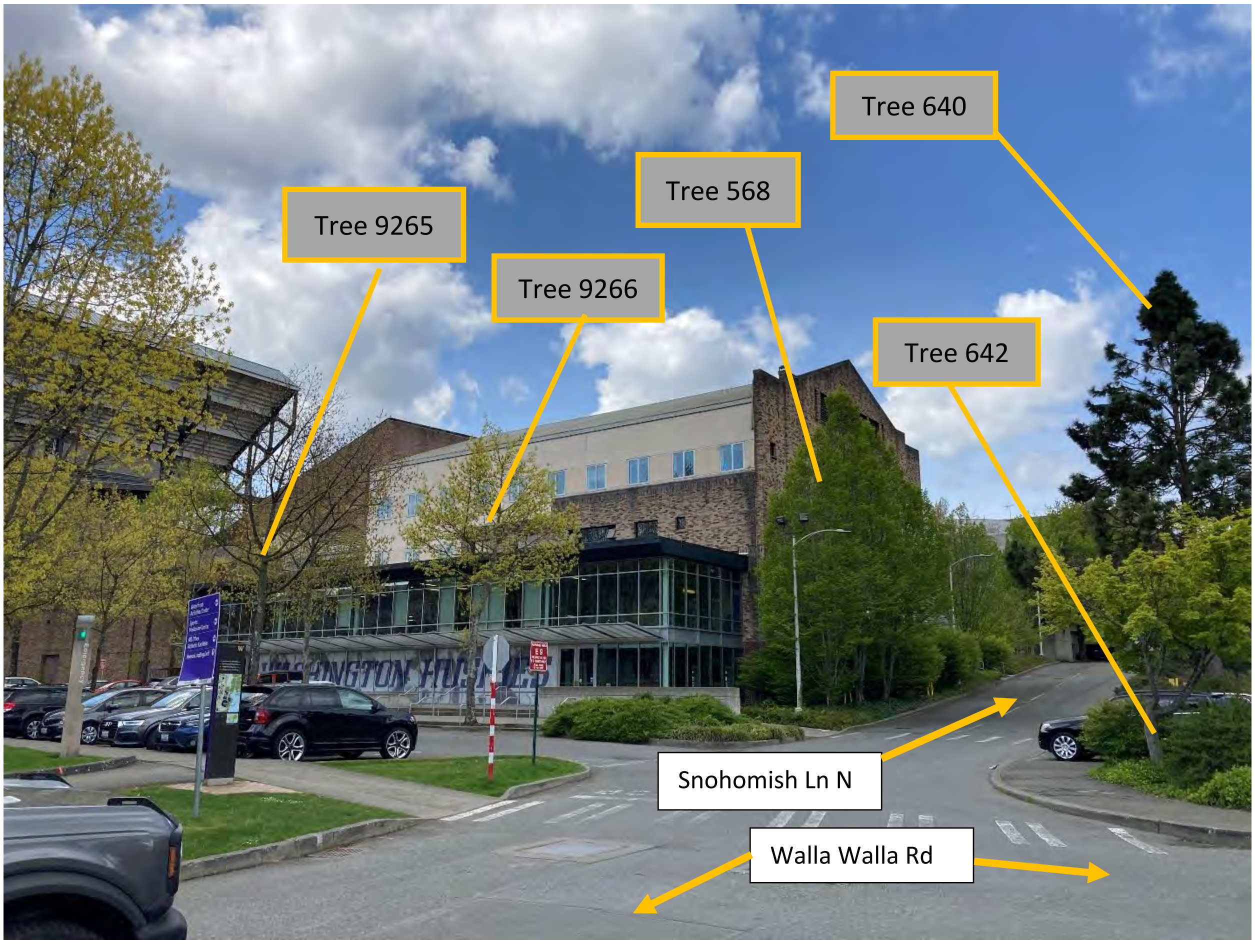


Photo 2. A view looking southwest at the intersection of Snohomish Ln N and Walla Walla Rd, near the northern limits of the scope area. Trees visible in the photo are identified.

Photo 3. A view looking northeast at two clusters of tulip trees. Trees 590-594 are in the foreground, and trees 585-589 are visible in the background.

Appendix E **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 a 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 the 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 this report were taken by Tree Solutions, Inc. during the documented site visit, unless otherwise noted. Sketches, drawings, and photographs (included in, and attached to, this report) are intended as visual aids and are not necessarily to scale. They should not be construed as engineering drawings, 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 the 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 do not provide guarantees regarding the future performance, health, vigor, structural stability, or safety of the plants described and 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 F **Methods**

Measuring

I measured the diameter of each tree at 54 inches above grade, diameter at standard height (DSH). If a tree had multiple stems, I measured each stem individually at standard height and determined a single-stem equivalent diameter by using the method outlined in the city of Seattle Director's Rule 16-2008 or the Guide for Plant Appraisal, 10th Edition Second Printing published by the Council of Tree and Landscape Appraisers. A tree is regulated based on this single-stem equivalent diameter value. Because this value is calculated in the office following field work, some trees in our data set may have diameters smaller than 6 inches. These trees are included in the tree table for informational purposes only and not factored into tree totals discussed in this report.

Tagging

I tagged each tree with a circular aluminum tag at eye level. I assigned each tree a numerical identifier on our map and in our tree table, corresponding to this tree tag. I used alphabetical identifiers for trees off-site.

Evaluating

I evaluated tree health and structure utilizing visual tree assessment (VTA) methods. The basis behind VTA is the identification of symptoms, which the tree produces in reaction to a weak spot or area of mechanical stress. A tree reacts to mechanical and physiological stresses by growing more vigorously to re-enforce weak areas, while depriving less stressed parts. An understanding of the uniform stress allows the arborist to make informed judgments about the condition of a tree.

Rating

When rating tree health, I took into consideration crown indicators such as foliar density, size, color, stem and shoot extensions. When rating tree structure, I evaluated the tree for form and structural defects, including past damage and decay. Tree Solutions has adapted our ratings based on the Purdue University Extension formula values for health condition (*Purdue University Extension bulletin FNR-473-W* - *Tree Appraisal*). These values are a general representation used to assist arborists in assigning ratings.

> Excellent - Perfect specimen with excellent form and vigor, well-balanced crown. Normal to exceeding shoot length on new growth. Leaf size and color normal. Trunk is sound and solid. Root zone undisturbed. No apparent pest problems. Long safe useful life expectancy for the species.
>
> Good - Imperfect canopy density in few parts of the tree, up to 10% of the canopy. Normal to less than ¾ typical growth rate of shoots and minor deficiency in typical leaf development. Few pest issues or damage, and if they exist, they are controllable, or tree is reacting appropriately. Normal branch and stem development with healthy growth. Safe useful life expectancy typical for the species.
>
> Fair - Crown decline and dieback up to 30% of the canopy. Leaf color is somewhat chlorotic/necrotic with smaller leaves and "off" coloration. Shoot extensions indicate some stunting and stressed growing conditions. Stress cone crop clearly visible. Obvious signs of pest problems contributing to lesser condition, control might be possible. Some decay areas found in main stem and branches. Below average safe useful life expectancy
>
> Poor - Lacking full crown, more than 50% decline and dieback, especially affecting larger branches. Stunting of shoots is obvious with little evidence of growth on smaller stems. Leaf size and color reveals overall stress in the plant. Insect or disease infestation may be severe and uncontrollable. Extensive decay or hollows in branches and trunk. Short safe useful life expectancy.

Appendix G **Tree Protection Specifications**

The following is a list of protection measures that must be employed before, during and after construction to ensure the long-term viability of retained trees.

1. **Project Arborist:** The project arborists shall at minimum have an International Society of Arboriculture (ISA) Certification and ISA Tree Risk Assessment Qualification.
2. **Tree Protection Area (TPA):** TPA is the area within the dripline of all retained trees. The TPA for non-exceptional trees may be reduced to within the dripline based on the recommendation of the project arborist. The TPA for exceptional trees may be reduced to within the dripline based on the recommendation of the project arborist and approval by the City of Seattle.
3. **Tree Protection Fencing:** Tree protection fencing shall consist of 6-foot tall chain-link fencing installed at the edge of the TPA as approved by the project arborist. Fence posts shall be anchored into the ground or bolted to existing hardscape surfaces.
    a. Where trees are being retained as a group the fencing shall encompass the entire area including all landscape beds or lawn areas associated with the group.
    b. Per arborist approval, TPA fencing may be placed at the edge of existing hardscape within the TPA to allow for staging and traffic.
    c. Where work is planned within the TPA, install fencing at edge of TPA and move to limits of disturbance at the time that the work within the TPA is planned to occur. This ensures that work within the TPA is completed to specification.
    d. Where trees are protected at the edge of the project boundary, construction limits fencing shall be incorporated as the boundary of tree protection fencing.
4. **Access Beyond Tree Protection Fencing:** In areas where work such as installation of utilities is required within the TPA, a locking gate will be installed in the fencing to facilitate access. The project manager or project arborist shall be present when tree protection areas are accessed.
5. **Tree Protection Signage:** Tree protection signage shall be affixed to fencing every 20 feet. Signage shall be fluorescent, at least 2' x 2' in size. Signage must include all information in the PDF located here: http://www.seattle.gov/Documents/Departments/SDCI/Codes/TreeProtectionAreaSign.pdf in addition to the contact information for the project manager and instructions for gaining access to the area.
6. **Filter / Silt Fencing:** Filter / silt fencing within, or at the edge of the TPA of retained trees shall be installed in a manner that does not sever roots. Install so that filter / silt fencing sits on the ground and is weighed in place by sandbags or gravel. Do not trench to insert filter / silt fencing into the ground.
7. **Monitoring:** The project arborist shall monitor all ground disturbance at the edge of or within the TPA.
8. **Soil Protection:** Retain existing paved surfaces within or at the edge of the TPA for as long as possible. No parking, foot traffic, materials storage, or dumping (including excavated soils) are allowed within the TPA. Heavy machinery shall remain outside of the TPA. Access to the tree protection area will be granted under the supervision of the project arborist. If project arborist allows, heavy machinery can enter the area if soils are protected from the load. Acceptable methods of soil protection include placing 3/4-inch plywood over 4 to 6 inches of wood chip mulch, or use of AlturnaMats® (or equivalent product approved by the project arborist). Compaction of soils within the TPA must not occur.
9. **Soil Remediation:** Soil compacted within the TPA of retained trees shall be remediated using pneumatic air excavation according to a specification produced by the project arborist.

10. **Canopy Protection**: Where fencing is installed at the limits of disturbance within the TPA, canopy management (pruning or tying back) shall be conducted to ensure that vehicular traffic does not damage canopy parts. Exhaust from machinery shall be located 5 feet outside the dripline of retained trees. No exhaust shall come in contact with foliage for prolonged periods of time.
11. **Duff/Mulch:** Apply 6 inches of arborist wood chip mulch or hog fuel over bare soil within the TPA to prevent compaction and evaporation. TPA shall be free of invasive weeds to facilitate mulch application. Keep mulch 1 foot away from the base of trees and 6 inches from retained understory vegetation. Retain and protect as much of the existing duff and understory vegetation as possible.
12. **Excavation:** Excavation done within the TPA shall use alternative methods such as pneumatic air excavation or hand digging. If heavy machinery is used, use flat front buckets with the project arborist spotting for roots. When roots are encountered, stop excavation and cleanly sever roots. The project arborist shall monitor all excavation done within the TPA.
13. **Fill:** Limit fill to 1 foot of uncompacted well-draining soil, within the TPA of retained trees. In areas where additional fill is required, consult with the project arborist. Fill must be kept at least 1 foot from the trunks of trees.
14. **Root Pruning:** Limit root pruning to the extent possible. All roots shall be pruned with a sharp saw making clean cuts. Do not fracture or break roots with excavation equipment.
15. **Root Moisture:** Root cuts and exposed roots shall be immediately covered with soil, mulch, or clear polyethylene sheeting and kept moist. Water to maintain moist condition until the area is back filled. Do not allow exposed roots to dry out before replacing permanent back fill.
16. **Hardscape Removal:** Retain hardscape surfaces for as long as practical. Remove hardscape in a manner that does not require machinery to traverse newly exposed soil within the TPA. Where equipment must traverse the newly exposed soil, apply soil protection as described in section 8. Replace fencing at edge of TPA if soil exposed by hardscape removal will remain for any period of time.
17. **Tree Removal:** All trees to be removed that are located within the TPA of retained trees shall not be ripped, pulled, or pushed over. The tree should be cut to the base and the stump either left or ground out. A flat front bucket can also be used to sever roots around all sides of the stump, or the roots can be exposed using hydro or air excavation and then cut before removing the stump.
18. **Irrigation:** Retained trees with soil disturbance within the TPA will require supplemental water from June through September. Acceptable methods of irrigation include drip, sprinkler, or watering truck. Trees shall be watered three times per month during this time.
19. **Pruning:** 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 2017 Standard Practices for Pruning. Pruning shall be conducted or monitored by an arborist with an ISA Certification.
20. **Plan Updates:** All plan updates or field modification that result in impacts within the TPA or change the retained status of trees shall be reviewed by the senior project manager and project arborist prior to conducting the work.
21. **Materials:** Contractor shall have the following materials on-site and available for use during work in the TPA:
    - **Sharp and clean bypass hand pruners**
    - **Sharp and clean bypass loppers**
    - **Sharp hand-held root saw**
    - **Reciprocating saw with new blades**
    - **Shovels**
    - **Trowels**
    - **Clear polyethylene sheeting**
    - **Burlap**
    - **Water**

Table of Trees

UW ICA Basketball Facility , Seattle, WA

Arborist: JSH, GW
Date of Inventory: 04.29.2022
Table Prepared: 06.16.2022

DSH (Diameter at Standard Height) is measured 4.5 feet above grade, or as specified in the Guide for Plant Appraisal, 10th Edition , published by the Council of Tree and Landscape Appraisers.
DSH for multi-stem trees are noted as a single stem equivalent, which is calculated using the method defined in the Director's Rule 16-2008.
Letters are used to identify trees on neighbouring properties 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**	**Proposed Action**	**Notes**
423	*Liriodendron tulipifera*	Tulip tree	14.1		Good	Good	14.6	18.6	16.6	16.6	*30.0*	-	Retain	crown encroaches on stadium
424	*Liriodendron tulipifera*	Tulip tree	12.5		Good	Fair	16.5	15.0	10.5	10.5	*30.0*	-	Retain	kink in trunk
500	*Quercus coccinea*	Scarlet oak	23.2		Good	Good	22.0	23.0	19.5	18.0	*30.0*	-	Retain	abuts sidewalk, stable codominant union at 6 feet
501	*Quercus coccinea*	Scarlet oak	14.5		Good	Good	21.6	25.1	21.1	28.6	*30.0*	-	Retain	trunk 1 foot from sidewalk
502	*Quercus coccinea*	Scarlet oak	24.0		Good	Good	25.0	28.0	22.0	27.0	*30.0*	-	Retain	trunk abuts sidewalk
503	*Quercus coccinea*	Scarlet oak	22.1		Good	Good	19.9	23.9	24.9	23.9	*30.0*	-	Retain	trunk abuts sidewalk, subdominant stem with stable union
504	*Quercus coccinea*	Scarlet oak	19.1		Good	Good	23.8	16.8	20.8	22.8	*30.0*	-	Retain	trunk 1 foot from sidewalk
505	*Quercus coccinea*	Scarlet oak	22.3		Good	Good	21.9	21.9	27.9	26.9	*30.0*	-	Retain	trunk abuts sidewalk
506	*Quercus coccinea*	Scarlet oak	16.0		Good	Good	16.2	17.7	19.7	18.7	*30.0*	-	Retain	new sidewalk at base
533	*Quercus rubra*	Red oak	10.3		Fair	Fair	14.9	10.4	13.9	14.4	*30.0*	-	Remove	partially enveloped ID tag ends in 3
534	*Quercus rubra*	Red oak	9.5		Good	Good	22.4	15.4	17.4	16.4	*30.0*	-	Remove	limited soil volume, large pruning wounds
535	*Quercus rubra*	Red oak	6.4		Poor	Fair	11.3	11.3	11.3	11.3	*30.0*	-	Remove	large pruning wounds, stressed, limited volume
536	*Quercus rubra*	Red oak	11.1		Fair	Good	17.0	10.0	17.0	14.0	*30.0*	-	Remove	very limited soil volume, lifting curb
542	*Quercus rubra*	Red oak	6.0		Good	Good	9.3	11.3	12.3	11.8	*30.0*	-	Remove	crown raised
543	*Quercus rubra*	Red oak	6.2		Fair	Fair	11.8	6.8	6.3	7.3	*30.0*	-	Remove	large wound on trunk at 2 to 3 feet
544	*Quercus rubra*	Red oak	5.9		Poor	Fair	7.2	7.2	7.2	7.2	*30.0*	-	Remove	low vigor, crown dieback
546	*Quercus rubra*	Red oak	9.1		Good	Fair	16.9	16.4	15.4	10.4	*30.0*	-	Remove	minor dieback, pruning wounds from crown raising
552	*Styrax japonicus*	Japanese snowbell	6.8	3.9,4.8,2.9	Good	Good	8.3	7.3	6.3	7.3	*12.0*	-	Retain	-
554	*Styrax japonicus*	Japanese	6.5	4.6,3,3.4	Fair	Good	7.3	7.3	7.3	7.3	*12.0*	-	Retain	minor dieback
556	*Styrax japonicus*	Japanese	5.9	3.3,3,3.9	Fair	Good	10.2	10.2	10.2	10.2	*12.0*	-	Retain	dead stem, appears stressed
557	*Styrax japonicus*	Japanese	7.4	4.2,6.1	Fair	Good	11.3	11.3	11.3	11.3	*12.0*	-	Retain	hypericum and blackberry at base
565	*Carpinus betulus*	European hornbeam	9.0		Good	Good	10.9	14.4	7.4	12.4	*16.0*	-	Retain	limited soil volume, abuts existing ramp
566	*Carpinus betulus*	European hornbeam	11.2	5.6,3,9.2	Good	Good	14.0	12.5	15.5	12.0	*16.0*	-	Retain	-
567	*Carpinus betulus*	European hornbeam	10.3		Good	Good	12.9	15.4	15.4	12.4	*16.0*	-	Retain	ivy at base, contiguous canopy with adjacent hornbeams

Table of Trees

UW ICA Basketball Facility , Seattle, WA

Arborist: JSH, GW
Date of Inventory: 04.29.2022
Table Prepared: 06.16.2022

Tree ID	Scientific Name	Common Name	DSH (inches)	DSH Multistem	Health Condition	Structural Condition	N	E	S	W	Exceptional Threshold	Exceptional by Size	Proposed Action	Notes
568	*Carpinus betulus*	European hornbeam	9.1	8.5,3.3	Good	Good	12.9	12.4	12.4	11.4	*16.0*	-	Retain	ivy, hypericum, blackberry at base
575	*Acer circinatum*	Vine maple	5.3	3.6,3.9	Good	Good	11.2	6.2	2.2	2.7	*8.0*	-	Remove	trunk 2.5 feet from building to west
576	*Acer circinatum*	Vine maple	6.9	5.3,2.1,3.3,2	Good	Good	17.3	14.3	10.3	5.8	*8.0*	-	Remove	trunk 5 feet from building
577	*Acer circinatum*	Vine maple	8.0	4.6,4.3,4.9	Good	Good	12.8	14.3	11.3	9.3	*8.0*	-	Remove	trunk 3 feet from building
578	*Quercus rubra*	Red oak	13.4		Good	Good	19.1	15.6	17.6	18.6	*30.0*	-	Remove	trunk 2 feet from concrete to east and north
579	*Quercus rubra*	Red oak	12.0		Good	Good	18.5	18.5	18.5	18.5	*30.0*	-	Remove	-
580	*Quercus rubra*	Red oak	21.9		Good	Good	25.9	27.4	27.9	27.9	*30.0*	-	Remove	trunk 2 feet from sidewalk, 22 feet from building
581	*Quercus rubra*	Red oak	16.8		Good	Good	17.7	19.7	20.2	24.7	*30.0*	-	Remove	20 feet from building 2 feet from sidewalk
582	*Quercus rubra*	Red oak	16.3		Good	Good	22.7	27.7	28.7	28.7	*30.0*	-	Remove	trunk 21 feet from building
583	*Quercus rubra*	Red oak	19.6		Good	Good	24.8	28.8	29.8	26.8	*30.0*	-	Remove	trunk 21 feet from building
584	*Quercus rubra*	Red oak	12.3		Good	Good	18.5	25.0	22.5	20.5	*30.0*	-	Remove	pruning wounds from past crown raising
585	*Liriodendron tulipifera*	Tulip tree	15.7		Good	Good	17.7	15.7	18.7	17.7	*30.0*	-	Remove	girdling roots, trunk seven feet from building on north and east side
586	*Liriodendron tulipifera*	Tulip tree	13.1		Good	Good	26.5	24.5	13.0	12.5	*30.0*	-	Remove	-
587	*Liriodendron tulipifera*	Tulip tree	12.3		Good	Good	17.5	18.5	16.5	15.5	*30.0*	-	Remove	-
588	*Liriodendron tulipifera*	Tulip tree	15.9		Good	Good	19.7	20.7	18.7	20.7	*30.0*	-	Remove	girdling roots, gas line 3 feet from base
589	*Liriodendron tulipifera*	Tulip tree	12.8		Good	Good	16.5	18.5	15.5	18.0	*30.0*	-	Remove	girdling roots
590	*Liriodendron tulipifera*	Tulip tree	15.9		Good	Fair	27.7	25.2	26.7	22.7	*30.0*	-	Remove	codominant stems with narrow union, trunk 7 feet from building, trunk lean to east
591	*Liriodendron tulipifera*	Tulip tree	19.7		Good	Good	27.8	15.8	18.8	15.8	*30.0*	-	Remove	branches abut building, structural roots abut foundation, trunk 7.5 feet from building
592	*Liriodendron tulipifera*	Tulip tree	13.4		Good	Good	14.6	15.6	16.6	14.6	*30.0*	-	Remove	-
593	*Liriodendron tulipifera*	Tulip tree	14.6		Good	Good	13.1	15.1	14.6	14.1	*30.0*	-	Remove	trunk 13 feet from building corner
594	*Liriodendron tulipifera*	Tulip tree	18.6		Good	Good	16.8	18.3	22.8	21.8	*30.0*	-	Remove	-
595	*Arbutus unedo*	Strawberry tree	12.7	9.5,8.5	Good	Good	6.5	13.5	19.0	15.0	*10.2*	Exceptional	Retain	pruning wounds from previous stem removal, trunk 4 feet from building, gravel and curb abut trunk
640	*Pinus jeffreyi*	Jeffrey pine	26.1		Fair	Fair	18.1	19.1	22.1	18.6	*30.0*	-	Retain	codominant at 35 feet, signs of needlecast fungi on foliage, history of crown raising, limited soil volume, possible previous storm damage based on missing scaffold branches in crown
642	*Acer palmatum*	Japanese maple	7.4		Fair	Good	10.8	9.3	6.8	12.8	*12.0*	-	Retain	mildly stressed, limited soil volume

Tree
Solutions Inc
Consulting Arborists

Table of Trees

UW ICA Basketball Facility , Seattle, WA

Arborist: JSH, GW
Date of Inventory: 04.29.2022
Table Prepared: 06.16.2022

Tree ID	Scientific Name	Common Name	DSH (inches)	DSH Multistem	Health Condition	Structural Condition	N	E	S	W	Exceptional Threshold	Exceptional by Size	Proposed Action	Notes
649	*Cercis canadensis*	Redbud	10.5		Good	Good	11.4	9.4	12.4	10.9	*9.5*	Exceptional	Retain	trunk buried in mulch, wire beaver guard at base
9234	*Quercus rubra*	Red oak	8.3		Fair	Good	20.3	18.3	16.3	15.3	*30.0*	-	Remove	limited soil volume
9262	*Quercus rubra*	Red oak	8.0		Good	Good	12.3	11.3	12.3	14.3	*30.0*	-	Remove	good vigor, limited soil volume
9263	*Quercus rubra*	Red oak	7.7		Fair	Good	12.3	10.3	11.3	11.3	*30.0*	-	Remove	limited soil volume
9265	*Quercus rubra*	Red oak	10.4		Good	Good	15.9	15.9	15.9	15.9	*30.0*	-	Remove	-
9266	*Quercus rubra*	Red oak	10.6		Good	Good	15.4	11.4	15.9	15.4	*30.0*	-	Remove	very limited soil volume, signs of recent concrete work in dripline
9415	*Pinus sylvestris*	Scots pine	6.3		Good	Good	8.3	8.3	8.3	8.3	*24.0*	-	Retain	tagged as 108 in field
9418	*Pinus jeffreyi*	Jeffrey pine	7.0		Good	Good	8.3	8.3	8.3	8.3	*30.0*	-	Retain	tagged as 107 in field, hypericum at base
9873	*Pinus densiflora*	Japanese red	11.3		Good	Good	14.5	14.5	14.5	14.5	*20.0*	-	Retain	girdling roots at base
650A/ 1322	*Cercis canadensis*	Redbud	7.5		Good	Good	10.8	12.3	12.8	13.3	*9.5*	-	Retain	limited soil volume
650B	*Cercis canadensis*	Redbud	9.0		Good	Good	10.9	10.4	10.4	10.4	*9.5*	-	Retain	-

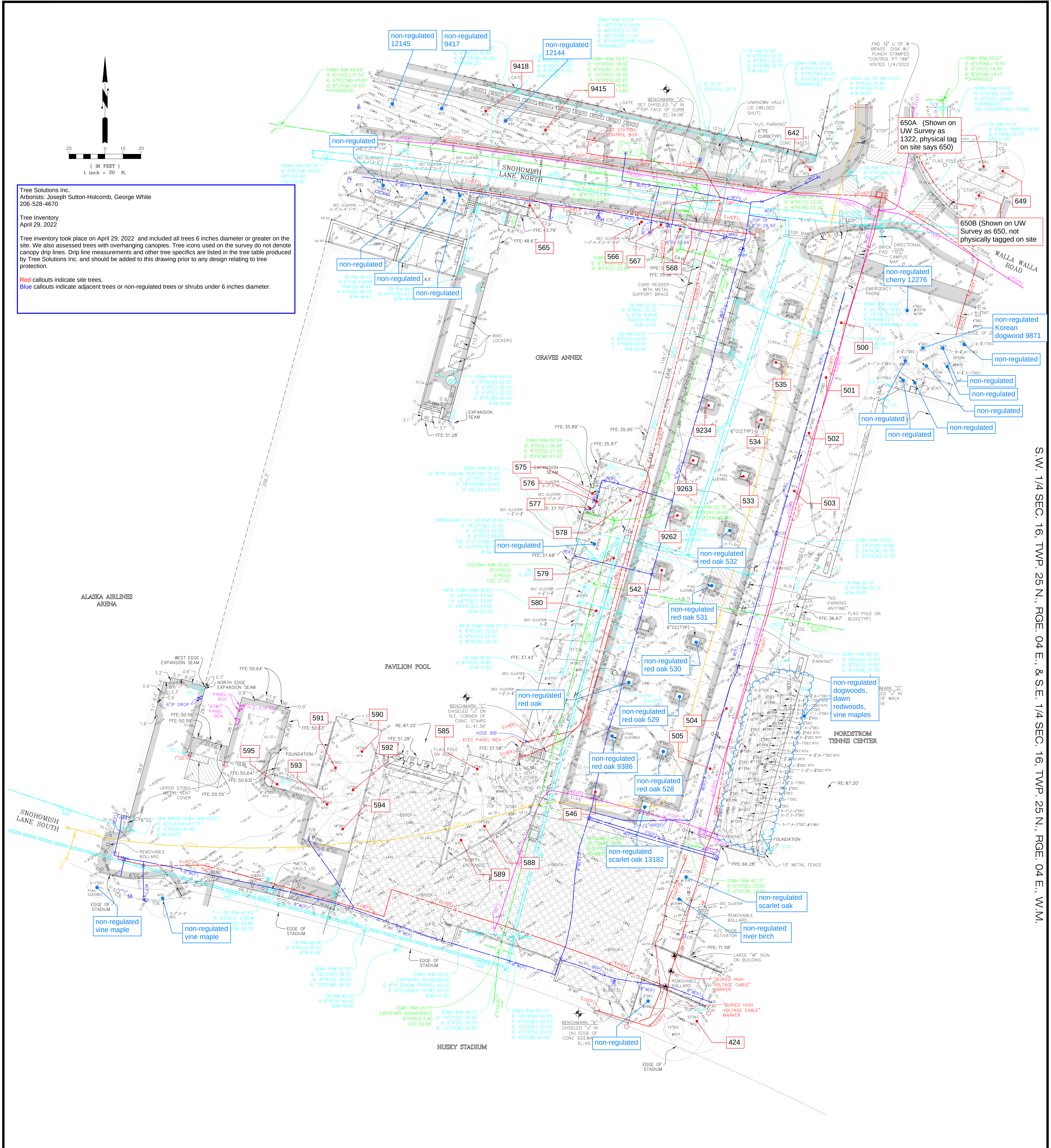
30"x42" 3/16/2022 U:\C3D\2021\2021277\SURVEYING\DWG\XS-SUR-00.DWG

Tree Solutions Inc.
Arborists: Joseph Sutton-Holcomb, George White
206-528-4670

Tree Inventory
April 29, 2022

Tree inventory took place on April 29, 2022 and included all trees 6 inches diameter or greater on the site. We also assessed trees with overhanging canopies. Tree icons used on the survey do not denote canopy drip lines. Drip line 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.

Red callouts indicate site trees.
Blue callouts indicate adjacent trees or non-regulated trees or shrubs under 6 inches diameter.



LEGEND

⊕	AREA DRAIN
ABAN/RET	ABANDONED/RETIRED
▨	ASPHALT (ASPH)
BE	BUILDING ENTRANCE
○	BOLLARD (BLRD)
▦	BRICK SURFACE
	BUILDING LINE
BC	BUILDING CORNER
BR	BIKE RACK
BTM	BOTTOM OF STRUCTURE
	BUILDING LIGHT
BVA	BUILDING VEHICLE ACCESS
⊠	CANOPY
	CATCH BASIN (CB)
	CONCRETE SURFACE
CC/XC/&G	CONCRETE/EXTRUDED CURB/& GUTTER
CD	CONDUIT DROP
CW/BW/AW	CONCRETE/BRICK/ASPHALT WALK
CRW/BRW/WRW	CONCRETE/BLOCK/WOOD RETAINING WALL
—×—×—	CHAIN LINK FENCE (CLF)
CTV	CABLE TV
COL	COLUMN
℄/M	CENTERLINE/MONUMENT LINE
CS/MS/WS	CONCRETE/METAL/WOOD STAIRS
♿	H/C PARKING SPACE
CON	CONIFEROUS TREE
DEC	DECIDUOUS TREE
COC	CENTER OF CHANNEL
DS/RD	DOWN SPOUT/ROOF DRAIN
DWY	DRIVEWAY
ECD	ELECTRICAL CONDUIT
ED	ELECTRICAL DUCT
EHH/EJB	ELECTRICAL HANDHOLE/JUNCTION BOX
EMH	ELECTRICAL MANHOLE
EM	ELECTRICAL METER
EV/ET	ELECTRICAL VAULT/TRANSFORMER
	FOUND SURVEY MONUMENT (AS NOTED)
	FIRE HYDRANT
	FIRE DEPT. CONNECTION (FDC)
FO	FIBER OPTICS
FOMH	FIBER OPTIC MANHOLE
FOV	FIBER OPTIC VAULT
FFE	FINISH FLOOR ELEVATION
G	GAS MAIN
GM	GAS METER
	GAS VALVE
GV	GAS VAULT
GB	GRADE BREAK
	GRAVEL SURFACE
GR	GROUNDING ROD
	GUY ANCHOR
○ GP/UP/PP	GUY/POWER/UTILITY POLE
—○—○—	HANDRAIL
IR	IRRIGATION LINE (RECORD)
ICB	IRRIGATION CONTROL BOX
⋈ IV	IRRIGATION VALVE
	INLET (TYPE 250A)
IE	INVERT ELEVATION
□—○	LIGHT POLE (METAL)
☼	LIGHT POLE (DECORATIVE)
LSCAPE/PA	LANDSCAPE/PLANTER
◎	MANHOLE
NTV	NO TAG VISIBLE
OHP/OHC/OHT	OVERHEAD POWER/CABLE/TELEPHONE
OHG/OHB	OVERHEAD GUYWIRE/BUS (TROLLEY)
P.S.	PARKING SPACE(S)
(P)	PAINTED UTILITY LOCATION
⟹	PIPE FLOW DIRECTION
CP/DI/CMP/VC	CONCRETE/IRON/METAL/CLAY (PIPE TYPES)
PE/PVC	POLYETHYLENE PIPE (POLYMER PIPE TYPES)
⊗	POST INDICATOR VALVE
PS/PSS	COMBINED/SANITARY SEWER
PSD	STORM DRAIN
RE/PPT	ROOF/PARAPET ELEVATION
(R)	RECORD DATA
RE	ROOF ELEVATION
SD	SERVICE DRAIN (STORM)
SDCO/SSCO	STORM DRAIN/SANITARY SEWER
	SIGN/STREET NAME SIGN
TCHD	TRENCH DRAIN
	TEMPORARY BENCHMARK (TBM)
TCD	TELEPHONE CONDUIT (BURIED)
TD	TELEPHONE DUCT
TV	TELEPHONE VAULT
➔	TRAFFIC FLOW DIRECTION
TOE	TOE OF SLOPE
TOP	TOP OF BANK
ULBL	UPPER LEVEL BUILDING LINE
WV	WATER VAULT
W	WATER MAIN
WM	WATER METER
⋈	WATER VALVE
⦶	WATER GATE VALVE/CHAMBER
	WOOD FENCE (WF)
—□—□—	IRON FENCE (WIF)
▲	BRASS DISC
	PK NAIL
	RR SPIKE
	SCREW

HORIZONTAL DATUM: NAD 83/2011 - (EPOCH 2010)

HORIZONTAL BENCHMARKS:

OWNER:	UNIVERSITY OF WASHINGTON
ID#	UW 245
DESCRIPTION:	3½" PUNCHED BRASS DISK
LOCATION:	N/A
NORTHING:	240802.349'
EASTING:	1279163.098'

OWNER:	UNIVERSITY OF WASHINGTON
ID#	UW 246
DESCRIPTION:	3½" PUNCHED SURFACE BRASS DISK
LOCATION:	N/A
NORTHING:	241282.593'
EASTING:	1279302.829'

VERTICAL DATUM: NAVD 88

VERTICAL BENCHMARKS:

OWNER:	UNIVERSITY OF WASHINGTON
ID#	UW 245
DESCRIPTION:	3½" PUNCHED BRASS DISK
LOCATION:	N/A
ELEVATION:	23.472'

OWNER:	UNIVERSITY OF WASHINGTON
ID#	UW 246
DESCRIPTION:	3½" PUNCHED SURFACE BRASS DISK
LOCATION:	N/A
ELEVATION:	21.532'

sheet 1 of 1
job no. 2021277.00
scale 1" = 20'
date 3/16/22
drawn by ABW
checked JMH

LIMITED TOPOGRAPHIC SURVEY EXHIBIT
BASKETBALL OPS & H2P CENTER
UNIVERSITY OF WASHINGTON
CITY OF SEATTLE, KING COUNTY, WASHINGTON

BUSH, ROED & HITCHINGS, INC.
LAND SURVEYORS & CIVIL ENGINEERS
2009 MINOR AVE. EAST
SEATTLE, Washington
98102-3513
(206) 323-4144
1-800-935-0508
WWW.BRHINC.COM

3/16/2022
JAMES M. HARPER
44634

NO	REVISION	DATE

Appendix D

Nesting Bird Survey Letter

SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

April 18, 2022

Mr. Harry Fuller (Project Manager)
Project Delivery Group/UW Facilities
University Facilities Building Box 352205
Seattle, WA 98195

RE: UNIVERSITY OF WASHINGTON BASKETBALL TRAINING AND HEALTH AND HIGH-PERFORMANCE CENTER PROJECT, NESTING BIRD SURVEY

Dear Mr. Fuller:

This letter describes the activities undertaken by Shannon & Wilson to determine nesting bird activity on the University of Washington (UW) campus, as it pertains to work being proposed for the Basketball Training and Health and High-Performance Center Project (H2P), hereby known as "the Project" located at the east end of the Alaska Airlines Arena, 3863 Walla Walla Rd NE, Seattle, Washington (see Exhibit 1). Our scope of services included surveying specifically for great blue heron (*Ardea Herodias)* and bald eagle (*Haliaeetus leucocephalus*) throughout the survey area and all bird species within the Project footprint. 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 (City'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 UW will need to take to comply with the City's regulations and other federal laws.

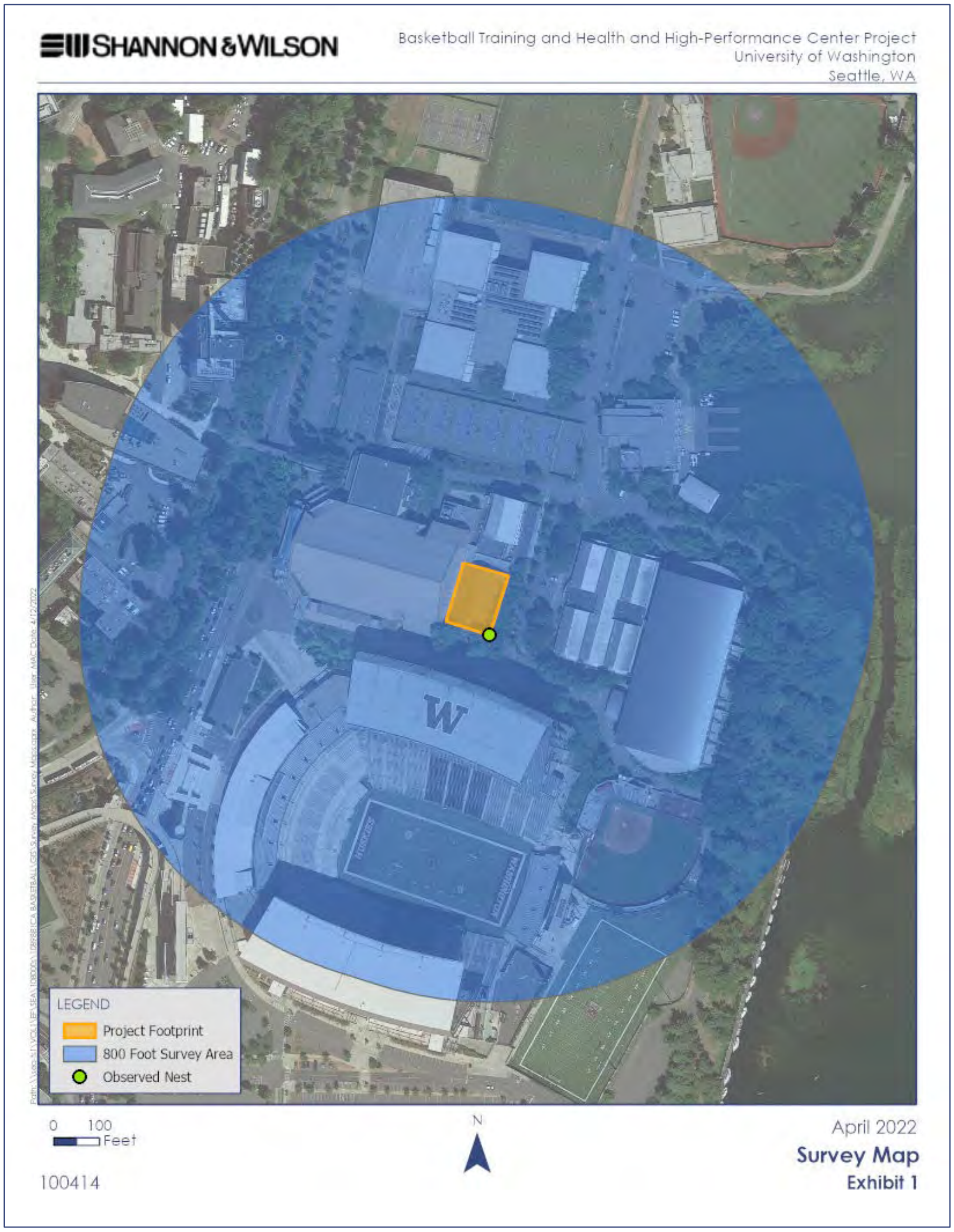


Exhibit 1: Survey map, the orange box indicates the location of the proposed work (Project footprint), the blue buffer marks the 800-foot survey area, and the green dot is the location of one observed nest.

BACKGROUND

In western Washington, the breeding season for the 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 UW 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 May 2020. Maps of management areas can be found on the Seattle Department of Construction & Inspections' geographic information system (GIS) online map (City of Seattle, 2021[1]).

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. Prior to the survey, there were no known 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 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

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[1] City of Seattle, 2021, Seattle Department of Construction & Inspections GIS, available: https://seattlecitygis.maps.arcgis.com/apps/webappviewer/index.html?id=f822b2c6498c4163b0cf908e2241e9c2, accessed April 2021

species identified by WDFW or any species of local importance" (SMC 25.09.200.2). Species of local importance currently include the great blue heron. Other species, including the 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[2]). 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 bird 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[3]).

FIELD METHODS

On April 5, 2022, a Shannon & Wilson biologist conducted a site visit to determine nesting activity at the UW campus near the H2P. During the site visit, riparian areas with mature trees within approximately 800 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 footprint were observed for any sign of current or past nesting activity by any species covered under the MBTA. Observed nest locations were collected using a hand-held global positioning system unit, and documented in Exhibit 1.

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[2] U.S. Fish and Wildlife Service (USFWS), 1918, The Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703 et seq.), 50 CFR 10.13.

[3] U.S. Fish and Wildlife Service (USFWS), 1940, Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), 50 CFR 22.6.

RESULTS

During the site visit, no great blue heron or eagle nests were observed at any location within the survey area. Within the Project footprint, one stick nest was observed on a tree adjacent to the southeast corner of the building (see Exhibit 2). The nest was observed for approximately 20 minutes and no adults were seen coming or going from the observed nests. Additionally, no juveniles were seen or heard, and no whitewash or feathers were observed beneath the nests. The nest is likely a currently unused American crow (*Corvus brachyrhynchos*) nest. American crows are known to build in the same nesting territory, even on top of old nests so there is potential for the nest area to become active even if no activity was currently observed.

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 no more than five days prior to the commencement of work to check the buildings, shrubs, and trees for any new nesting activity not observed during the April 2022 survey. If nesting activity is observed, inactive nests (unused/ abandoned nests or nests currently being built but do not have eggs or young in them) can legally be removed under the MBTA. These precautions would aid in avoiding "take" under the MBTA.

Exhibit 2: Inactive stick nest (yellow circle) observed at the southeast corner of the Project footprint.

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, PWS
Biologist

MAC:PCJ/mac

Appendix E

Regulated Building Materials Survey Report

Environmental Compliance

Submitted to
University of Washington
University Facilities Building
Seattle, Washington
98195-2205

Submitted by
AECOM
1111 3rd Avenue
Suite 1600
Seattle, Washington
98101
May 4, 2022

Regulated Building Materials Assessment Report

UWMC Pavilion Pool (206829)
University of Washington Campus
Seattle, Washington

Table of Contents

List of Appendices

Project Title:	Regulated Building Materials Assessment Report UWMC Pavilion Pool (206829) University of Washington Campus Seattle, Washington 98133
Prepared for:	Ms. Sydney Thiel Project Manager University of Washington University Facilities Building Seattle, Washington 98195-2205
Assessment Conducted by:	AECOM Technical Services, Inc. 1111 3rd Avenue, Suite 1600 Seattle, Washington 98101-3241
AECOM Project Number:	60678092
Assessment Personnel:	Mr. Chris Selders AHERA-Accredited Building Inspector Certification IRO-21-6916B (exp. 9/10/2022) Mr. Aaron Heath AHERA-Accredited Building Inspector Certification 18243 (exp. 9/10/2022)
Assessment Date:	February 9 and April 7 and 19, 2022
Report Prepared by:	Chris Selders Industrial Hygienist AECOM Technical Services, Inc.
Report Reviewed by:	Mike Kosoff Environmental Scientist AECOM Technical Services, Inc.
Report Issue Date:	May 4, 2022

EXECUTIVE SUMMARY

The University of Washington retained AECOM Technical Services, Inc. (AECOM), to conduct a regulated building materials (RBM) assessment of the materials anticipated to be impacted by the UWMC Pavilion Pool Project (the Project Area) in UWMC Pavilion Pool located at University of Washington Campus in Seattle, Washington. AECOM's representatives, Mr. Chris Selders and Mr. Aaron Heath, conducted the assessments on February 9 and April 7 and 19, 2022. This assessment included the building materials anticipated to be impacted by proposed demolition and excluded all other areas of the buildings and campus.

AECOM assessed the Project Area for the following:

- Asbestos-containing materials (ACM);
- Assumed asbestos-containing materials;
- Lead-containing coatings (paints);
- Mercury-containing light tubes; and,
- Polychlorinated biphenyls (PCBs)-containing light ballasts.

Forty five bulk samples of suspect asbestos-containing materials were collected and analyzed using Polarized Light Microscopy (PLM). Nine of the materials were found to contain greater than one percent asbestos, none of the materials were assumed to contain asbestos, and none of the materials were found to contain less than one percent asbestos. In addition, none of the materials were visually assessed and determined to be non-suspect.

Five paint chip samples were collected and analyzed for total lead content. Three of the paint chip samples were found to contain reportable levels of lead.

Mercury-containing fluorescent light tubes were identified in the Project Area. The observed light ballasts were magnetic and are considered to be PCB-containing.

1.0 INTRODUCTION

The University of Washington retained AECOM Technical Services, Inc. (AECOM), to conduct a regulated building materials (RBM) assessment of the materials anticipated to be impacted by the UWMC Pavilion Pool Project (the Project Area) in UWMC Pavilion Pool located at University of Washington Campus in Seattle, Washington. AECOM's representatives, Mr. Chris Selders and Mr. Aaron Heath, conducted the assessments on February 9 and April 7 and 19, 2022. This assessment included the building materials anticipated to be impacted by proposed demolition and excluded all other areas of the buildings and campus.

- Asbestos-containing materials (ACM);
- Assumed asbestos-containing materials; and
- Lead-containing coatings (paints).

1.1 Project Background

This report presents the results of our targeted regulated building materials assessment conducted of the Project Area located at University of Washington Campus in Seattle, Washington. Other suspect building materials outside of the Project Area were excluded from the scope of the assessment. AECOM's assessment included the materials anticipated to be impacted by the project based on communication from the client and drawings provided by University of Washington.

The purpose of the assessment was to provide information to assist University of Washington with communicating the presence of lead-containing coatings and presence, location, and quantity of ACMs and assumed ACMs to employees, vendors, and contractors working in the Project Area and to meet the requirements for an asbestos survey for the Puget Sound Clean Air Agency (PSCAA) and US Occupational Safety and Health (OSHA) regulations and a good faith inspection as required by the Washington State Department of Labor and Industries' Division of Occupational Safety and Health (DOSH) prior to renovation.

1.2 Sources of Information

During the course of the assessment, the following personnel and report provided assistance to the AECOM inspectors:

- Mr. Harry Fuller, Project Manager, Project Delivery Group, University of Washington
- Mr. Bob Dillon, Construction Manager, University of Washington
- *Limited Hazardous Materials Survey Report, Preliminary Summary of Findings, ICA Basketball Operations – Edmundson Pavilion Pool, Revised Date: January 7, 2015,* Prepared by PBS

1.3 Project Description

The UW Pavilion was constructed in 1939. The UW Pavilion Pool consists of three floors: Basement Level, Ground Floor, and First Floor. The Basement Level which is located under the pool area serves as a mechanical room which houses equipment for pool support, a tunnel and pipe space area are also located in the Basement level. The Ground Floor consists of the pool area, locker rooms, restrooms, storage rooms, janitor rooms, HVAC/mechanical spaces, corridors, and the pipe chase which is located to the west of the pool. The First Floor is primarily used as the main entrance for the public and consists of corridors, rest rooms, bleacher area, and offices.

Walls in the Project Area consists of plaster and gypsum wallboard with rubber cove base in areas, ceramic tile and grout finishes in the pool and locker room/restroom areas, and exposed brick and mortar in areas. Flooring in the Project Area consists of unfinished concrete floors, ceramic tile with grout and mortar in the pool and locker room/restroom areas, vinyl floor tile and mastic and in first floor restroom and office areas, and carpet in select office areas. Ceilings were observed to be hard lid gypsum ceilings, exposed concrete ceiling, and ceiling tiles over upper pool area. Pipe insulation was observed to be canvas-wrapped hard block pipe insulation runs with mudded fittings.

2.0 ASBESTOS ASSESSMENT

2.1 Building Assessment

Mr. Selders and Mr. Heath, both Asbestos Hazard Emergency Response Act (AHERA)-accredited building inspectors, (Certification IRO-21-6916B, expiration date: 9/10/2022 and Certification 18243 expiration date 9/10/2022, respectively), from AECOM, performed the sampling on February 9 and April 7 and 19, 2022. The AECOM inspectors collected 45 samples of materials identified as suspect ACM.

This assessment was conducted using a modified protocol adapted from AHERA. The protocol is as follows:

- Identify suspect asbestos-containing materials.
- Group materials into homogeneous sampling areas/materials.
- Quantify each homogeneous material and collect representative samples. The number of samples collected of miscellaneous materials was determined by the inspector.
- Samples of each material were taken to the substrate, ensuring that all components and layers of the material were included.
- Sample locations are referenced on the field data forms according to sample number.
- Sampling was performed by an AHERA-accredited building inspector, and the use of proper protective equipment and procedures was followed.

2.2 Sampling Procedures

This sampling was conducted using the following procedures:

1) Spread the plastic drop cloth (if needed) and set up other equipment, e.g., ladder.
2) Don protective equipment (respirator and protective clothing if needed).
3) Label sample container with its identification number and record number. Record sample location and type of material sampled on a sampling data form.
4) Moisten area where sample is to be extracted (spray the immediate area with water).
5) Extract sample using a clean knife, drill capsule, or cork boring tool to cut out or scrape off approximately one tablespoon of the material. Penetrate all layers of material.
6) Place sample in a container and tightly seal it.
7) Wipe the exterior of the container with a wet wipe to remove any material that may have adhered to it during sampling.
8) Clean tools with wet wipes and wet mop; or vacuum area with HEPA vacuum to clean all debris.
9) Discard protective clothing, wet wipes and rags, cartridge filters, and drop cloth in a labeled plastic waste bag.

2.3 Analytical Methodology

Suspect ACMs were sampled in general accordance with 40 CFR 763.86 by an Environmental Protection Agency (EPA) AHERA-accredited building inspector. Each sample was collected and stored in a heavy-duty, self-sealing plastic bag, and delivered to NVL Laboratories in Seattle, Washington. Samples were analyzed via polarized light microscopy (PLM) in accordance with EPA/600/R-93/116. NVL Laboratories is accredited to perform PLM analysis by the National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program (NVLAP).

2.4 Asbestos Sampling Results

Table 2.4-1 provides a list of suspect homogeneous sampling area (HSA) material descriptions, material locations, and results for this sampling. ACMs are presented in bold. Refer to the attached Figures in Appendix A for sample locations and Photographs in Appendix B for additional material information.

Table 2.4-1. Results of Bulk Sample Analyses

HSA ID, Material Description, and AHERA Classification	Material Location	HSA Results
1: Off-white compressed fibrous material with black brittle coating (M)	**Mounted chalkboard on Ground Floor**	**29% chrysotile**
2: Off-white concrete, gray foam, beige mastic, and gray soft material (M)	Residual floor mastic in G-04 area	Off-white concrete: ND Gray foam: ND Beige mastic: ND Gray soft material ND
3: 6” black rubber cove base, brown brittle mastic, yellow mastic, white compacted powdery material with paint, and trace white compacted material (M)	**At base of walls in G13 corridor and corridor adjacent to G12**	**Cove base: ND** **Brown mastic: ND** **Yellow mastic: ND** **White compacted powdery material with paint: ND to 2% chrysotile** **White compacted material: ND**
4: 4” white cove base, yellow mastic and trace joint compound with paint (M)	Base of wall in G-15	Cove base: ND Mastic: ND Joint compound: ND
5: Tan mastic and white crumbly material with paint (M)	**Residual mastic in Room G14**	**Mastic: 3% chrysotile** **Crumbly material with paint: ND**
6: Various sized dark brown vinyl floor tile and black asphaltic mastic (M)	**Accent/perimeter floor tile in Rooms 003, 004, 005, 006, and 008**	**Tile: 3% to 4% chrysotile** **Mastic: ND**
7: 9”x9” red vinyl floor tile and black asphaltic mastic (M)	**Flooring in Room 003**	**Floor tile: 4% to 5% chrysotile** **Mastic: 3% chrysotile**
8: 9”x9” red vinyl floor tile with white streaks and black asphaltic mastic (M)	**Flooring in Room 003**	**Floor tile: 4% chrysotile** **Mastic: 3% to 4% chrysotile**
9: 12”x12” blue vinyl floor tile and black asphaltic mastic (M)	Flooring in Rooms 005 and 006	Floor tile: ND Mastic: ND
10: Black residual mastic with paint (M)	On walls in Room 002	ND
11: Yellow carpet mastic (M)	Associated with carpeting in Room 002	ND
12: 4” brown rubber cove base and white mastic (M)	At base of walls in Room 002	Cove base: ND Mastic: ND
13: Black brittle material (M)	Associated with restroom privacy panels in G-08	ND
14: Brown flaky fibrous electrical panel backing (M)	**Mounted electrical gauge panel at Basement Level**	**48% chrysotile**

Table 2.4-1. Results of Bulk Sample Analyses

HSA ID, Material Description, and AHERA Classification	Material Location	HSA Results
15: White crumbly material, off-white brittle material, brown/red crumbly material, gray cementitious material with yellow fibrous material, and gray cementitious material (M)	General floor debris in areas of Basement Level	ND (all layers)
16: Gray sandy material (M)	Debris in lower wall access at Basement Level	ND
17: Black asphaltic waterproofing and gray concrete (M)	Associated with pool walls in tunnel area at Basement Level	Asphaltic waterproofing: ND Concrete: ND
18: White fluffy fibrous pipe insulation debris (T)	**Damaged pipe debris on HVAC ducting in Pipe Space area at Ground Floor**	**8% to 11% amosite and 34% to 37% chrysotile**
19: Gray flaky fibrous pipe insulation debris and off-white flaky fibrous residual pipe insulation debris (T)	**Residual piping debris embedded in dirt piles located in Pipe Space area at Ground Floor**	**Gray flaky fibrous pipe insulation debris: 28% to 43% amosite and 11% chrysotile** **Off-white flaky fibrous pipe insulation debris: 3% amosite and 39% chrysotile**
20: Off-white sandy material with paint (two layers) (S)	Plaster walls in corridor adjacent to G12	ND (all layers)
21: Off-white sandy material with paint (S)	Plaster walls in G13 corridor	ND

ND: none detected, HSA: material that is uniform in color, texture, general appearance, and construction and application date; M: Miscellaneous material per AHERA; T: Thermal systems insulation per AHERA

Additional suspect ACMs may be present in inaccessible or concealed spaces. These spaces include, but are not limited to, areas not assessed, areas not accessible at the time of the assessment, fire doors, electrical systems, pipe chases, spaces between wall/ceiling/door/floor cavities, interior of mechanical components, beneath foundation pads, etc. If future maintenance, renovation, and/or demolition activities make these areas accessible, AECOM recommends that a thorough assessment of these spaces be conducted at that time to identify and confirm the presence or absence of additional suspect ACMs. Until then, all such unidentified materials must be treated as assumed ACMs in accordance with applicable federal, state, and local regulations.

If the analytical results indicate that all the samples collected per HSA do not contain asbestos, then the HSA (material) is considered a non-ACM. If the analytical results of one or more of the samples collected per HSA indicate that asbestos is present in quantities of greater than one percent asbestos as defined by the EPA, all of the HSA (material) is considered to be an ACM regardless of any other analytical results.

Any material that contains greater than one percent asbestos is considered an ACM and must be handled according to Occupational Safety and Health Administration (OSHA), EPA, and applicable state and local regulations. The EPA National Emission Standard for Hazardous Air Pollutants (NESHAP) 40 CFR 61, Subparts A and M has a requirement related to assessment of suspect ACM in buildings. When the asbestos content of a friable material is visually estimated by PLM to be detectable but less than ten percent, your firm may elect to (1) assume the amount is greater than one percent and treat the material as asbestos-containing or (2) require verification of the amount by the PLM point counting technique. If the results obtained by point counting and visual estimation are different, the point count result must be used. When no asbestos is detected by PLM, point counting is not required.

3.0 LEAD ASSESSMENT

3.1 Sampling Methodology

Homogeneous painted surfaces were defined by substrate, application, and color. The paint chip samples were collected to the substrate to ensure that all layers present on the substrate were included in the laboratory analysis. The samples were collected and stored in a heavy-duty, self-sealing plastic bag and delivered to NVL Laboratories in Seattle, Washington. The samples were analyzed via Atomic Absorption Spectrophotometry in accordance with Method EPA 7000B. NVL Laboratories in Seattle, Washington is accredited by American Industrial Hygiene Association (AIHA) for lead analysis.

3.2 Lead Sampling Results

Five paint chip samples were collected and analyzed for total lead content. Three of the samples were found to contain reportable levels of lead. The results of the analysis are presented in Table 3.2-1.

Table 3.2-1. Results of Paint Chip Sample Analysis

Sample Number and Description	Paint Location	Sample Result in parts per million (ppm)
Pb1: Yellow paint on concrete	Basement stairs	61,000
Pb2: Yellow paint on metal	Stair railing at Basement Level	220,000
Pb3: White paint on concrete	Concrete walls at Ground Floor	<55
Pb4: White paint on wood	Wood walls at Ground Floor	<51
Pb5: White paint on plaster	Plaster walls at Ground Floor and First Floor	1,300

< below laboratory reportable level

4.0 OTHER REGULATED BUILDING MATERIALS

4.1 Methodology

An inventory of fluorescent light tubes, thermostats, and potential PCB-containing ballasts was conducted in all accessible areas of the Project Area.

Where fluorescent light fixtures were accessible, the ballast covers were removed, and the ballast labels were visually examined. Different types of fluorescent fixtures were distinguished by shield shape, fixture dimension, diffuser type, and the manner in which the ballast covers were connected to the fixture. Inspectors attempted to visually inspect at least two of each type of fluorescent light fixture.

Where fluorescent light fixtures could not be visually examined, the number of potential PCB-containing ballasts in fixture was estimated based on the following assumptions:

- Each single light tube fluorescent fixture contains one ballast;
- Each HID lamp contains one ballast and one mercury bulb;
- Each multiple light tube fluorescent fixture contains one ballast for every pair of light tubes; and
- All light ballasts are assumed to contain PCBs unless they are electronic ballasts.

4.2 Results

All observed light ballasts were magnetic. Mercury-containing fluorescent light tubes were identified in the Project Area in the following quantities:

Table 4.2-1. Other Regulated Building Materials Results

Other Regulated Building Materials Description	Approximate Quantity
Mercury-containing fluorescent light tubes (4' length)	140 EA
Mercury-containing fluorescent light tubes (3' length)	1 EA
Compact fluorescent bulbs	26 EA
PCB-containing ballasts (magnetic)	70 EA
HID lights	5 EA

EA: Each

5.0 CONCLUSIONS AND RECOMMENDATIONS

On February 9 and April 7 and 19, 2022, AECOM conducted a targeted regulated building materials assessment associated with the UWMC Pavilion Pool Project located at University of Washington Campus in Seattle, Washington.

5.1 Asbestos

The following table identifies the assumed and confirmed ACM.

Table 5.1-1. Assumed and Confirmed ACM

HSA ID Material Description	Material Location	HSA Quantity (approximate)
1: Asbestos-containing off-white compressed fibrous material with black brittle chalkboard coating (M)	Mounted chalkboard on ground floor	1 EA
3: Asbestos-containing white compacted powdery material with paint and non-asbestos 6" black rubber cove base, brown brittle mastic, yellow mastic, and trace white compacted material (M)	At base of walls in G13 corridor and corridor adjacent to G12	40 LF
5: Asbestos-containing tan mastic and non-asbestos white crumbly material with paint (M)	Residual mastic in Room G14	12 SF
6: Asbestos-containing dark brown vinyl floor tile and non-asbestos black asphaltic mastic (M)	Accent/perimeter floor tile in Rooms 003, 004, 005, 006, and 008	170 SF
7: Asbestos-containing 9"x9" Red vinyl floor tile and black asphaltic mastic (M)	Flooring in Room 003	36 SF
8: Asbestos-containing 9"x9" Red vinyl floor tile with white streaks and black asphaltic mastic (M)	Flooring in Room 003	45 SF
14: Asbestos-containing brown flaky fibrous electrical panel backing (M)	Mounted electrical gauge panel at Basement Level	6 SF

Table 5.1-1. Assumed and Confirmed ACM

HSA ID Material Description	Material Location	HSA Quantity (approximate)
18: Asbestos-containing white fluffy fibrous pipe insulation debris (T)	Damaged pipe debris on HVAC ducting in Pipe Space area at Ground Floor Level	2 SF
19: Asbestos-containing gray flaky fibrous pipe insulation debris and off-white flaky fibrous residual pipe insulation debris (T)	Residual piping debris embedded in dirt piles located in Pipe Space area at Ground Floor Level	Unable to quantify

HSA: material that is uniform in color, texture, general appearance, and construction and application date; M: Miscellaneous material per AHERA; T: Thermal system insulation per AHERA; EA: Each; SF: Square feet

5.2 Lead

Five paint chip samples were collected and analyzed for total lead content. Three of the samples were found to contain reportable levels of lead. If lead-containing paint is impacted, the Washington State Department of Labor and Industries requires an exposure assessment be conducted during operations that may disturb the lead paint in such a way that the airborne exposure may reach or exceed the Action level of 30 micrograms per cubic meter (µg/m^3) or the Permissible Exposure Limit of 50 µg/m^3. The worker protection requirements of WAC 296-155 "Lead in Construction" and 29 CFR 1926.62 Lead may apply.

5.3 Other Regulated Building Materials

Fluorescent light tubes, HID lamps, switches, and thermostats may contain mercury. Fluorescent light ballasts may contain PCBs. In Washington State, even magnetic ballasts labeled with "No PCBs" may have regulated amount of PCBs and therefore should be handled in accordance with Washington Department of Ecology requirements. Employers must inform their employees of mercury and PCB hazards in accordance with WAC 296-800-170.

Fluorescent light tubes, thermostats, and PCB-containing light ballasts must be removed and recycled or disposed of prior to building demolition as per 40 CFR 262, 40 CFR 265, and WAC 173-303.

6.0 LIMITING CONDITIONS

AECOM's assessment was limited to observation and minimal destructive sampling and analysis of potentially regulated building materials in accessible portions of the Project Area. However, common construction techniques render portions of any building inaccessible. As a result, additional asbestos-containing building materials or lead-containing coatings may be present in inaccessible areas (i.e., between walls, ceiling spaces enclosed by wallboard, interior of fire doors, etc.) of the Project Area that were not observed during the assessment. Inaccessible areas should be assumed to contain asbestos until extensive destructive sampling is performed in those areas.

6.1 Limitations of the Assessment

The conclusions of this report are AECOM's professional opinions, based solely upon visual site observations and interpretations of laboratory analyses, as described in this report. The opinions presented herein apply to the site conditions existing at the time of AECOM's assessment and interpretation of current regulations pertaining to asbestos and lead-containing paint. Therefore, AECOM's opinions and recommendations may not apply to future conditions that may exist at the site which we have not had the opportunity to evaluate. All applicable state, federal, and local regulations should always be verified prior to any work that will disturb materials containing asbestos.

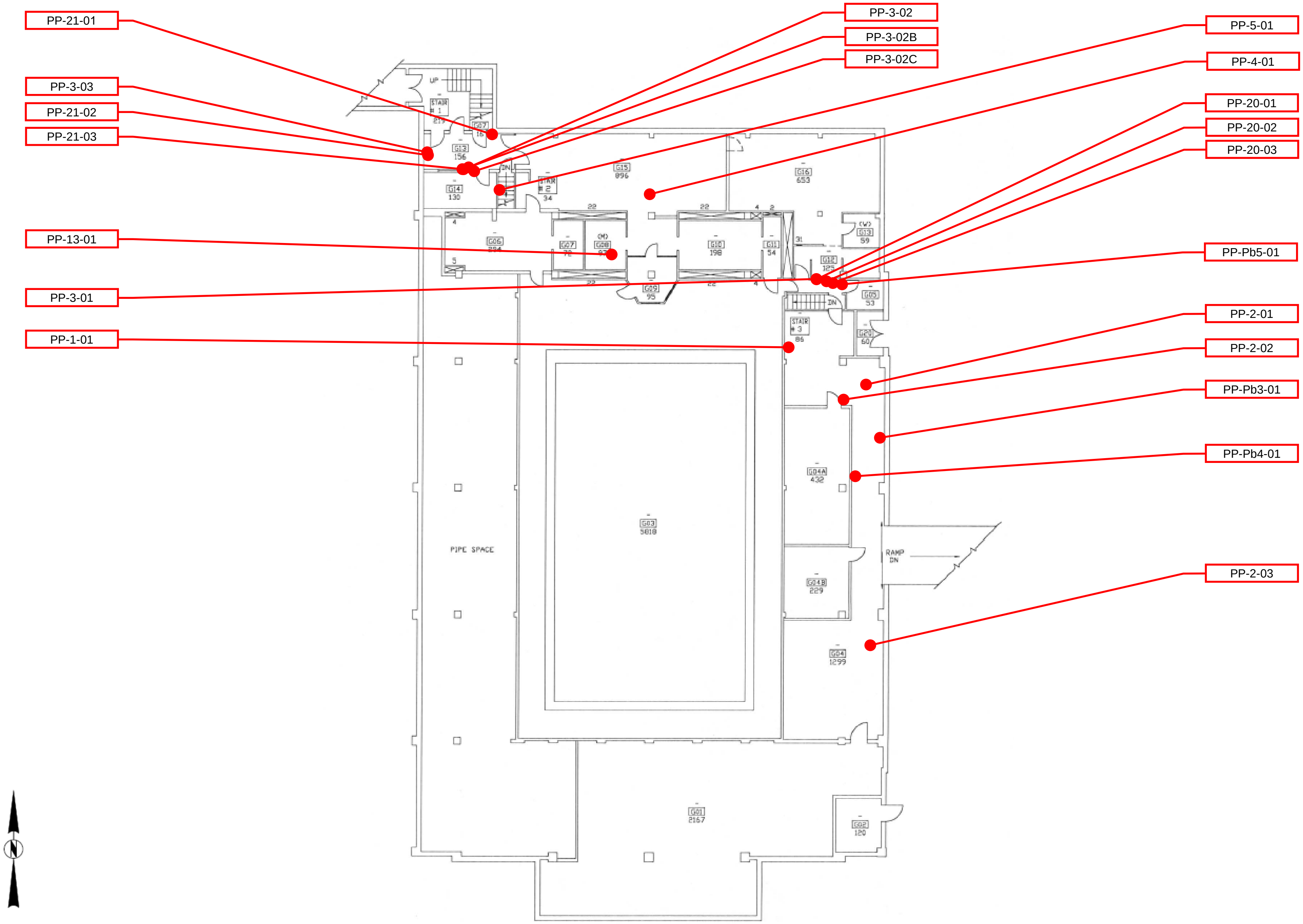
AECOM has performed the services set forth in the Scope of Work in accordance with generally accepted industrial hygiene practices in the same or similar localities, related to the nature of the work accomplished, at the time the services were performed.

Suspect regulated building materials located at UWMC Pavilion Pool that are outside the Project Area and/or are not included in this regulated building materials assessment are assumed to be asbestos-containing unless they are sampled by an AHERA-accredited asbestos building inspector and analyzed by a NVLAP-accredited laboratory to confirm the presence of asbestos prior to the disturbing of such materials.

The regulated building materials and conditions presented in this report represent those observed on the dates we conducted the sampling. This sampling is intended for the exclusive use of University of Washington for specific application to the UWMC Pavilion Pool Project renovations. This assessment is not intended to replace construction or demolition plans, specifications, or bidding documents. This report is not meant to represent a legal opinion.

Prepared by:	Reviewed by:
Chris Selders Industrial Hygienist AECOM Technical Services, Inc.	Mike Kosoff Environmental Scientist AECOM Technical Services, Inc.

Appendix A. Figures



Legend

PP – HSA# - ## = Asbestos sample location

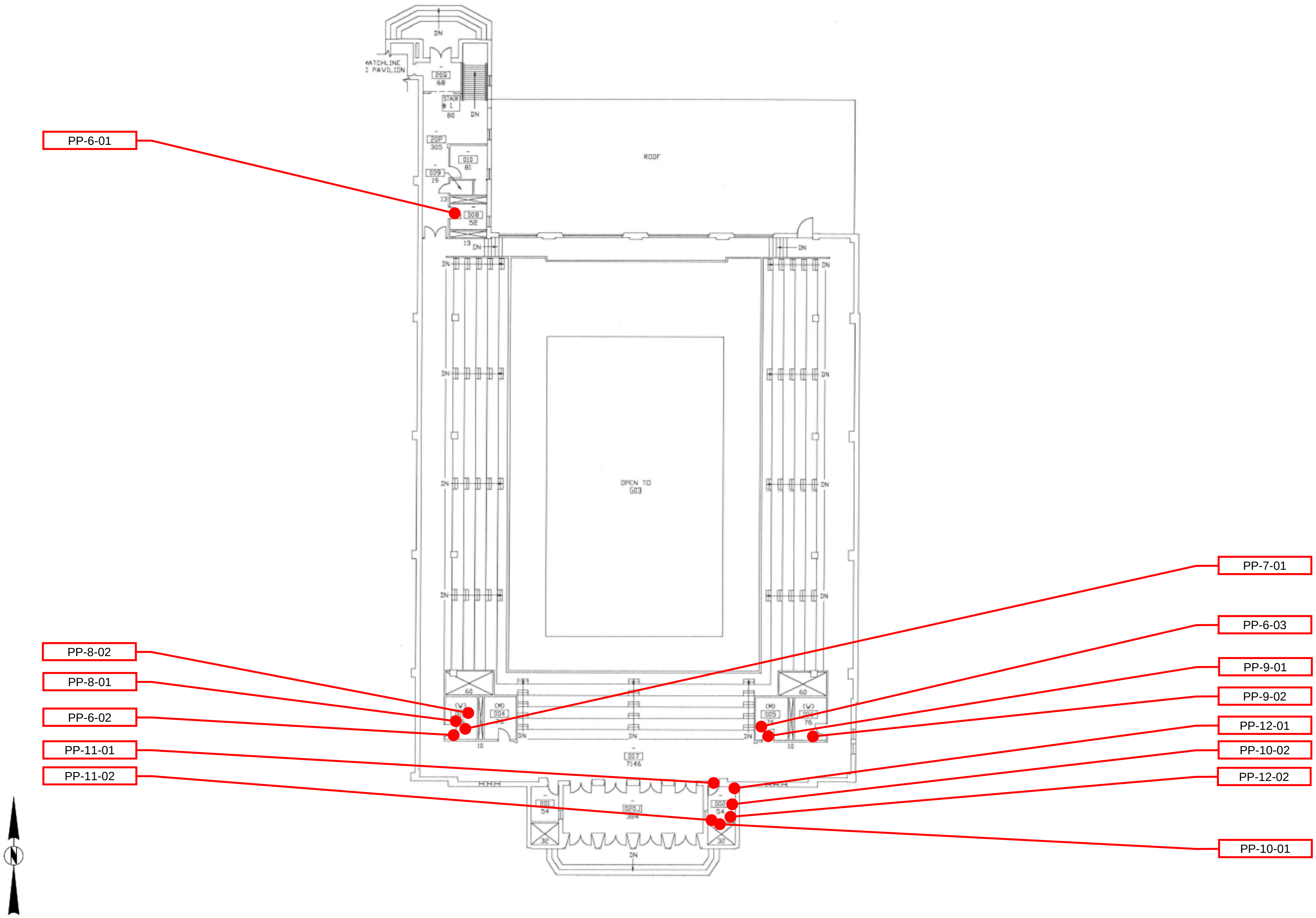
PP – Pb# - ## = Lead sample location

Job Number: 60678092 Not to scale

Figure 1
Approximate Asbestos and Lead Sample Locations
Ground Floor
206829 UW Pavilion Pool

AECOM

University of Washington
Seattle, Washington



Legend

PP – HSA# - ## = Asbestos sample location

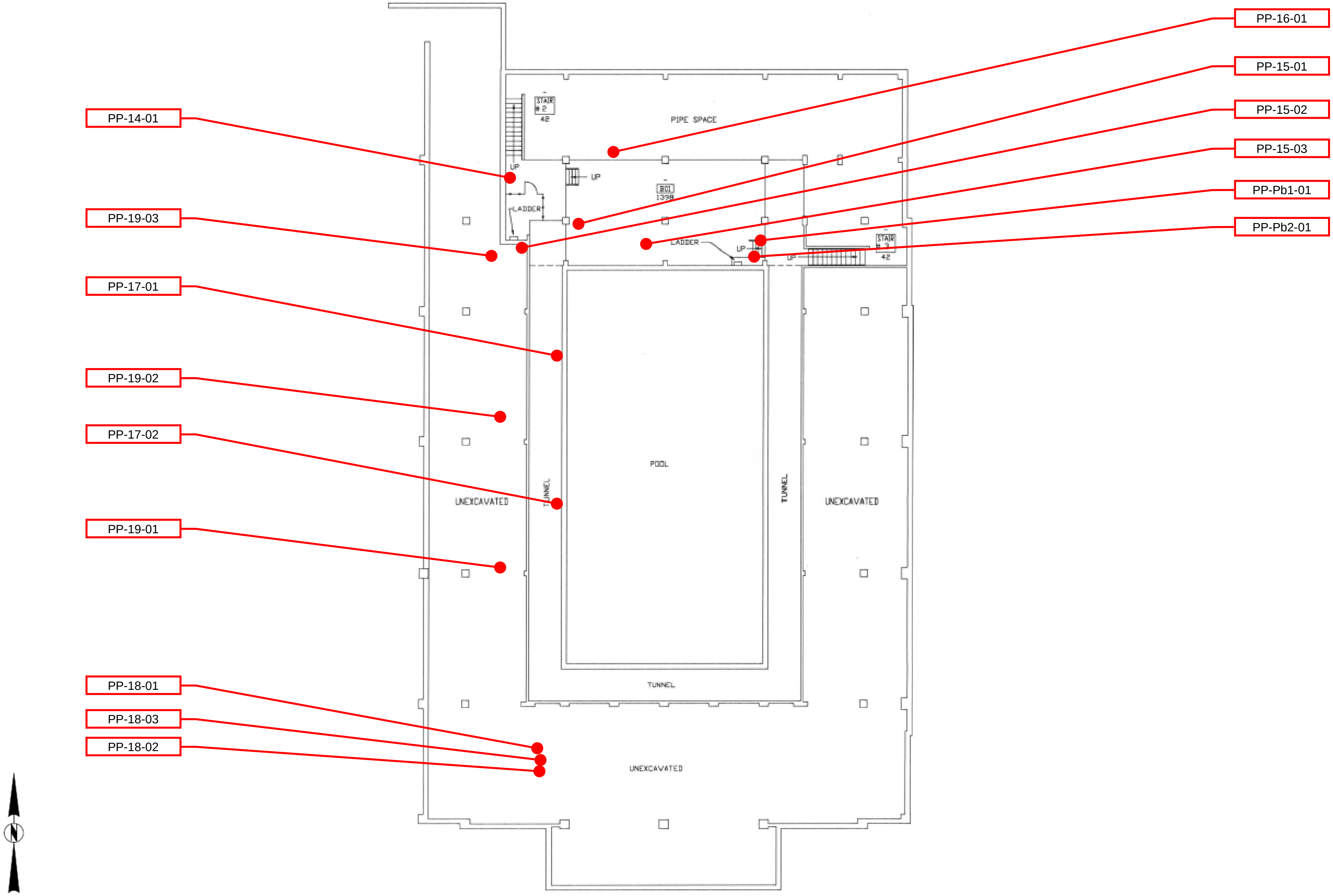
PP – Pb# - ## = Lead sample location

Job Number: 60678092 Not to scale

Figure 2
Approximate Asbestos and Lead Sample Locations
First Floor
206829 UW Pavilion Pool

AECOM

University of Washington
Seattle, Washington



Legend

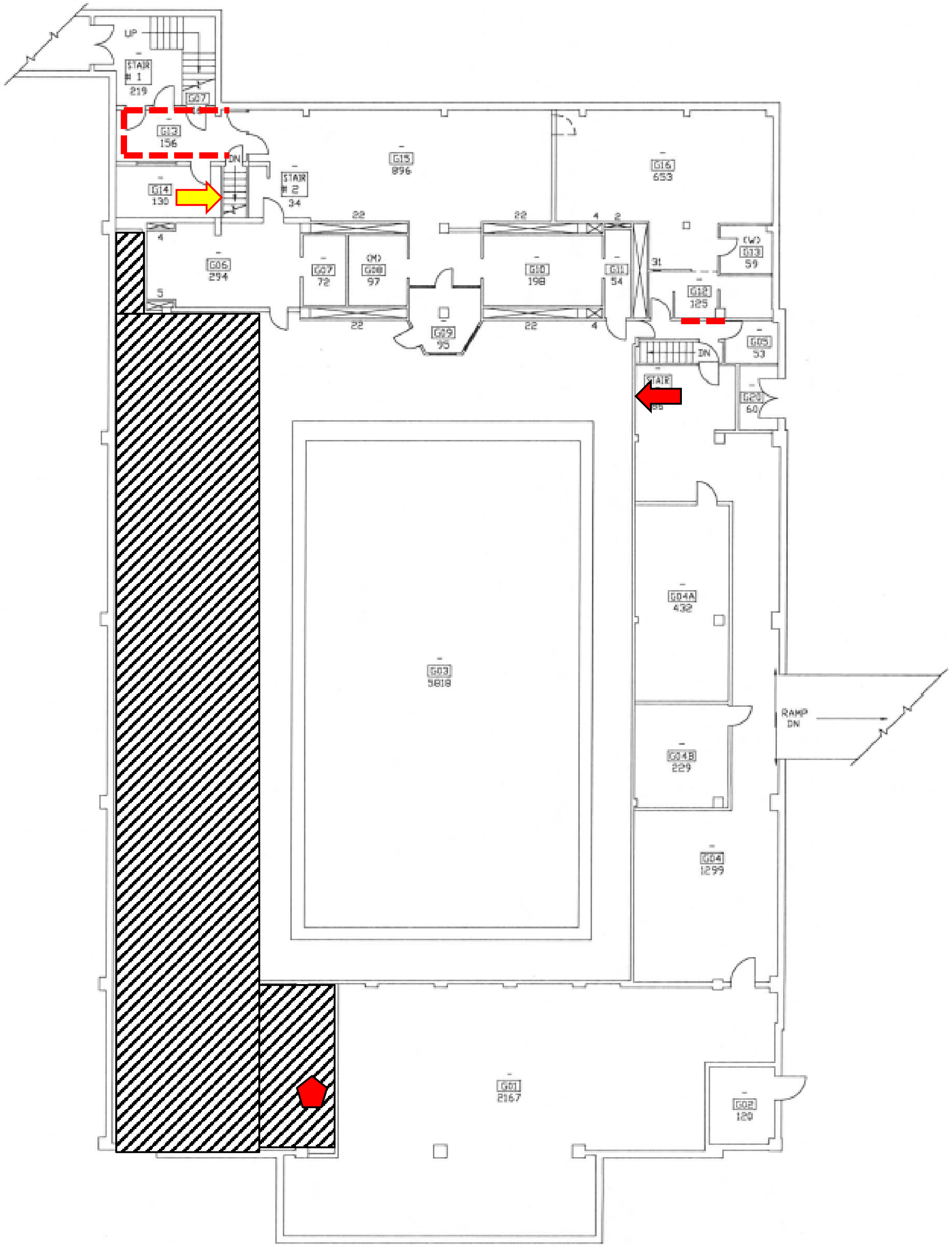
PP – HSA# - ## = Asbestos sample location
PP – Pb# - ## = Lead sample location

Job Number: 60678092 Not to scale

Figure 3
Approximate Asbestos and Lead Sample Locations
Basement Level
206829 UW Pavilion Pool

AECOM

University of Washington
Seattle, Washington



Legend

⬅ HSA 1: Asbestos-containing off-white compressed fibrous material with black brittle chalkboard coating (M)

▬ ▬ HSA 3: Asbestos-containing white compacted powdery material with paint and non-asbestos 6” black rubber cove base, brown brittle mastic, yellow mastic, and trace white compacted material (M)

➡ HSA 5: Asbestos-containing tan mastic and non-asbestos white crumbly material with paint (M)

⬟ HSA 18: Asbestos-containing white fluffy fibrous pipe insulation debris (T)

▨ HSA 18: Asbestos-containing gray flaky fibrous and off-white flaky fibrous residual pipe insulation debris (T)

Drawing should be printed in color

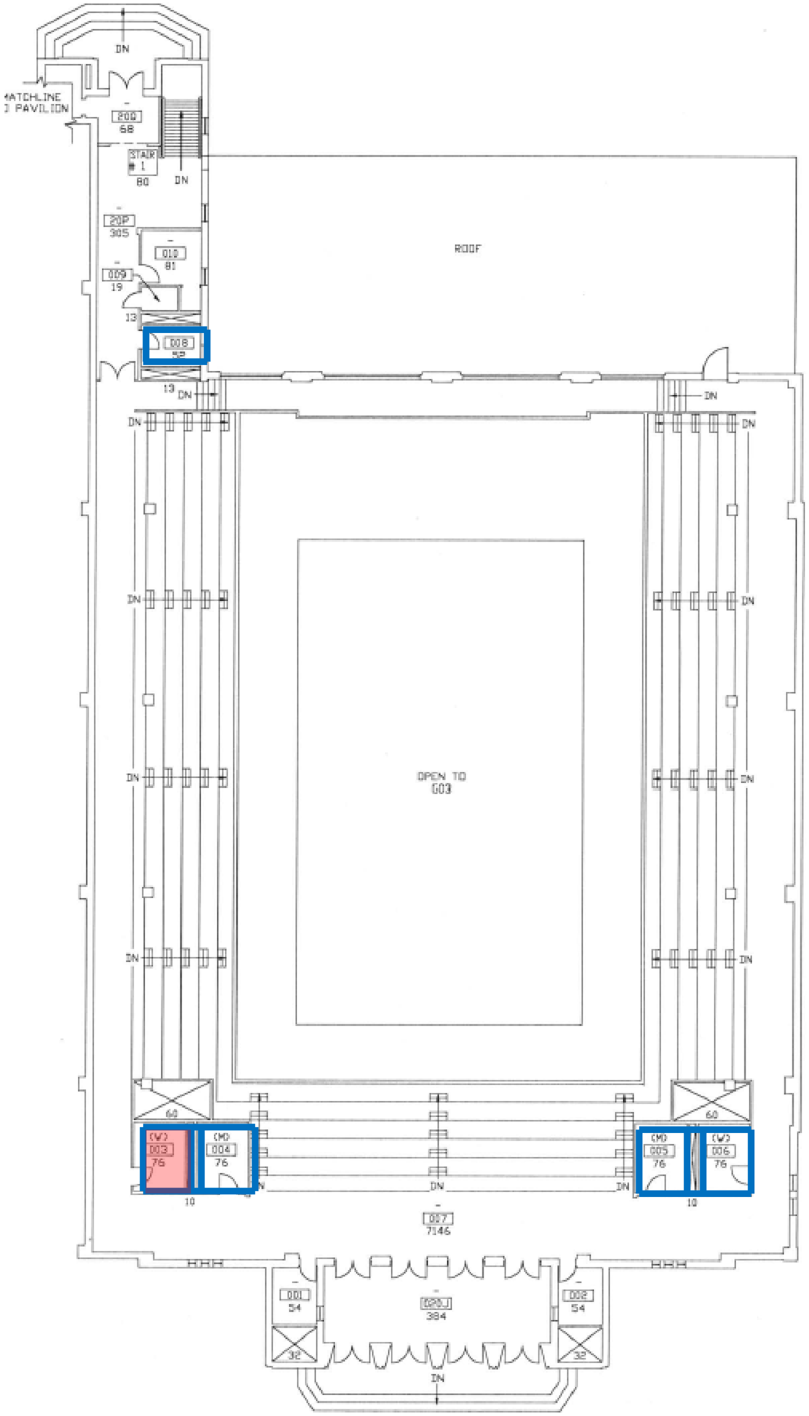
N

Job Number: 60678092 Not to scale

Figure 4
Approximate ACM Locations
Ground Floor
206829 UW Pavilion Pool

AECOM

University of Washington
Seattle, Washington



Legend

▬ HSA 6: Asbestos-containing dark brown vinyl floor tile and non-asbestos black mastic (M)

▨ HSA 7: Asbestos-containing 9"x9" Red vinyl floor tile and black mastic (M) and HSA 8: Asbestos-containing dark brown vinyl floor tile and non-asbestos black mastic (M)

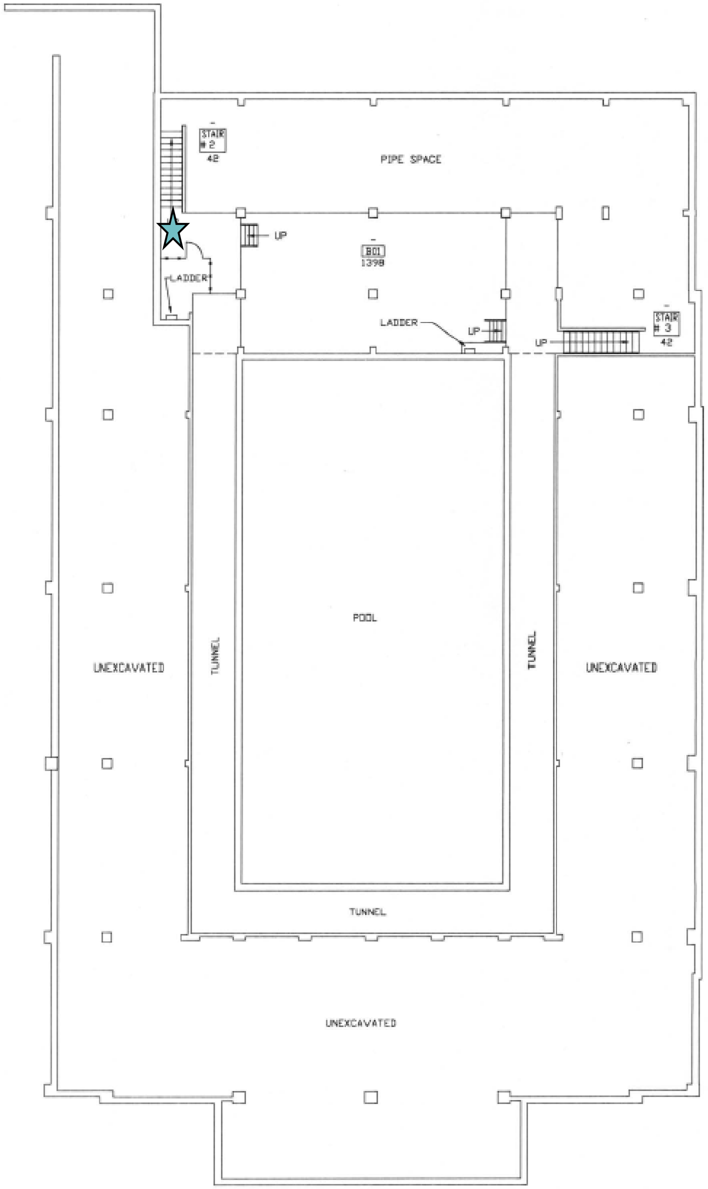
Drawing should be printed in color

Figure 5
Approximate ACM Locations
First Floor
206829 UW Pavilion Pool

Job Number: 60678092 Not to scale

AECOM

University of Washington
Seattle, Washington



Legend

★ HSA 14: Asbestos-containing brown flaky fibrous electrical panel backing (M)

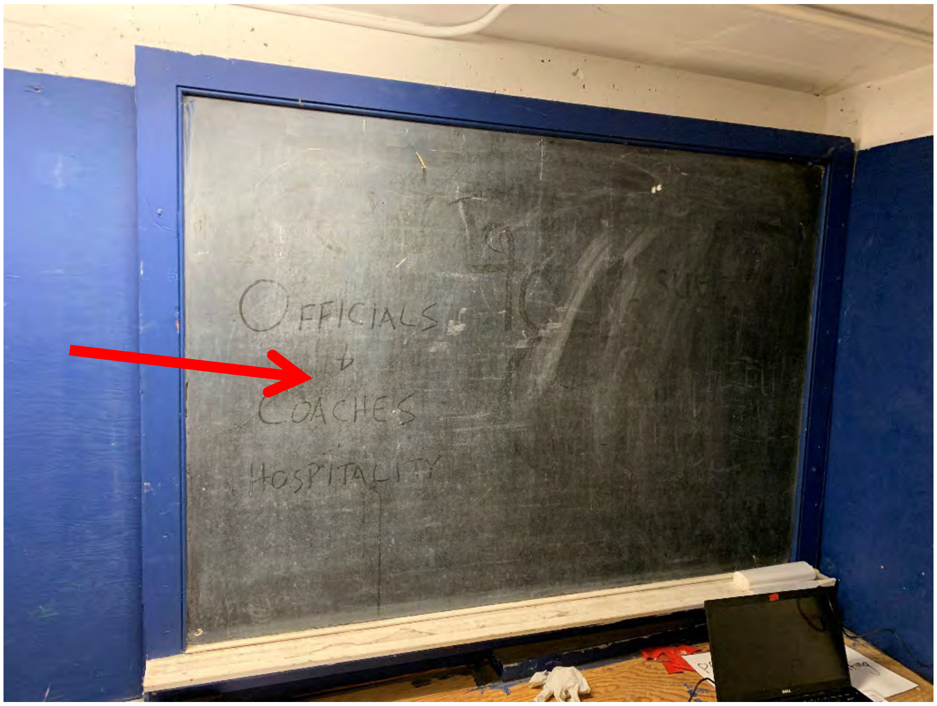
Drawing should be printed in color

Job Number: 60678092 Not to scale

Figure 6
Approximate ACM Locations
Basement Level
206829 UW Pavilion Pool

University of Washington
Seattle, Washington

Appendix B. Photographs



HSA 1. Off-white compressed fibrous material with black brittle coating (M)

HSA 2. Off-white concrete, gray foam, beige mastic, and gray soft material (M)

HSA 3. 6” black rubber cove base, brown brittle mastic, yellow mastic, white compacted powdery material with paint, and trace white compacted material (M)

HSA 4. 4” white cove base, yellow mastic and trace joint compound with paint (M)

HSA 5. Tan mastic and white crumbly material with paint (M)

HSA 6. Various sized dark brown vinyl floor tile and black asphaltic mastic (M)

HSA 7. 9”x9” red vinyl floor tile and black asphaltic mastic (M)

HSA 8. 9”x9” red vinyl floor tile with white streaks and black asphaltic mastic (M)

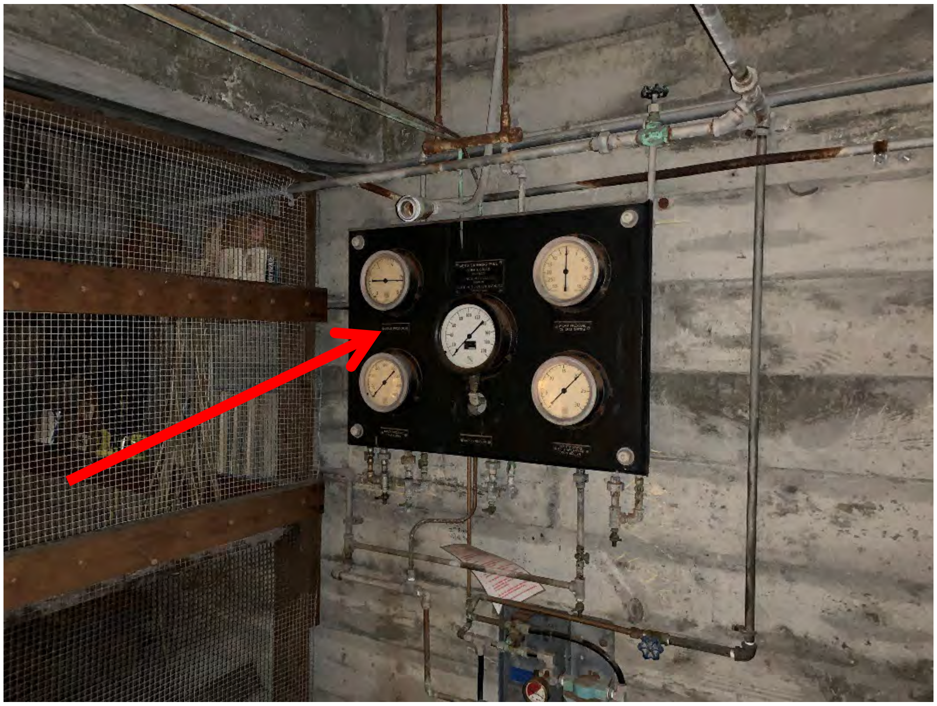
HSA 9. 12”x12” blue vinyl floor tile and black asphaltic mastic (M)

HSA 10. Black residual mastic with paint (M)

HSA 11. Yellow carpet mastic (M)

HSA 12. 4” brown rubber cove base and white mastic (M)

HSA 13. Black brittle material (M)



HSA 14. Brown flaky fibrous electrical panel backing (M)

HSA 15. White crumbly material, off-white brittle material, brown/red crumbly material, gray cementitious material with yellow fibrous material, and gray cementitious material (M)

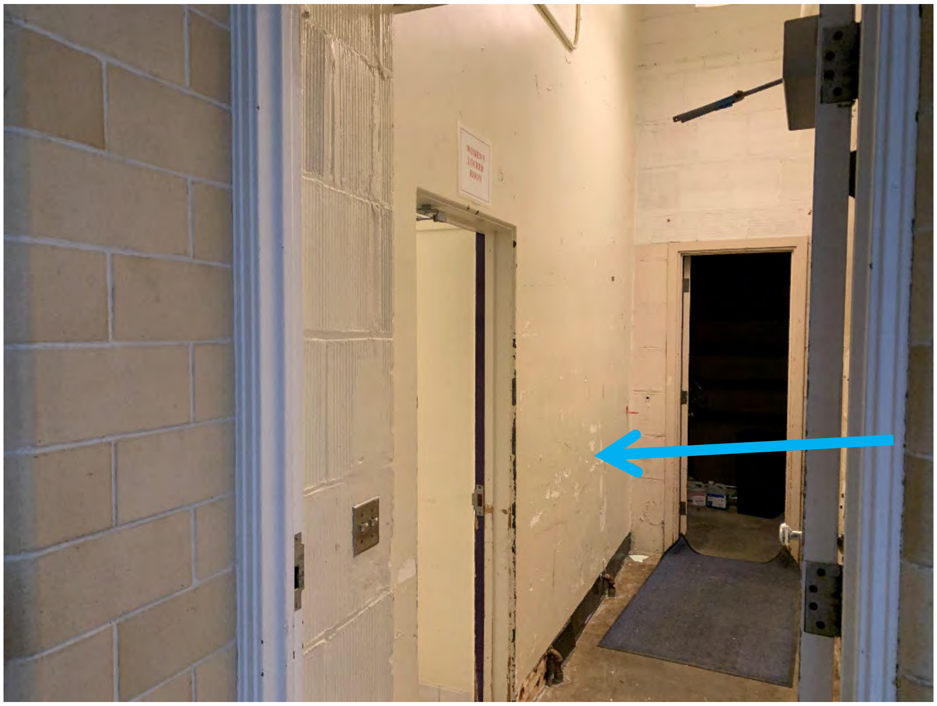
HSA 16. Gray sandy material (M)

HSA 17. Black asphaltic waterproofing and gray concrete (M)

Photograph not available

HSA 18. White fluffy fibrous pipe insulation debris (T)

HSA 19. Gray flaky fibrous pipe insulation debris and off-white flaky fibrous residual pipe insulation debris (T)



HSA 20. Off-white sandy material with paint (S)

HSA 21. Off-white sandy material with paint (S)

Appendix C. Asbestos Analytical Results

NVL
INDUSTRIAL HYGIENE SERVICES
LABORATORY + MANAGEMENT + TRAINING

February 15, 2022

Aaron Heath
AECOM-Seattle
1111 3rd Avenue Ste. 1600
Seattle, WA 98101

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2202801.00

Client Project: 60678092
Location: Pavilion Pool

Dear Mr. Heath,

Enclosed please find test results for the 37 sample(s) submitted to our laboratory for analysis on 2/10/2022.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Nick Ly, Technical Director

NVLAP
Lab Code: 102063-0

Enc.: Sample Results

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: **Mr. Aaron Heath**
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Lab ID: 22317116 **Client Sample #: PP-1-01**
Location: Pavilion Pool

Layer 1 of 1 **Description:** Off-white compressed fibrous material with black brittle coating material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine particles	None Detected	ND	**Chrysotile 29%**

Lab ID: 22317117 **Client Sample #: PP-2-01**
Location: Pavilion Pool

Layer 1 of 2 **Description:** Off-white sandy/brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Mineral grains, Fine grains Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** Beige soft mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Mastic/Binder, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 22317118 **Client Sample #: PP-2-02**
Location: Pavilion Pool

Layer 1 of 2 **Description:** Gray foamy material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Synthetic foam	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** Beige soft mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Mastic/Binder, Fine grains, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 22317119 **Client Sample #: PP-2-03**
Location: Pavilion Pool

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: Mr. Aaron Heath
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Layer 1 of 3 **Description:** Gray foamy material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Synthetic foam	None Detected	ND	**None Detected ND**

Layer 2 of 3 **Description:** Beige soft mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine grains, Fine particles	None Detected	ND	**None Detected ND**

Layer 3 of 3 **Description:** Gray soft material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 22317120 **Client Sample #: PP-3-01**

Location: Pavilion Pool

Layer 1 of 2 **Description:** Black rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Vinyl/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** Brown brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles	Talc fibers	3%	**None Detected ND**

Lab ID: 22317121 **Client Sample #: PP-3-02**

Location: Pavilion Pool

Comments: Insufficient sample amount for further analysis (Layer 3).

Layer 1 of 3 **Description:** Black rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Vinyl/Binder, Fine particles	None Detected	ND	**None Detected ND**

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: Mr. Aaron Heath
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Layer 2 of 3 **Description:** Brown brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 3 of 3 **Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles Paint	None Detected	ND	**Chrysotile 2%**

Lab ID: 22317122 **Client Sample #: PP-3-03**

Location: Pavilion Pool

Layer 1 of 3 **Description:** Black rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Vinyl/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 3 **Description:** Light yellow soft mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 3 of 3 **Description:** Trace amount of white compacted powdery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	Cellulose	<1%	**None Detected ND**

Lab ID: 22317123 **Client Sample #: PP-4-01**

Location: Pavilion Pool

Layer 1 of 3 **Description:** White rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Vinyl/Binder, Fine particles	None Detected	ND	**None Detected ND**

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: Mr. Aaron Heath
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Layer 2 of 3 **Description:** Light yellow soft mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 3 of 3 **Description:** Trace amount of white compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles Paint	None Detected	ND	**None Detected ND**

Lab ID: 22317124 **Client Sample #: PP-5-01**

Location: Pavilion Pool

Layer 1 of 2 **Description:** Yellow brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine grains, Fine particles	Cellulose	2%	**Chrysotile 3%**

Layer 2 of 2 **Description:** White crumbly material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine particles, Paint	None Detected	ND	**None Detected ND**

Lab ID: 22317125 **Client Sample #: PP-6-01**

Location: Pavilion Pool

Layer 1 of 2 **Description:** Brown brittle tile

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	None Detected	ND	**Chrysotile 3%**

Layer 2 of 2 **Description:** Black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Asphalt/Binder, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 22317126 **Client Sample #: PP-6-02**

Location: Pavilion Pool

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: **Mr. Aaron Heath**
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Layer 1 of 2 **Description:** Brown brittle tile

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	None Detected	ND	**Chrysotile 3%**

Layer 2 of 2 **Description:** Black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Asphalt/Binder, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 22317127 **Client Sample #: PP-6-03**
Location: Pavilion Pool

Layer 1 of 2 **Description:** Brown brittle tile

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine grains, Fine particles	None Detected	ND	**Chrysotile 4%**

Layer 2 of 2 **Description:** Black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Asphalt/Binder, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 22317128 **Client Sample #: PP-7-01**
Location: Pavilion Pool

Layer 1 of 2 **Description:** Red brittle tile

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Vinyl/Binder, Fine grains, Fine particles	None Detected	ND	**Chrysotile 5%**

Layer 2 of 2 **Description:** Black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Asphalt/Binder, Fine particles	None Detected	ND	**Chrysotile 3%**

Lab ID: 22317129 **Client Sample #: PP-8-01**
Location: Pavilion Pool

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: Mr. Aaron Heath
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Layer 1 of 2 **Description:** Red brittle tile

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Vinyl/Binder, Fine grains, Fine particles	None Detected ND	**Chrysotile 4%**

Layer 2 of 2 **Description:** Black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Asphalt/Binder, Fine particles	None Detected ND	**Chrysotile 3%**

Lab ID: 22317130 **Client Sample #: PP-8-02**
Location: Pavilion Pool

Layer 1 of 2 **Description:** Red brittle tile

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Vinyl/Binder, Fine grains, Fine particles	None Detected ND	**Chrysotile 4%**

Layer 2 of 2 **Description:** Black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Asphalt/Binder, Fine particles	None Detected ND	**Chrysotile 4%**

Lab ID: 22317131 **Client Sample #: PP-9-01**
Location: Pavilion Pool

Layer 1 of 2 **Description:** Blue vinyl tile

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Vinyl/Binder, Fine grains, Fine particles	None Detected ND	**None Detected ND**

Layer 2 of 2 **Description:** Black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Asphalt/Binder, Fine particles	Cellulose 7%	**None Detected ND**

Lab ID: 22317132 **Client Sample #: PP-9-02**
Location: Pavilion Pool

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: Mr. Aaron Heath
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Layer 1 of 2 **Description:** Blue vinyl tile

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Vinyl/Binder, Fine grains, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** Black asphaltic mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Asphalt/Binder, Fine particles	Cellulose	7%	**None Detected ND**

Lab ID: 22317133 **Client Sample #: PP-10-01**
Location: Pavilion Pool

Layer 1 of 1 **Description:** Brown brittle mastic with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine particles, Paint	None Detected	ND	**None Detected ND**

Lab ID: 22317134 **Client Sample #: PP-10-02**
Location: Pavilion Pool

Layer 1 of 1 **Description:** Brown brittle mastic with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine particles, Paint	None Detected	ND	**None Detected ND**

Lab ID: 22317135 **Client Sample #: PP-11-01**
Location: Pavilion Pool

Layer 1 of 1 **Description:** Yellow brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 22317136 **Client Sample #: PP-11-02**
Location: Pavilion Pool

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: Mr. Aaron Heath
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Layer 1 of 1 **Description:** Yellow brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 22317137 **Client Sample #: PP-12-01**

Location: Pavilion Pool

Layer 1 of 2 **Description:** Brown rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Vinyl/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** White brittle mastic with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles, Paint	None Detected	ND	**None Detected ND**

Lab ID: 22317138 **Client Sample #: PP-12-02**

Location: Pavilion Pool

Layer 1 of 2 **Description:** Brown rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Vinyl/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** White brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles	None Detected	ND	**None Detected ND**

Lab ID: 22317139 **Client Sample #: PP-13-01**

Location: Pavilion Pool

Layer 1 of 1 **Description:** Black brittle tile

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Mineral grains, Fine particles	None Detected	ND	**None Detected ND**

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: Mr. Aaron Heath
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Lab ID: 22317140 **Client Sample #: PP-14-01**
Location: Pavilion Pool

Layer 1 of 1 **Description:** Brown flaky fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Fine particles	Cellulose	2%	Chrysotile 48%

Lab ID: 22317141 **Client Sample #: PP-15-01**
Location: Pavilion Pool

Layer 1 of 2 **Description:** White crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Calcareous particles	None Detected	ND	None Detected ND

Layer 2 of 2 **Description:** Off-white brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Fine grains Perlite	None Detected	ND	None Detected ND

Lab ID: 22317142 **Client Sample #: PP-15-02**
Location: Pavilion Pool

Layer 1 of 3 **Description:** White crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Calcareous particles	None Detected	ND	None Detected ND

Layer 2 of 3 **Description:** Brown-red crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Fine particles	None Detected	ND	None Detected ND

Layer 3 of 3 **Description:** Gray cementitious material with trace amount of yellow fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Concrete/Binder, Gravel, Cementitious particles	Glass fibers	11%	None Detected ND

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: **Mr. Aaron Heath**
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Lab ID: 22317143 **Client Sample #: PP-15-03**

Location: Pavilion Pool

Layer 1 of 3 **Description:** White/beige crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Mineral grains, Fine grains Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 3 **Description:** Brown-red crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Fine particles	None Detected	ND	**None Detected ND**

Layer 3 of 3 **Description:** Gray cementitious material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Cement/Binder, Fine grains, Cementitious particles	Cellulose	4%	**None Detected ND**

Lab ID: 22317144 **Client Sample #: PP-16-01**

Location: Pavilion Pool

Layer 1 of 1 **Description:** Gray sandy material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Sand	Glass fibers	2%	**None Detected ND**

Lab ID: 22317145 **Client Sample #: PP-17-01**

Location: Pavilion Pool

Layer 1 of 2 **Description:** Gray crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Mineral grains, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** Black asphaltic material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Asphalt/Binder, Fine particles	None Detected	ND	**None Detected ND**

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: Mr. Aaron Heath
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Lab ID: 22317146 **Client Sample #: PP-17-02**
Location: Pavilion Pool
Layer 1 of 1 **Description:** Gray crumbly/sandy material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Mineral grains, Fine particles Sand	None Detected	ND	**None Detected ND**

Lab ID: 22317147 **Client Sample #: PP-18-01**
Location: Pavilion Pool
Layer 1 of 1 **Description:** White fluffy fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine particles	None Detected	ND	**Chrysotile 34%** **Amosite 9%**

Lab ID: 22317148 **Client Sample #: PP-18-02**
Location: Pavilion Pool
Layer 1 of 1 **Description:** White fluffy fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine particles	None Detected	ND	**Chrysotile 37%** **Amosite 11%**

Lab ID: 22317149 **Client Sample #: PP-18-03**
Location: Pavilion Pool
Layer 1 of 1 **Description:** White fluffy fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine particles	None Detected	ND	**Chrysotile 36%** **Amosite 8%**

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-Seattle
Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: Mr. Aaron Heath
Project Location: Pavilion Pool

Batch #: 2202801.00
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 37
Samples Analyzed: 37
Method: EPA/600/R-93/116

Lab ID: 22317150 **Client Sample #: PP-19-01**
Location: Pavilion Pool
Layer 1 of 1 **Description:** Gray flaky fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine grains, Fine particles	Cellulose	4%	**Amosite 28%**
Wood flakes			**Chrysotile 11%**

Lab ID: 22317151 **Client Sample #: PP-19-02**
Location: Pavilion Pool
Layer 1 of 1 **Description:** Off-white flaky fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Fine particles, Mineral grains	None Detected	ND	**Chrysotile 39%**
Sand			**Amosite 3%**

Lab ID: 22317152 **Client Sample #: PP-19-03**
Location: Pavilion Pool
Layer 1 of 1 **Description:** Gray flaky fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Mineral grains, Fine grains	Cellulose	6%	**Amosite 43%**
Fine particles, Wood flakes			

Sampled by: Client
Analyzed by: Akane Yoshikawa **Date:** 02/15/2022
Reviewed by: Nick Ly **Date:** 02/15/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

ASBESTOS LABORATORY SERVICES

Company AECOM-Seattle
Address 1111 3rd Avenue Ste. 1600
Seattle, WA 98101
Project Manager Mr. Aaron Heath
Phone (206) 438-2700
Cell

NVL Batch Number **2202801.00**
TAT 3 Days **AH** No
Rush TAT
Due Date 2/15/2022 **Time** 4:50 PM
Email Aaron.heath@aecom.com
Fax (866) 495-5288

Project Name/Number: 60678092 **Project Location:** Pavilion Pool

Subcategory PLM Bulk
Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 37 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	22317116	PP-1-01		A
2	22317117	PP-2-01		A
3	22317118	PP-2-02		A
4	22317119	PP-2-03		A
5	22317120	PP-3-01		A
6	22317121	PP-3-02		A
7	22317122	PP-3-03		A
8	22317123	PP-4-01		A
9	22317124	PP-5-01		A
10	22317125	PP-6-01		A
11	22317126	PP-6-02		A
12	22317127	PP-6-03		A
13	22317128	PP-7-01		A
14	22317129	PP-8-01		A
15	22317130	PP-8-02		A
16	22317131	PP-9-01		A
17	22317132	PP-9-02		A
18	22317133	PP-10-01		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Client				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	2/10/22	1650
Analyzed by	Akane Yoshikawa		NVL	2/15/22	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 2/10/2022
Time: 4:58 PM
Entered By: Fatima Khan

ASBESTOS LABORATORY SERVICES

Company AECOM-Seattle
Address 1111 3rd Avenue Ste. 1600
Seattle, WA 98101
Project Manager Mr. Aaron Heath
Phone (206) 438-2700
Cell

NVL Batch Number **2202801.00**
TAT 3 Days **AH** No
Rush TAT
Due Date 2/15/2022 **Time** 4:50 PM
Email Aaron.heath@aecom.com
Fax (866) 495-5288

Project Name/Number: 60678092 **Project Location:** Pavilion Pool

Subcategory PLM Bulk
Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 37 Rush Samples

	Lab ID	Sample ID	Description	A/R
19	22317134	PP-10-02		A
20	22317135	PP-11-01		A
21	22317136	PP-11-02		A
22	22317137	PP-12-01		A
23	22317138	PP-12-02		A
24	22317139	PP-13-01		A
25	22317140	PP-14-01		A
26	22317141	PP-15-01		A
27	22317142	PP-15-02		A
28	22317143	PP-15-03		A
29	22317144	PP-16-01		A
30	22317145	PP-17-01		A
31	22317146	PP-17-02		A
32	22317147	PP-18-01		A
33	22317148	PP-18-02		A
34	22317149	PP-18-03		A
35	22317150	PP-19-01		A
36	22317151	PP-19-02		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Client				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	2/10/22	1650
Analyzed by	Akane Yoshikawa		NVL	2/15/22	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 2/10/2022
Time: 4:58 PM
Entered By: Fatima Khan

ASBESTOS LABORATORY SERVICES

Company AECOM-Seattle

Address 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Project Manager Mr. Aaron Heath

Phone (206) 438-2700

Cell

NVL Batch Number **2202801.00**

TAT 3 Days **AH** No

Rush TAT

Due Date 2/15/2022 **Time** 4:50 PM

Email Aaron.heath@aecom.com

Fax (866) 495-5288

Project Name/Number: 60678092 **Project Location:** Pavilion Pool

Subcategory PLM Bulk

Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 37

Rush Samples

	Lab ID	Sample ID	Description	A/R
37	22317152	PP-19-03		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Client				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	2/10/22	1650
Analyzed by	Akane Yoshikawa		NVL	2/15/22	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 2/10/2022
Time: 4:58 PM
Entered By: Fatima Khan

2202801

PAGE 1 of 3

NVL
INDUSTRIAL HYGIENE SERVICES
LABORATORY • MANAGEMENT • TRAINING

ASBESTOS CHAIN OF CUSTODY

Turn Around Time

☐ 1 Hour	☐ 24 Hours	☐ 4 Days
☐ 2 Hours	☐ 2 Days	☐ 5 Days
☐ 4 Hours	☒ 3 Days	☐ 10 Days

Please call for TAT less than 24 Hours

Company AECOM
Address 1111 Third Ave, Suite 1500
Seattle, WA 98101
Phone 206-438-2700

Project Manager Aaron Heath
Cell (360) 350- 2361
Email
Fax ( ) -

Project Name/Number
Project Location - PAVILION POOL

☐ PCM Air (NIOSH 7400)
☒ PLM (EPA 600/R-93-116)
☐ PLM Gravimetry (600/R-93-116)
☐ Asbestos Friable/Non-Friable (EPA 600/R-93/116)
☐ TEM (NIOSH 7402)
☐ EPA 400 Points (600/R-93-116)
☐ Asbestos in Vermiculite (EPA 600/R-04/004)
☐ TEM (AHERA)
☐ Other
☐ TEM (EPA Level II Modified)
☐ EPA 1000Points (600/R-93-116)
☐ Asbestos in Sediment (EPA 1900 Points)

Reporting Instructions Please email results to Aaron Heath and Chris Selders
☐ Call ( ) -
☐ Fax ( ) -
☒ Email christopher.selders@aecom.com

Total Number of Samples

	Sample ID	Description	A/R
1	PP-1-01		
2	2-01		
3	02		
4	03		
5	3-01		
6	02		
7	03		
8	4-01		
9	5-01		
10	6-01		
11	02		
12	03		
13	7-01		
14	8-01		
15	02		

	Print Name	Signature	Company	Date	Time
Sampled by	Chris Selders		AECOM	2/9/2022	
Relinquish by	Chris Selders		AECOM	2/10/2022	

Office Use Only

	Print Name	Signature	Company	Date	Time
Received by	[illegible]		[illegible]	2/10/22	1650
Analyzed by					
Called by					
Faxed/Email by					

2202801

NVL
INDUSTRIAL HYGIENE SERVICES
LABORATORY • MANAGEMENT • TRAINING

ASBESTOS CHAIN OF CUSTODY

PAGE 2 of 3

…und Time
☐ 1 Hour ☐ 24 Hours ☐ 4 Days
☐ 2 Hours ☐ 2 Days ☐ 5 Days
☐ 4 Hours ☒ 3 Days ☐ 10 Days
Please call for TAT less than 24 Hours

Company AECOM
Address 1111 Third Ave, Suite 1500
Seattle, WA 98101
Phone 206-438-2700

Project Manager Aaron Heath
Cell (360) 350- 2361
Email
Fax ( ) -

Project Name/Number
Project Location Pavilion Pool

☐ PCM Air (NIOSH 7400) ☐ TEM (NIOSH 7402) ☐ TEM (AHERA) ☐ TEM (EPA Level II Modified)
☒ PLM (EPA 600/R-93-116) ☐ EPA 400 Points (600/R-93-116) ☐ EPA 1000Points (600/R-93-116)
☐ PLM Gravimetry (600/R-93-116) ☐ Asbestos in Vermiculite (EPA 600/R-04/004) ☐ Asbestos in Sediment (EPA 1900 Points)
☐ Asbestos Friable/Non-Friable (EPA 600/R-93/116) ☐ Other

Reporting Instructions Please email results to Aaron Heath and Chris Selders
☐ Call ( ) - ☐ Fax ( ) - ☒ Email christopher.selders@aecom.com

Total Number of Samples ______

	Sample ID	Description	A/R
1	PP- 9-01		
2	02		
3	10-01		
4	02		
5	11-01		
6	02		
7	12-01		
8	02		
9	13-01		
10	14-01		
11	15-01		
12	02		
13	03		
14	16-01		
15	17-01		

	Print Name	Signature	Company	Date	Time
Sampled by	Chris Selders		AECOM	2/9/2020	
Relinquish by	Chris Selders		AECOM	2/10/2020	

Office Use Only

	Print Name	Signature	Company	Date	Time
Received by	Kim Allen		NVL	2/10/22	1650
Analyzed by					
Called by					
Faxed/Email by					

2202801

PAGE 3 of 3

NVL
INDUSTRIAL HYGIENE SERVICES
LABORATORY • MANAGEMENT • TRAINING

ASBESTOS CHAIN OF CUSTODY

Turn Around Time

☐ 1 Hour	☐ 24 Hours	☐ 4 Days
☐ 2 Hours	☐ 2 Days	☐ 5 Days
☐ 4 Hours	☒ 3 Days	☐ 10 Days

Please call for TAT less than 24 Hours

Company AECOM

Address 1111 Third Ave, Suite 1500
Seattle, WA 98101

Phone 206-438-2700

Project Manager Aaron Heath

Cell (360) 350- 2361

Email

Fax ( ) -

Project Name/Number	Project Location

☐ PCM Air (NIOSH 7400) ☐ TEM (NIOSH 7402) ☐ TEM (AHERA) ☐ TEM (EPA Level II Modified)
☒ PLM (EPA 600/R-93-116) ☐ EPA 400 Points (600/R-93-116) ☐ EPA 1000Points (600/R-93-116)
☐ PLM Gravimetry (600/R-93-116) ☐ Asbestos in Vermiculite (EPA 600/R-04/004) ☐ Asbestos in Sediment (EPA 1900 Points)
☐ Asbestos Friable/Non-Friable (EPA 600/R-93/116) ☐ Other

Reporting Instructions Please email results to Aaron Heath and Chris Selders

☐ Call ( ) - ☐ Fax ( ) - ☒ Email christopher.selders@aecom.com

Total Number of Samples

	Sample ID	Description	A/R
1	PP- 17-02		
2	18-01		
3	02		
4	03		
5	19-01		
6	02		
7	03		
8			
9			
10			
11			
12			
13			
14			
15			

	Print Name	Signature	Company	Date	Time
Sampled by	Chris Selders		AECOM	1/9/2020	
Relinquish by	Chris Selders		AECOM	1/10/2020	

Office Use Only

	Print Name	Signature	Company	Date	Time
Received by	Kelly Allen		NVL	2/10/22	1650
Analyzed by					
Called by					
Faxed/Email by					

INDUSTRIAL HYGIENE SERVICES
LABORATORY + MANAGEMENT + TRAINING

April 19, 2022

Aaron Heath
AECOM-UW
1111 Third Avenue Ste. 1600
Seattle , WA 98101

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2206650.01

Client Project: 60678092
Location: UW - Pavilion Pool

Dear Mr. Heath,

Enclosed please find test results for the 7 sample(s) submitted to our laboratory for analysis on 4/8/2022.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Nick Ly, Technical Director

Lab Code: 102063-0

Enc.: Sample Results

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-UW
Address: 1111 Third Avenue Ste. 1600
Seattle , WA 98101

Attention: Mr. Aaron Heath
Project Location: UW - Pavilion Pool

Batch #: 2206650.01
Client Project #: 60678092
Date Received: 4/8/2022
Samples Received: 7
Samples Analyzed: 7
Method: EPA/600/R-93/116

Lab ID: 22341327 **Client Sample #: PP-3-02B**
Location: UW - Pavilion Pool
Comments: Insufficient amount of white powder on mastic to conduct thorough analysis for presence of asbestos fibers.

Layer 1 of 2 **Description:** Beige rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Rubber/Synthetic Binder, Fine grains	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** Brown brittle mastic with very trace amount of white powder

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Fine grains, Mastic/Binder, Fine particles	Wollastonite	5%	**None Detected ND**
	Cellulose	2%	

Lab ID: 22341328 **Client Sample #: PP-20-01**
Location: UW - Pavilion Pool

Layer 1 of 1 **Description:** Off-white sandy material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Paint, Fine grains, Calcareous binder	Cellulose	2%	**None Detected ND**

Lab ID: 22341329 **Client Sample #: PP-20-02**
Location: UW - Pavilion Pool

Layer 1 of 1 **Description:** Off-white sandy material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Paint, Fine grains, Calcareous binder	Cellulose	<1%	**None Detected ND**

Lab ID: 22341330 **Client Sample #: PP-20-03**
Location: UW - Pavilion Pool

Layer 1 of 2 **Description:** Off-white sandy material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Paint, Fine grains, Calcareous binder	Cellulose	1%	**None Detected ND**

Sampled by: Client
Analyzed by: Munaf Khan **Date:** 04/11/2022
Reviewed by: Nick Ly **Date:** 04/19/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-UW
Address: 1111 Third Avenue Ste. 1600
Seattle , WA 98101

Attention: Mr. Aaron Heath
Project Location: UW - Pavilion Pool

Batch #: 2206650.01
Client Project #: 60678092
Date Received: 4/8/2022
Samples Received: 7
Samples Analyzed: 7
Method: EPA/600/R-93/116

Layer 2 of 2 **Description:** Off-white sandy material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Paint, Mineral grains, Calcareous binder	Cellulose 3%	**None Detected ND**

Lab ID: 22341331 **Client Sample #: PP-21-01**

Location: UW - Pavilion Pool

Layer 1 of 1 **Description:** Off-white sandy material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Paint, Mineral grains, Calcareous binder	Cellulose 3%	**None Detected ND**

Lab ID: 22341332 **Client Sample #: PP-21-02**

Location: UW - Pavilion Pool

Layer 1 of 1 **Description:** Off-white sandy material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Paint, Mineral grains, Calcareous binder	Cellulose 2%	**None Detected ND**

Lab ID: 22341333 **Client Sample #: PP-21-03**

Location: UW - Pavilion Pool

Layer 1 of 1 **Description:** Off-white sandy material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%	**Asbestos Type: %**
Paint, Mineral grains, Calcareous binder	Cellulose 2%	**None Detected ND**

Sampled by: Client
Analyzed by: Munaf Khan **Date:** 04/11/2022
Reviewed by: Nick Ly **Date:** 04/19/2022

Nick Ly, Technical Director

ASBESTOS LABORATORY SERVICES

Company AECOM-UW
Address 1111 Third Avenue Ste. 1600
Seattle , WA 98101
Project Manager Mr. Aaron Heath
Phone (206) 438-2700

NVL Batch Number **2206650.00**
TAT 3 Days **AH** No
Rush TAT
Due Date 4/13/2022 **Time** 10:00 AM
Email Aaron.heath@aecom.com
Fax

Project Name/Number: 60678092 **Project Location:** UW - Pavilion Pool

Subcategory PLM Bulk
Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 7 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	22341327	PP-3-02B		A
2	22341328	PP-20-01		A
3	22341329	PP-20-02		A
4	22341330	PP-20-03		A
5	22341331	PP-21-01		A
6	22341332	PP-21-02		A
7	22341333	PP-21-03		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Client				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	4/8/22	1000
Analyzed by	Munaf Khan		NVL	4/11/22	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 4/8/2022
Time: 10:09 AM
Entered By: Rachelle Miller

CHAIN of CUSTODY
SAMPLE LOG

2206650

Client AECOM-UW
Street 1111 Third Avenue Ste. 1600
Seattle , WA 98101

Project Manager Mr. Aaron Heath
Project Location UW - Pavilion Pool

Phone: (206) 438-2700 **Fax:**

NVL Batch Number
Client Job Number 60678092
Total Samples
Turn Around Time ☐ 1 Hr ☐ 6 Hrs ☒ 3 Days ☐ 10 Days ☐ 2 Hrs ☐ 1 Day ☐ 4 Days ☐ 4 Hrs ☐ 2 Days ☐ 5 Days
Please call for TAT less than 24 Hrs
Email address Aaron.heath@aecom.com

☐ **Asbestos Air** ☐ PCM (NIOSH 7400) ☐ TEM (NIOSH 7402) ☐ TEM (AHERA) ☐ TEM (EPA Level II) ☐ Other

☒ **Asbestos Bulk** ☒ PLM (EPA/600/R-93/116) ☐ PLM (EPA Point Count) ☐ PLM (EPA Gravimetry) ☐ TEM BULK

☐ **Mold/Fungus** ☐ Mold Air ☐ Mold Bulk ☐ **Rotometer Calibration**

METALS
☐ Total Metals
☐ TCLP
☐ Cr 6

Det. Limit
☐ FAA (ppm)
☐ ICP (ppm)
☐ GFAA (ppb)
☐ CVAA (ppb)

Matrix
☐ Air Filter
☐ Drinking water
☐ Dust/wipe (Area)
☐ Soil
☐ Paint Chips in %
☐ Paint Chips in cm2
☐ Waste Water
☐ Other

RCRA Metals ☐ All 8
☐ Arsenic (As)
☐ Barium (Ba)
☐ Cadmium (Cd)
☐ Chromium (Cr)
☐ Lead (Pb)
☐ Mercury (Hg)
☐ Selenium (Se)
☐ Silver (Ag)

Other Metals
☐ **All 3**
☐ Copper (Cu)
☐ Nickel (Ni)
☐ Zinc (Zn)

☐ **Other Types of Analysis** ☐ Fiberglass ☐ Silica ☐ Nuisance Dust ☐ Respirable Dust ☐ Other (Specify)

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	**Lab ID**	**Client Sample Number**	**Comments (e.g Sample are, Sample Volume, etc)**	**A/R**
1		PP-3-02B		
2		PP-20-01		
3		02		
4		03		
5		PP-21-01		
6		02		
7		03		
8				
9				
10				
11				
12				
13				
14				
15				

	Print Below	Sign Below	Company	Date	Time
Sampled by	CHRIS SELDERS		AECOM	4/7/22	
Relinquished by	CHRIS SELDERS		AECOM	4/7/22	
Received by	KennAzen		nvl	4/8/22	1000
Analyzed by					
Results Called by					
Results Faxed by					

Special Instructions: Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.
* PLEASE EMAIL RESULTS TO: christopher.selders@aecom.com

NVL
INDUSTRIAL HYGIENE SERVICES
LABORATORY + MANAGEMENT + TRAINING

April 20, 2022

Aaron Heath
AECOM-UW
1111 Third Avenue Ste. 1600
Seattle , WA 98101

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2207352.00

Client Project: 60678092
Location: UW Pavilion Pool

Dear Mr. Heath,

Enclosed please find test results for the 1 sample(s) submitted to our laboratory for analysis on 4/19/2022.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Nick Ly, Technical Director

NVLAP
Lab Code: 102063-0

Enc.: Sample Results

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: AECOM-UW
Address: 1111 Third Avenue Ste. 1600
Seattle , WA 98101

Attention: Mr. Aaron Heath
Project Location: UW Pavilion Pool

Batch #: 2207352.00
Client Project #: 60678092
Date Received: 4/19/2022
Samples Received: 1
Samples Analyzed: 1
Method: EPA/600/R-93/116

Lab ID: 22345734 **Client Sample #: PP-3-02-C**

Location: UW Pavilion Pool

Layer 1 of 3 **Description:** Black rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Rubber/Synthetic Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 3 **Description:** Brown brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles	Cellulose	3%	**None Detected ND**

Layer 3 of 3 **Description:** White brittle skim coat material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Paint, Calcareous particles, Binder/Filler	Cellulose	2%	**None Detected ND**

Sampled by: Client
Analyzed by: Munaf Khan **Date:** 04/20/2022
Reviewed by: Nick Ly **Date:** 04/20/2022

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

ASBESTOS LABORATORY SERVICES

Company AECOM-UW
Address 1111 Third Avenue Ste. 1600
Seattle , WA 98101
Project Manager Mr. Aaron Heath
Phone (206) 438-2700

NVL Batch Number **2207352.00**
TAT 1 Day **AH** No
Rush TAT
Due Date 4/20/2022 **Time** 11:45 AM
Email Aaron.heath@aecom.com
Fax (866) 495-5288

Project Name/Number: 60678092 **Project Location:** UW Pavilion Pool

Subcategory PLM Bulk
Item Code ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

Total Number of Samples 1 Rush Samples

	Lab ID	Sample ID	Description	A/R
1	22345734	PP-3-02-C		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Client				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	4/19/22	1145
Analyzed by	Munaf Khan		NVL	4/20/22	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 4/19/2022
Time: 11:57 AM
Entered By: Rachelle Miller

UNIVERSITY OF WASHINGTON

CHAIN of CUSTODY
SAMPLE LOG

2207352

INDUSTRIAL HYGIENE SERVICES
LABORATORY • MANAGEMENT • TRAINING

Client AECOM-Seattle

Street 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Project Manager Mr. Aaron Heath

Project Location UW PAVILION POOL

Phone: (206) 438-2700 **Fax:** (866) 495-5288

NVL Batch Number

Client Job Number 60678092

Total Samples 1

Turn Around Time ☐ 1 Hr ☐ 6 Hrs ☐ 3 Days ☐ 10 Days ☐ 2 Hrs ☒ 1 Day ☐ 4 Days ☐ 4 Hrs ☐ 2 Days ☐ 5 Days

Please call for TAT less than 24 Hrs

Email address Aaron.heath@aecom.com

Cell

☐ **Asbestos Air** ☐ PCM (NIOSH 7400) ☐ TEM (NIOSH 7402) ☐ TEM (AHERA) ☐ TEM (EPA Level II) ☐ Other

☒ **Asbestos Bulk** ☐ PLM (EPA/600/R-93/116) ☐ PLM (EPA Point Count) ☐ PLM (EPA Gravimetry) ☐ TEM BULK

☐ **Mold/Fungus** ☐ Mold Air ☐ Mold Bulk ☐ **Rotometer Calibration**

METALS	**Det. Limit**	**Matrix**		**RCRA Metals**	☐ All 8	**Other Metals**
☐ Total Metals	☐ FAA (ppm)	☐ Air Filter	☐ Paint Chips in %	☐ Arsenic (As)	☐ Lead (Pb)	☐ **All 3**
☐ TCLP	☐ ICP (ppm)	☐ Drinking water	☐ Paint Chips in cm2	☐ Barium (Ba)	☐ Mercury (Hg)	☐ Copper (Cu)
☐ Cr 6	☐ GFAA (ppb)	☐ Dust/wipe (Area)	☐ Waste Water	☐ Cadmium (Cd)	☐ Selenium (Se)	☐ Nickel (Ni)
	☐ CVAA (ppb)	☐ Soil	☐ Other	☐ Chromium (Cr)	☐ Silver (Ag)	☐ Zinc (Zn)

☐ **Other Types of Analysis** ☐ Fiberglass ☐ Nuisance Dust ☐ Other (Specify) ☐ Silica ☐ Respirable Dust

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	**Lab ID**	**Client Sample Number**	**Comments (e.g Sample are, Sample Volume, etc)**	**A/R**
1		FP-3-02C		
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

	Print Below	Sign Below	Company	Date	Time
Sampled by	A. HEATH		AECOM	4/19/22	1130
Relinquished by	A. HEATH		AECOM	4/19/22	1144
Received by	KellyAdler		NVL	4/19/22	1145
Analyzed by					
Results Called by					
Results Faxed by					

Special Instructions: Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Appendix D. Lead Analytical Results

NVL
INDUSTRIAL HYGIENE SERVICES
LABORATORY + MANAGEMENT + TRAINING

February 14, 2022

Aaron Heath
AECOM-Seattle
1111 3rd Avenue Ste. 1600
Seattle, WA 98101

NVL Batch # 2202802.00

RE: **Total Metal Analysis**
Method: EPA 7000B Lead by FAA <paint>
Item Code: FAA-02

Client Project: 60678092
Location: Pavilion Pool

Dear Mr. Heath,

NVL Labs received 5 sample(s) for the said project on 2/10/2022. Preparation of these samples was conducted following protocol outlined in EPA 3051/7000B , unless stated otherwise. Analysis of these samples was performed using analytical instruments in accordance with EPA 7000B Lead by FAA <paint>. The results are usually expressed in mg/Kg and percentage (%). Test results are not blank corrected.

For recent regulation updates pertaining to current regulatory levels or permissible exposure levels, please call your local regulatory agencies for more detail.

At NVL Labs all analyses are performed under strict guidelines of the Quality Assurance Program. This report is considered highly confidential and will not be released without your approval. Samples are archived after two weeks from the analysis date. Please feel free to contact us at 206-547-0100, in case you have any questions or concerns.

Sincerely,

Shalini Patel, Lab Supervisor

Enc.: Sample results

Lab ID # 101861

Analysis Report

Total Lead (Pb)

Client: AECOM-Seattle

Address: 1111 3rd Avenue Ste. 1600
Seattle, WA 98101

Attention: **Mr. Aaron Heath**

Project Location: Pavilion Pool

Batch #: 2202802.00

Matrix: Paint
Method: EPA 3051/7000B
Client Project #: 60678092
Date Received: 2/10/2022
Samples Received: 5
Samples Analyzed: 5

Lab ID	Client Sample #	Sample Weight (g)	RL in mg/Kg	Results in mg/Kg	Results in percent
22317163	PP-Pb1-01	0.1990	50	61000	6.1
22317164	PP-Pb2-01	0.1836	54	220000	22
22317165	PP-Pb3-01	0.1807	55	< 55	<0.0055
22317166	PP-Pb4-01	0.1956	51	< 51	<0.0051
22317167	PP-Pb5-01	0.1856	54	1300	0.13

Sampled by: Client
Analyzed by: Yasuyuki Hida
Reviewed by: Shalini Patel

Date Analyzed: 02/11/2022
Date Issued: 02/14/2022

Shalini Patel, Lab Supervisor

mg/ Kg =Milligrams per kilogram
Percent = Milligrams per kilogram / 10000

RL = Reporting Limit
'<' = Below the reporting Limit

Note : Method QC results are acceptable unless stated otherwise.
Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.

Bench Run No: 2022-0211-04

LEAD LABORATORY SERVICES

Company AECOM-Seattle
Address 1111 3rd Avenue Ste. 1600
Seattle, WA 98101
Project Manager Mr. Aaron Heath
Phone (206) 438-2700
Cell

NVL Batch Number **2202802.00**
TAT 3 Days **AH** No
Rush TAT
Due Date 2/15/2022 **Time** 4:50 PM
Email Aaron.heath@aecom.com
Fax (866) 495-5288

Project Name/Number: 60678092 **Project Location:** Pavilion Pool

Subcategory Flame AA (FAA)
Item Code FAA-02 EPA 7000B Lead by FAA <paint>

Total Number of Samples 5

Rush Samples

	Lab ID	Sample ID	Description	A/R
1	22317163	PP-Pb1-01		A
2	22317164	PP-Pb2-01		A
3	22317165	PP-Pb3-01		A
4	22317166	PP-Pb4-01		A
5	22317167	PP-Pb5-01		A

	Print Name	Signature	Company	Date	Time
Sampled by	Client				
Relinquished by	Client				

Office Use Only	Print Name	Signature	Company	Date	Time
Received by	Kelly AuVu		NVL	2/10/22	1650
Analyzed by	Yasuyuki Hida		NVL	2/11/22	
Results Called by					
☐ **Faxed** ☐ **Emailed**					

Special Instructions:

Date: 2/10/2022
Time: 5:03 PM
Entered By: Fatima Khan

2202802

NVL
INDUSTRIAL HYGIENE SERVICES
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METALS CHAIN OF CUSTODY

Turn Around Time
☐ 2 Hour ☐ 4 Hours ☐ 24 Hours
☐ 2 Days ☒ 3 Days ☐ 4 Days
☐ 5 Days ☐ 6-10 Days
Please call for TAT less than 24 Hours

Company: Aecom
Address: 1111 Third Ave, Suite 1600
Seattle, WA 98101
Phone: 206-438-2700

Project Manager: Aaron Heath
Cell: (360) 350- - 2361
Email: aaron.heath@aecom.com
Fax: ( ) -

Project Name/Number:
Project Location: Pavillion Pool

☒ Total Metals
☐ TCLP

☒ FAA (ppm
☐ ICP (PPM
☐ GFAA (ppb)
☐ CVAA (ppb)

☐ Air Filter
☐ Paint Chips (cm)
☐ Drinking Water
☐ Other

☒ Paint Chips (%)
☐ Dust Wipes
☐ Waste Water

☐ Soil

RCRA 8
☐ Barium
☐ Arsenic
☐ Selenium
☐ Chromium
☐ Mercury
☐ Cadmium
☐ Silver
☒ Lead

RCRA 11
☐ Copper
☐ Zinc
☐ Other

Reporting Instructions: Please email results to Aaron Heath and Chris Selders
☐ Call ( ) -
☐ Fax ( ) -
☐ Email christopher.selders@aecom.com

Total Number of Samples

	Sample ID	Description	A/R
1	PP-Pb1-01		
2	Pb2-01		
3	Pb3-01		
4	Pb4-01		
5	Pb5-01		
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

	Print Name	Signature	Company	Date	Time
Sampled by	Chris Selders		Aecom	2/9/2020	
Relinquish by	Chris Selders		Aecom	2/10/2020	

Office Use Only

	Print Name	Signature	Company	Date	Time
Received by	[illegible]			2/10/22	1650
Analyzed by	Yasuyuki Iida			2/11/22	1120
Called by					
Faxed/Email by					

Appendix E. Personnel and Laboratory Accreditations

THIS IS TO CERTIFY THAT

CHRISTOPHER SELDERS

HAS SUCCESSFULLY COMPLETED THE TRAINING COURSE
for

ONLINE AHERA ASBESTOS INSPECTOR REFRESHER

In accordance with TSCA Title II, Part 763, Subpart E, Appendix C of 40 CFR

Course Date: 09/10/2021

Course Location: Online

Certificate: IRO-21-6916B

PBS

CCB #SRA0615 4-Hr Training

4-Hour Online AHERA Inspector Refresher Training; AHERA is the Asbestos Hazard Emergency Response Act enacting Title II of Toxic Substance Control Act (TSCA)

Expiration Date: 09/10/2022

For verification of the authenticity of this certificate contact:
PBS Engineering and Environmental Inc.
4412 S Corbett Avenue
Portland, Oregon 97239
503.248.1939

Andrew Fridley

Andy Fridley, Instructor

Certificate of Completion

This is to certify that

Aaron H. Heath

has satisfactorily completed
4 hours of online refresher training as an

AHERA Building Inspector

to comply with the training requirements of
TSCA Title II, 40 CFR 763 (AHERA)

EPA Provider # 1085

182423
Certificate Number

ARGUS PACIFIC
TRAINING • CONSULTING
A Terracon COMPANY

Sep 10, 2021 Expires in 1 year.
Date(s) of Training

Exam Score: N/A
(if applicable)

Instructor: Andre Zwanenburg

ARGUS PACIFIC, INC / 21905 64th AVE W, SUITE 100 / MOUNTLAKE TERRACE, WASHINGTON 98043 / 206.285.3373 / ARGUSPACIFIC.COM

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 102063-0

NVL Laboratories, Inc.

Seattle, WA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2021-10-01 through 2022-09-30
Effective Dates

Dana S. Leaman
For the National Voluntary Laboratory Accreditation Program

NVLAP® National Voluntary Laboratory Accreditation Program

DEPARTMENT OF COMMERCE UNITED STATES OF AMERICA

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

NVL Laboratories, Inc.
4708 Aurora Avenue N.
Seattle, WA 98103
Mr. Nghiep Vi Ly
Phone: 206-547-0100   Fax: 206-634-1936
Email: nick.l@nvllabs.com
http://www.nvllabs.com

ASBESTOS FIBER ANALYSIS   NVLAP LAB CODE 102063-0

Bulk Asbestos Analysis

Code	***Description***
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Dana S Leaman

For the National Voluntary Laboratory Accreditation Program

Effective 2021-10-01 through 2022-09-30

AIHA Laboratory Accreditation Programs, LLC

acknowledges that

NVL Laboratories, Inc.

4708 Aurora Ave N, Seattle, WA 98103-6516

Laboratory ID: LAP-101861

along with all premises from which key activities are performed, as listed above, has fulfilled the requirements of the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC accreditation to the ISO/IEC 17025:2017 international standard, General Requirements for the Competence of Testing and Calibration Laboratories in the following:

LABORATORY ACCREDITATION PROGRAMS

☑	**INDUSTRIAL HYGIENE**	Accreditation Expires: June 01, 2023
☑	**ENVIRONMENTAL LEAD**	Accreditation Expires: June 01, 2023
☑	**ENVIRONMENTAL MICROBIOLOGY**	Accreditation Expires: June 01, 2023
☐	**FOOD**	Accreditation Expires:
☑	**UNIQUE SCOPES**	Accreditation Expires: June 01, 2023

Specific Field(s) of Testing (FoT)/Method(s) within each Accreditation Program for which the above named laboratory maintains accreditation is outlined on the attached Scope of Accreditation. Continued accreditation is contingent upon successful on-going compliance with ISO/IEC 17025:2017 and AIHA-LAP, LLC requirements. This certificate is not valid without the attached Scope of Accreditation. Please review the AIHA-LAP, LLC website (www.aihaaccreditedlabs.org) for the most current Scope.

Cheryl O. Morton

Cheryl O Morton
Managing Director, AIHA Laboratory Accreditation Programs, LLC

Revision19: 09/01/2020

Date Issued: 04/30/2021

AIHA Laboratory Accreditation Programs, LLC

SCOPE OF ACCREDITATION

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103-6516

Laboratory ID: LAP-101861
Issue Date: 04/30/2021

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

Industrial Hygiene Laboratory Accreditation Program (IHLAP)

Initial Accreditation Date: 02/07/1997

IHLAP Scope Category	Field of Testing (FOT)	Technology sub-type/Detector	Published Reference Method/Title of In-house Method	Component, parameter or characteristic tested
Asbestos/Fiber Microscopy Core	Phase Contrast Microscopy (PCM)	-	NIOSH 7400	Asbestos/Fibers
Miscellaneous Core	Gravimetric	-	NIOSH 0500	Total Dust
Miscellaneous Core	Gravimetric	-	NIOSH 0600	Respirable Dust
Spectrometry Core	Atomic Absorption	FAA	NIOSH 7082	Lead
Spectrometry Core	Inductively-Coupled Plasma	ICP/AES	NIOSH 7300	RCRA Metals
Spectrometry Core	X-ray Diffraction (XRD)	-	NIOSH 7500	Silica

A complete listing of currently accredited IHLAP laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

Effective: 11/21/2019
Revision: 9

AIHA Laboratory Accreditation Programs, LLC

SCOPE OF ACCREDITATION

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103-6516

Laboratory ID: LAP-101861
Issue Date: 04/30/2021

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

The EPA recognizes the AIHA-LAP, LLC ELLAP program as meeting the requirements of the National Lead Laboratory Accreditation Program (NLLAP) established under Title X of the Residential Lead-Based Paint Hazard Reduction Act of 1992 and includes paint, soil and dust wipe analysis. Air and composited wipes analyses are not included as part of the NLLAP.

Environmental Lead Laboratory Accreditation Program (ELLAP)

Initial Accreditation Date: 04/01/1997

Component, parameter or characteristic tested	Technology sub-type/Detector	Method	Method Description *(for internal methods only)*
Airborne Dust	AA	EPA SW-846 3051A	N/A
		EPA SW-846 7000B	N/A
Paint	AA	EPA SW-846 3051A	N/A
		EPA SW-846 7000B	N/A
Settled Dust by Wipe	AA	EPA SW-846 3051A	N/A
		EPA SW-846 7000B	N/A
Soil	AA	EPA SW-846 3051A	N/A
		EPA SW-846 7000B	N/A

A complete listing of currently accredited ELLAP laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

AIHA Laboratory Accreditation Programs, LLC

SCOPE OF ACCREDITATION

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103-6516

Laboratory ID: LAP-101861
Issue Date: 04/30/2021

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

Environmental Microbiology Laboratory Accreditation Program (EMLAP)

Initial Accreditation Date: 02/07/1997

EMLAP Scope Category	Field of Testing (FOT)	Component, parameter or characteristic tested	Method	Method Description *(for internal methods only)*
Fungal	Air - Direct Examination	Spore Trap	SOP 12.133	In House: Analysis of Spore Trap
Fungal	Bulk - Direct Examination	Bulk	SOP 12.133	In House: Analysis of Spore Trap
Fungal	Surface - Direct Examination	Surface Wipe	SOP 12.133	In House: Analysis of Spore Trap

A complete listing of currently accredited EMLAP laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

AIHA Laboratory Accreditation Programs, LLC

SCOPE OF ACCREDITATION

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103-6516

Laboratory ID: LAP-101861
Issue Date: 04/30/2021

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

Unique Scopes Laboratory Accreditation Programs (Unique Scopes)

Initial Accreditation Date: 04/01/2013

Unique Scopes Scope Category	Field of Testing (FOT)	Component, parameter or characteristic tested	Method	Method Description *(for internal methods only)*
Consumer Product Testing	Lead in Paint and Other Similar Surface Coatings	Surface paint	CPSC-CH-E1003-09	-
	Total Lead in Metal Children's Products	Metallic jewelry	CPSC-CH-E1001-08	-
	Total Lead in Non-Metal Children's Products	Non-metallic	CPSC-CH-E1002-08	-

A complete listing of currently accredited Unique Scopes laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

Appendix F. Limited Hazardous Materials Survey Report, Preliminary Summary of Findings, ICA Basketball Operations – Edmundson Pavilion Pool, Prepared by PBS, Dated: January 7, 2015

Limited Hazardous Materials Survey Report Preliminary Summary of Findings

ICA Basketball Operations – Edmundson Pavilion Pool

University of Washington Project No. 203567
Seattle, Washington

Prepared for:

UW Capital Projects Office
University Facilities Building, Box 352205
Seattle, Washington 98195

PBS Project No. 40035.639
Revised January 7, 2015

Attachments

Representative Photos

PLM Asbestos Sample Inventory/Laboratory Data

FAA Lead Sample Inventory/Laboratory Data

PCB Lab Analysis Results

RCRA 8 Metals Lab Results

Prior/Historical Sampling Data:

PBS Survey Data for the Alaska Airline Arena (Edmundson Pavilion)
HVAC improvements (UW 203204) dated September 27, 2011

Attachments

Prior/Historical Sampling Data:

PBS Survey Data for the Alaska Airline Arena (Edmundson Pavilion)
HVAC improvements (UW 203204) dated September 27, 2011

Project Background

PBS Engineering and Environmental performed a limited hazardous materials survey of the Edmondson Pavilion Pool building at the University of Washington. It is the intent of this investigation to comply with applicable regulatory requirements for the identification of ACMs prior to renovation or demolition activities, and to identify selected other regulated materials as indicated that may exist in areas of the buildings to be impacted. At the request of Mr. Ken Kubota of the UW Capital Projects Office, all accessible areas of the above building and select areas of impacted adjacent buildings as part of the is project, were inspected for the presence of asbestos-containing materials (ACM), regulated RCRA 8 metals, polychlorinated biphenyls (PCB) and mercury-containing components.

Design drawings were not available for review at the time of the inspection. Based on information provided by the UW Capital Projects Office, PBS understands that the scope of the project includes the demolition of the Pavilion Pool building, renovation of the Sports Medicine Clinic (attached to the northeast side of the Edmondson Pavilion) as well as eventual impacts to existing adjacent structures (Graves Annex and Edmundson Pavilion).

The Pavilion Pool Building was constructed in 1939. Typical interior finishes in the building include: plaster and gypsum wallboard walls with vinyl cove base trim and concrete slab floors covered with ceramic tile in the pool area and in locker rooms. Existing piping systems were observed to be covered with a combination of fiberglass and asbestos on straight runs and fittings. The former Sports Medicine Clinic is located at the northeast corner of the Edmondson Pavilion and was added in 1999, at the same time as the remodel of the Edmondson Pavilion. Interior finishes generally consists of gypsum wallboard walls with vinyl cove base trim. Other finish includes suspended ceiling system (2’x4’) and a concrete slab covered with 12” vinyl floor tiles or carpet. Typical piping systems are insulated with fiberglass on straight runs and fittings.

Survey Process

Accessible areas included in the project scope were inspected by AHERA Certified Building Inspector Chuck Greeb (cert. # 145124 expires December 30, 2014) in January and February, 2014. Inaccessible spaces are defined as those requiring selective demolition (such as chases/plenums), fall protection, or confined-space entry protocols to gain access. When observed, suspect ACMs were sampled, assigned a unique identification number, and transmitted under chain-of-custody protocols to Seattle Asbestos Test, LLC (NVLAP #200768-0) in Bellevue, Washington for analysis according to EPA Method 600R-93/116 using Polarized Light Microscopy (PLM), which has a reliable limit of quantification of 1% asbestos by volume. PBS noted the quantity, location of ACMs encountered during the inspection.

Accessible areas included in the scope of work were inspected as part of this investigation. Inaccessible areas are defined as those requiring selective demolition, fall protection or confined-space entry protocols to gain access. While PBS has endeavored to identify or presumed the presence and type of ACMs in concealed locations, additional unidentified ACMs may exist. Potentially concealed ACMs that may exist in the inspected area include, but are not limited to the following: internal gaskets, mastics, caulking and sealants of HVAC equipment. PBS reviewed limited previous inspection data obtained from the project areas as available, and pertinent information is incorporated into this report and attached. The following was reviewed:

- PBS survey data for the Alaska Airline Arena (Edmundson Pavilion) HVAC improvements (UW 203204) dated September 27, 2011.

PRELIMINARY PROJECT FINDINGS

Asbestos-Containing Materials (ACM)

A total of 75 representative suspect materials were sampled and analyzed. The following materials were found to contain asbestos in concentrations greater than 1% as determined by PLM microscopy and as identified by historical sampling results:

Pavilion Pool

- ACM: Pipe straight run and fitting insulation located at various exposed locations throughout the basement, first and second floors, including the basement level crawlspace (approx. 1,200 LF). In addition, this ACM is also is present in wall and ceiling cavities throughout the building (estimated 2,100 LF).
- Crawlspace soil (generally covered with plastic sheeting) assumed contaminated with asbestos pipe insulation debris (approximately 200 SF at the northeast portion of the crawlspace).
- ACM: Vibration isolating (damper) cloth located on a fan unit in the basement mechanical room (2 EA).
- ACM: Brown 9" vinyl floor tile and associated black mastic located in various 1st floor locations (approx. 500 SF).
- ACM: Brown caulk (interior side) associated with the north side glass block windows (approx. 280 LF).
- ACM: Tan/gray caulk (exterior side) associated with the north side glass block windows (approx. 350 LF).
- ACM: Window putty (gray) associated with steel framed windows throughout (approx. 12 units).
- ACM: Window frame caulk (tan/gray) associated with steel frame windows (approx. 300 LF).
- Fire doors with assumed asbestos lining (estimated 24 fire doors).
- Vapor barrier assumed used as a waterproofing liner or asphaltic coating underneath the pool structure and side walls (estimated 12,000 SF).
- Vapor barrier assumed in between brick masonry and concrete walls (estimated 35,000 SF).

Non-Asbestos-Containing Materials

Representative materials sampled that **did not** contain detectable asbestos include the following:

Pavilion Pool

Material	General Location (Pavilion Pool)	Asbestos Results
Blue 12" vinyl floor tile and black mastic	1st Floor restrooms	No-Asbestos Detected (NAD)
Plaster wall and ceiling material	Throughout building	NAD
Gypsum wallboard and joint compound	1st Floor	NAD
2'x4' cork ceiling panels (nailed to ceiling)	1st floor pool area ceiling	NAD
Tan mastic associated with brown 4" cove base	Throughout building	NAD

Material	General Location (Pavilion Pool)	Asbestos Results
Brown mastic associated with brown 4" cove base	Throughout building	NAD
Cementatious floor curbing	Throughout building	NAD
Grout associated with glass block windows	1st floor, north and south ends	NAD
1" ceramic tile, grout and yellow mastic	Ground floor pool area	NAD
Red 1' clay wall block and gray mortar	Ground floor	NAD
Brown 4"x12" ceramic brick and mortar/grout	Ground floor locker rooms	NAD
Horsehair pipe insulation with asphaltic wrap`	Attic	NAD
Caulk (beige/white) on sinks	Ground floor locker rooms	NAD
Valve blanket	Basement mechanical room	NAD
Black flange gasket	Basement mechanical room	NAD
Brown flange gasket	Basement mechanical room	NAD
Caulk (brown/tan) at exterior expansion joint	Exterior, north end of building	NAD
Sidewalk joint sealant	East entry to building	NAD
Gray/white window frame sealant	Exterior, south entry to building	NAD
Felt under metal roof	Main (pitched) roof	NAD
Built-up asphaltic roof	Valley roof west of pitched roof	NAD
Built-up asphaltic roof	Roof above the south entry	NAD
Gray caulk on counter flashing	Roof above the south entry	NAD
Beige caulk on terracotta joints	Roof above the south entry	NAD
Built-up asphaltic roof	North lower	NAD
Built-up asphaltic roof	Northwest mid-level roof	NAD
Gray caulk on counter flashing	Northwest mid-level roof	NAD

Sports Medicine Clinic

Material	General Location (Sports Med. Clinic)	Asbestos Results
Gray 12" vinyl floor tile and Yellow mastic	Throughout Clinic	NAD
Gray 12" vinyl floor tile and Yellow mastic	Throughout Clinic	NAD
Off-white 12" vinyl floor tile and Yellow mastic	Throughout Clinic	NAD
Yellow carpet mastic	Throughout Clinic	NAD
Gray 4" vinyl cove base and beige mastic`	Throughout Clinic	NAD
Gypsum wallboard and joint compound	Throughout Clinic	NAD
Sink undercoating (black, gray or white)	Throughout Clinic	NAD

Material	General Location (Sports Med. Clinic)	Asbestos Results
2'x2' lay-in ceiling tile	Throughout Clinic	NAD
White ceramic tile, grout and white mastic	Throughout Clinic	NAD
Built-up asphaltic roof	Roof, west section	NAD

Edmondson Pavilion and Graves Annex

Material	General Location (Edm. Pavilion and Grave Annex)	Asbestos Results
Fireproofing (gray)	Edmondson Pavilion East end	NAD
Gypsum wallboard and joint compound	Edmondson Pavilion East end	NAD
Purple rubberized flooring	Graves Annex Weight Room, south end	NAD
Beige 6" vinyl cove base and yellow mastic	Graves Annex Weight Room, south end	NAD
Joint compound associated with gypsum wallboard walls	Graves Annex Weight Room, south end	NAD

Impacts to the Edmondson Pavilion and Graves Annex may occur based on the planned scope of the project. PBS inspected only areas of potential impact as part of this survey. Both buildings have been extensively renovated in the late 1990s.

For a complete listing of representative bulk sample inventory and associated laboratory analysis, refer to the attachments

Lead Containing Paint (LCP) & Lead-Containing Materials

Eighteen (18) representative materials/coatings were sampled for lead content. The samples were assigned a unique identification number and transmitted to NVL Laboratories, Inc. (AIHA IH #101861) in Seattle, Washington under chain-of-custody protocols for analysis using Flame Atomic Absorption. Lead was detected in each of the samples collected at concentrations ranging from 0.044% to 1.3%.

Lead was detected in the following painted coatings sampled:

- White (and off-white) paint on plaster walls – Pavilion Pool Building
- Beige paint on plaster walls – Pavilion Pool Building
- White paint on concrete walls – Pavilion Pool Building
- White paint on cast iron radiators – Pavilion Pool Building
- Mortar associated with red clay block walls – Pavilion Pool Building
- Ceramic tile and associated grout – Pavilion Pool Building
- White paint on brick wall (east wall of Edmondson Pavilion) – Sports Medicine Clinic
- Gray paint on steel stair railing – Graves Annex south stairway

For locations and results of paint sampling see Attachments.

Polychlorinated Biphenyls (PCB)

Representative fluorescent light fixture ballasts were observed and found to be labeled “No-PCBs” and did not contain suspect potting compound (electronic ballast noted). However, based on other projects at the University it is anticipated that special handling consideration related to PCB-containing ballasts may be required during renovation activities as non-labeled ballast were uncovered during completed on-campus construction projects. All light fixture ballasts should be inspected prior to disposal. All non-electronic ballasts with or without labeling should be considered PCB-containing in the potting compound and should be removed and recycled or disposed off in accordance with all applicable local, state and federal regulations.

In addition, four (4) samples were collected and analyzed for PCB content. Suspect material samples were transmitted for analysis to Advanced Analytical and NVL Laboratories. Samples were analyzed using the EPA method 8082 for PCBs identification.

No PCB’s were detected in any of the materials sampled:

- White caulk around locker room sinks – Pavilion Pool Building
- Tan/gray interior caulk around glass block windows – Pavilion Pool Building
- Tan/gray exterior caulk around glass block windows – Pavilion Pool Building
- Putty (gray/tan) associated with steel frame windows – Pavilion Pool Building
- Sealant (gray) as exterior expansion joint between Graves Annex and the Pavilion Pool Building

For locations and sampling information, see attachments.

RCRA Regulated Metals

As part of the scope PBS sampled masonry brick mortar for the presence of the following regulated RCRA metals: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver as part of managing solid waste disposal. Lead and Barium were detected in low concentration in the exterior masonry brick mortar of the Pavilion Pool building. Refer to the AA Total Metals Sample Analysis Report in the Attachments.

Mercury-Containing Components

Fluorescent lamps (approximately 340 tubes) and light fixtures will be impacted by this project. All light tubes within the areas of work are presumed to contain mercury vapors in small concentrations.

Silica Containing Materials

Certain building materials, including but not limited to concrete walls/ceilings, masonry mortar, plaster and fireproofing may contain silica. PBS performed visual observations for silica-containing materials. Based on the field observations and the scope of work, the following materials are assumed to contain silica:

- Concrete floor slab, walls and ceiling, and masonry brick mortar (Pavilion Pool)
- Plaster walls and ceiling (Pavilion Pool)
- Fireproofing (in Edmundson Pavilion)

RECOMMENDATIONS

Asbestos-Containing Materials (ACM)

PBS recommends that ACM and assumed ACM to be impacted by the planned work be removed prior to construction activities, or be impacted by properly trained and protected personnel in accordance to all applicable local, state and federal regulations. A qualified asbestos abatement contractor licensed in the State of Washington should be employed for any removal and proper disposal of ACM in accordance with all applicable local, state and federal regulations.

The possibility exist that suspect ACM may be present in wall and ceiling cavities, equipment, and select areas of the building included in the scope of renovations. These may include, but are not limited to ACM pipe insulation and hard-mudded fittings, other mechanical insulation, vibration joint cloth or sealants on ductwork, construction adhesives and wall mastics, flooring sub-layers, and vapor barriers or weatherproofing.

Any suspect ACMs that may be encountered should be considered asbestos-containing until properly sampled by an AHERA Certified Building Inspector.

Lead Containing Paint (LCP) & Lead-Containing Materials

Representative painted coatings and building materials were found to contain lead in detectable concentrations at the project site work areas.

Painted coatings may exist in inaccessible areas of the building or in secondary coatings on building components. These may consist of standard interior paint on walls/floors/ceilings, in wall and ceiling cavities or mechanical chases, or coatings on structural steel. Any previously unidentified painted coatings should be considered lead containing until sampled and proven otherwise.

Impact of any detectable concentrations of lead requires construction activities to be performed according to Washington Labor and Industries regulations for Lead in Construction (WAC 296-155-176). Workers impacting LCP should be provided the proper personal protective equipment and use proper work methods to limit occupational and environmental exposure to lead until an initial exposure assessment has been conducted.

Mercury-Containing Components

All fluorescent lamps including compact fluorescent lamps are presumed to be mercury-containing (contains mercury vapors). Mercury is known to be toxic to mammals and light fixture requires special handling and proper disposal, ideally through recycling. In the event of impact, PBS recommends that fluorescent light tubes and compact lights be properly handled by contractor and recycled in accordance with applicable regulations and UW policy during demolition/renovation activities.

PCBs

Light ballasts at the site may potentially be impacted by the project and may contain small concentration of suspect potting compound even though labeled with "No-PCBs”. Special handling consideration and safe management practices related to potential PCB-containing ballasts may be required during renovation activities. As such all light fixture ballasts should be inspected prior to impact and disposal. All ballasts with or without labeling should be considered PCB-containing and should be properly handled, managed, and recycled or dispose of in accordance with the Owners' policy, and all applicable local, state and federal regulations.

RCRA Regulated Metals

Barium and Lead were detected in low concentrations in masonry mortar, which will be impacted by the planned demolition. Impact of these materials will require compliance with applicable regulations, which may include development and implementation of a metals-compliance plan, exposure assessments, control of wastewater discharge/capture, and waste stream characterization for proper disposal.

Silica-Containing Materials

Suspect silica-containing materials are assumed to be in concrete walls, pre-cast concrete structures, floors and ceiling deck, masonry brick mortar and fireproofing. Construction activities including, but not limited to, chipping, sawing and jack hammering require control of potentially airborne respirable silica dust. Impact of these building materials with detectable concentrations of silica should be performed according to Washington Labor and Industries regulations for Silica in Construction (WAC 296-841 - Respiratory Hazards and Air Contaminants).

Workers impacting these building materials should be provided the proper personal protective equipment and use proper work methods and engineering controls to limit occupational and environmental exposure to respirable silica dust until an initial exposure assessment has been conducted.

Limitations

Suspect materials (regulated metals or asbestos) may exist in inaccessible areas at the project site, such as in ceiling/wall cavities and in interstitial spaces. PBS endeavors to determine the presence and estimate the condition of suspect materials in all accessible areas included in the scope of work. If suspect materials are uncovered during construction and excavation, contractor should contact immediately the UW and PBS for associated asbestos or other hazardous materials confirmation testing.

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Attachments: Representative Photos, PLM Asbestos Sample Inventory and Laboratory Data, FAA Lead Sample Inventory and Laboratory Data, PCB Lab Analysis Results, RCRA 8 Metals Lab Results & Prior Sampling Data

Attachments

Representative Photos

PLM Asbestos Sample Inventory/Laboratory Data

FAA Lead Sample Inventory/Laboratory Data

PCB Lab Analysis Results

RCRA 8 Metals Lab Results

Prior/Historical Sampling Data:

PBS Survey Data for the Alaska Airline Arena (Edmundson Pavilion)
HVAC improvements (UW 203204) dated September 27, 2011

Photo 1: Asbestos-containing material (ACM) caulk (gray/tan) on glass block windows at the north end of the pool area.

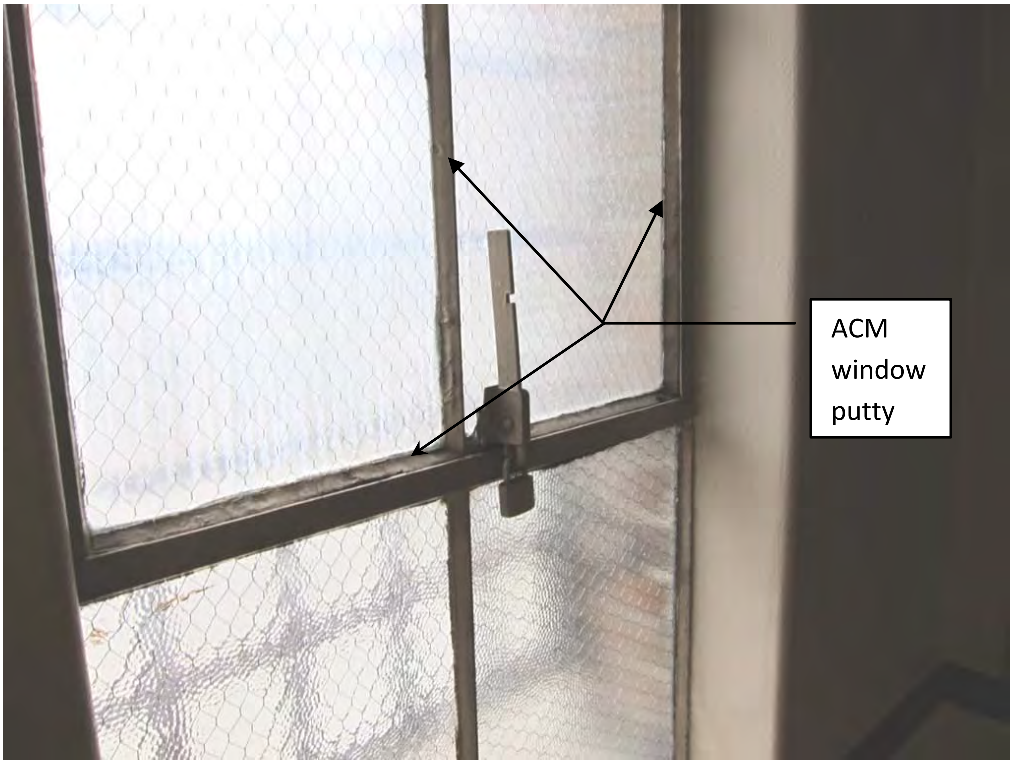

Photo 2: Steel frame window with ACM gray putty (typical).

Photo 3: ACM 9" vinyl floor tile and mastic (dark brown) in the pool building.

Photo 4: Asbestos-containing vibration isolation gasket associated with HVAC ductwork located in the basement mechanical room.

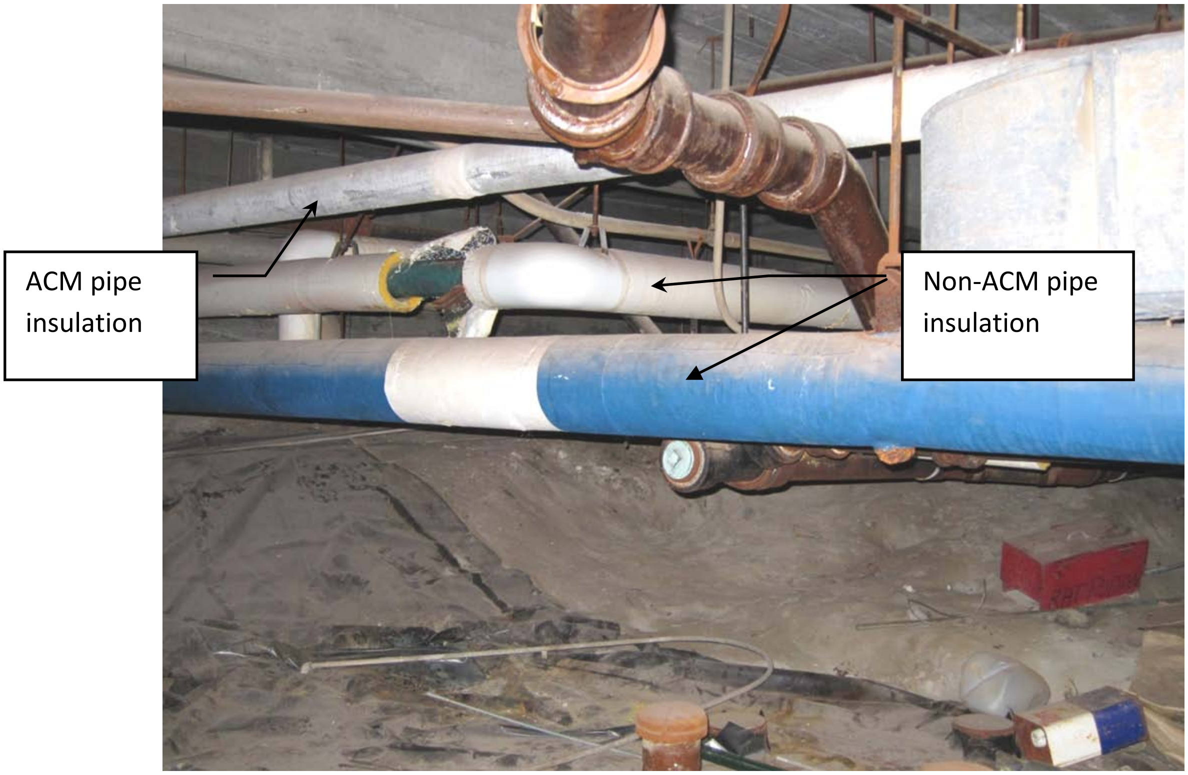

Photo 5: Basement level crawlspace with asbestos-containing pipe insulation with assumed asbestos debris present beneath the plastic sheeting vapor barrier.

Photo 6: Asbestos-containing pipe insulation located in the ground floor east corridor.

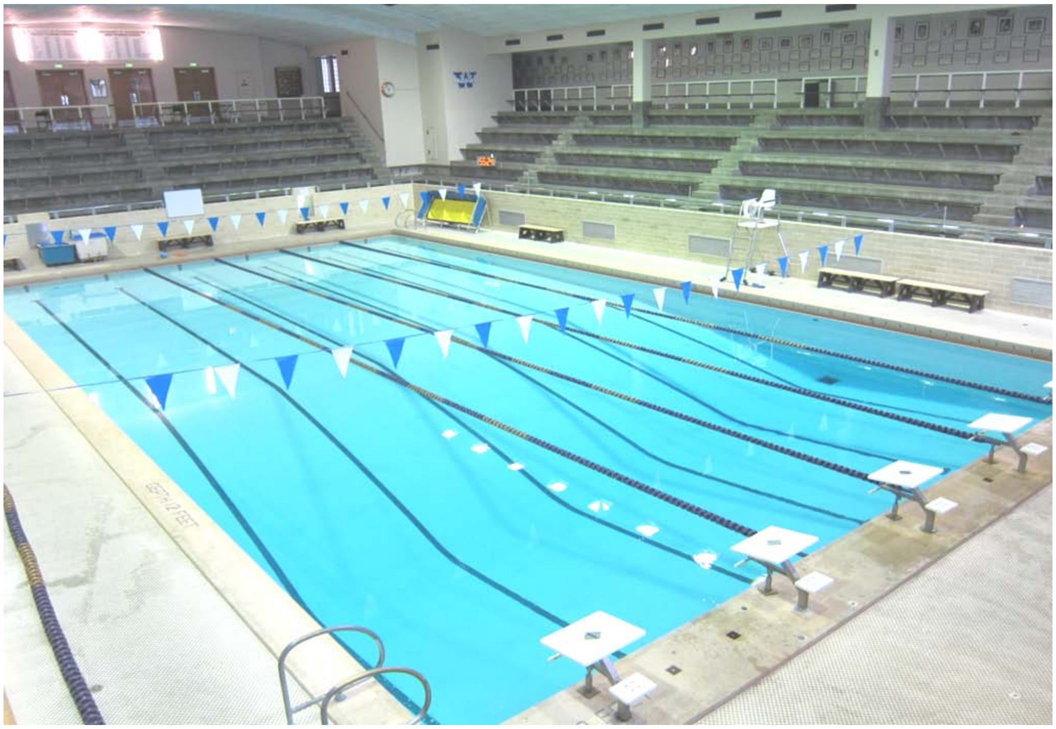

Photo 7: Assumed ACM vapor barrier or coating underneath the pool walls and floor.

Photo 8: Assumed ACM vapor barrier or coating behind masonry brick façade of the Pavilion Pool building.

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.639 -01	Brown vinyl flooring	P. Pool Men's restroom - Room 5	Layer 1: Brown tile	3% Chrysotile	SAT
	Black mastic	(P. Pool = Pavilion Pool)	Layer 2: Black mastic	2% Chrysotile	SAT
40035.639 -02	Blue 12" vinyl floor tile	P. Pool Women's restroom - Room 6	Layer 1: Blue tile	NAD	SAT
	Black mastic		Layer 2: Black mastic	NAD	SAT
40035.639 -03	Brown 4" vinyl cove base	P. Pool Men's restrrom - Room 5	Layer 1: Brown rubbery material	NAD	SAT
	Brown mastic		Layer 2: Brown mastic	NAD	SAT
	Wall plaster		Layer 3: White sandy/brittle material with paint	NAD	SAT
40035.639 -04	Window putty (tan/gray)	P. Pool 1st floor walkway at Men's restroom	Layer 1: Gray brittle material with paint	2% Chrysotile	SAT
40035.639 -05	Grout (gray) - glass block windows	P. Pool 1st floor, S wall, E side	Layer 1: Gray loose sandy/brittle material with paint	NAD	SAT
40035.639 -06	1" ceramic tile	P. Pool Ground floor, pool area floor	Layer 1: White ceramic	NAD	SAT
	Grout (gray)		Layer 2: Beige/gray brittle material	NAD	SAT
	Yellow mastic		Layer 3: Yellow mastic	NAD	SAT
			Layer 4: Silver metal	NAD	SAT
40035.639 -07	Clay block (1'x1') wall	P. Pool Ground floor E side	Layer 1: Red hard brittle material with paint	NAD	SAT
	Mortar (gray)		Layer 2: Gray hard sandy/brittle material	NAD	SAT
40035.639 -08	Plaster wall	P. Pool Room 8 (1st floor)	Layer 1: Gray loose sandy/brittle material with paint	NAD	SAT
40035.639 -09	Brown 4" cove	P. Pool Room 8	Layer 1: Brown rubbery material	NAD	SAT
	Tan mastic		Layer 2: Tan mastic	NAD	SAT
40035.639 -10	Brown 9" vinyl floor tile	P. Pool Room 8	Layer 1: Brown tile	2% Chrysotile	SAT
	Black mastic		Layer 2: Black mastic	2% Chrysotile	SAT
40035.639 -11	Cementatious curb	P. Pool Corridor at room 8	Layer 1: Gray hard sandy/brittle material	NAD	SAT
40035.639 -12	Caulk (white) at sink	P. Pool Men's locker room	Layer 1: White soft/elastic material	NAD	SAT

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.639 -13	Brown 4"x12" ceramic brick	P. Pool Men's locker room	Layer 1: Brown ceramic	NAD	SAT
	Grout (tan gray)		Layer 2: Tan brittle/sandy material	NAD	SAT
40035.639 -14	Cork 2x4 ceiling panels	P. Pool 1st floor pool area SW (nailed up)	Layer 1: Brown cork	NAD	SAT
40035.639 -15	Cork 2x4 ceiling panels	P. Pool 1st floor pool area NW (nailed up)	Layer 1: Brown cork	NAD	SAT
40035.639 -16	Plaster wall	P. Pool Corridor at Room 4, 1st floor	Layer 1: White woven fibrous material with piant	NAD	SAT
			Layer 2: Gray sandy/brittle material	NAD	SAT
40035.639 -17	Joint compound	P. Pool 1st floor pool bleacher area, E wall	Layer 1: White powdery material with woven fibrous material and paint	NAD	SAT
	Gypsum wallboard		Layer 2: White chalky material with paper	NAD	SAT
40035.639 -18	Plaster wall	P. Pool 1st floor W wall, center	Layer 1: White brittle material with paint	NAD	SAT
			Layer 2: Gray loose sandy/brittle material	NAD	SAT
40035.639 -19	Grout (gray) on glass block	P. Pool 1st floor N end	Layer 1: Gray loose sandy/brittle material	NAD	SAT
40035.639 -20	Plaster wall	P. Pool 1st floor N end	Layer 1: White woven fibrous material with paint	NAD	SAT
			Layer 2: Gray loose sandy/brittle material	NAD	SAT
40035.639 -21	Brown caulk at glass block windows	P. Pool 1st floor N end, at steel framing	Layer 1: Brown soft material	3% Chrysotile	SAT
40035.639 -22	Horsehair pipe insulation	P. Pool Attic space	Layer 1: Black asphaltic fibrous material	NAD	SAT
			Layer 2: Brown fibrous material	NAD	SAT
40035.639 -23	Plaster ceiling	P. Pool Attic space	Layer 1: Gray sandy/brittle material	NAD	SAT

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.639 -24	Window putty - green gray	P. Pool N stair 1st floor	Layer 1: Green brittle material with paint	4% Chrysotile	SAT
40035.639 -25	Caulk at expansion joint	P. Pool N side at Graves Annex	Layer 1: Gray soft/elastic material with brittle material	NAD	SAT
40035.639 -26	Cementatious curb	P. Pool 1st floor of N entry	Layer 1: Gray hard sandy/brittle material	NAD	SAT
40035.639 -27	Vibration joint insulator	P. Pool Mechanical room - basement fan 0-02-17	Layer 1: Gray fibrous material with paint	62% Chrysotile	SAT
40035.639 -28	Valve blanket	P. Pool Mechanical room in basement	Layer 1: White woven fibrous material	NAD	SAT
40035.639 -29	Pipe straight run - 10"	P. Pool Mechanical room crawlspace (N side)	Layer 1: White powdery material with woven fibrous material	5% Chrysotile, 3% Amosite	SAT
40035.639 -30	Pipe fitting - 8"	P. Pool Mechanical room N crawlspace, plastic sheeting over dirt	Layer 1: Trace silver paint	2% Chrysotile	SAT
			Layer 2: White powdery material with woven fibrous material	6% Chrysotile, 2% Amosite	SAT
40035.639 -31	Pipe straight run - 8"	P. Pool Mechanical room N crawlspace	Layer 1: White powdery material	5% Chrysotile, 4% Amosite	SAT
40035.639 -32	Black pliable flange gasket	P. Pool Mechanical room basement	Layer 1: Black soft/elastic material	NAD	SAT
40035.639 -33	Brown pliable flange gasket	P. Pool Mechanical room basement	Layer 1: Brown soft/elastic material	NAD	SAT
40035.639 -34	Vibration joint insulator	P. Pool Mechanical room fan 01-02-15	Layer 1: White soft/elastic material with woven fibrous material	NAD	SAT
			Layer 2: Trace clear mastic	NAD	SAT
40035.639 -35	Plaster wall	P. Pool At room 614 (by men's locker)	Layer 1: White brittle material with paint	NAD	SAT
			Layer 2: Gray sandy/brittle material	NAD	SAT
40035.639 -36	Black 6" cove	P. Pool At room 614	Layer 1: Black rubbery material	NAD	SAT

NAD - No Asbestos Detected

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
	Tan mastic		Layer 2: Tan mastic	NAD	SAT
40035.639 -37	Plaster wall	P. Pool Women's locker room	Layer 1: Gray loose sandy/brittle material with paint	NAD	SAT
40035.639 -53	Joint compound	Graves Annex weight room, SE corner	Layer 1: Off-white powdery material with paint	NAD	SAT
	Gypsum wallboard		Layer 2: White chalky material with paper	NAD	SAT
40035.639 -54	Rubberized floor (purple)	Graves Annex weight room, SE corner	Layer 1: Purple rubbery material	NAD	SAT
40035.639 -55	Beige 6" cove base	Graves Annex weight room, SE corner	Layer 1: Beige rubbery material	NAD	SAT
	Yellow mastic		Layer 2: Yellow mastic	NAD	SAT
	Joint compound		Layer 3: White powdery material with paint	NAD	SAT
40035.639 -56	Fireproofing on column	Hec Ed Pav - SE corner	Layer 1: Gray fibrous material	NAD	SAT
40035.639 -57	Window frame sealant	Pool building, S side	Layer 1: Gray/white soft/elastic material	NAD	SAT
40035.639 -58	Felt under metal roof	Pavilion Pool pitched roof	Layer 1: Black asphaltic fibrous material	NAD	SAT
40035.639 -59	Built-up roof (core)	Pavilion Pool, west valley adj. to Hec Ed Pavillion east wall	Layer 1: Black asphaltic material with fibrous material and sand	NAD	SAT
			Layer 2: Black asphaltic material	NAD	SAT
			Layer 3: Black asphaltic material with fibrous material	NAD	SAT
			Layer 4: Black asphaltic material	NAD	SAT
			Layer 5: Black asphaltic fibrous material	NAD	SAT
			Layer 6: Brouwn fibrous material with perlite	NAD	SAT
			Layer 7: Tan paper	NAD	SAT
40035.639 -60	Built-up roof (core)	Pavilion Pooll, roof over S entry	Layer 1: Black asphaltic material with fibrous material and sand	NAD	SAT
			Layer 2: Black asphaltic material	NAD	SAT

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
			Layer 3: Black asphaltic material with fibrous material	NAD	SAT
			Layer 4: Black asphaltic material	NAD	SAT
			Layer 5: Black asphaltic material with fibrous material	NAD	SAT
			Layer 6: Black asphaltic material	NAD	SAT
			Layer 7: Brown fibrous material with perlite	NAD	SAT
			Layer 8: Black asphaltic fibrous material	NAD	SAT
40035.639 -61	Caulk on counter flashing	Pavilion Pool, roof over S entry	Layer 1: Gray soft/elastic material	NAD	SAT
40035.639 -62	Caulk on terracotta joints	Pavilion Pool, roof over S entry	Layer 1: Beige soft/elastic material	NAD	SAT
40035.639 -63	Built-up roof (core)	Pavilion Pool, N lower roof, E end	Layer 1: Black asphaltic material with fibrous material and sand	NAD	SAT
			Layer 2: Black asphaltic material	NAD	SAT
			Layer 3: Black asphaltic material with fibrous material	NAD	SAT
			Layer 4: Black asphaltic material	NAD	SAT
			Layer 5: Black asphaltic material with fibrous material	NAD	SAT
			Layer 6: Black asphaltic material	NAD	SAT
			Layer 7: Brown fibrous material with perlite	NAD	SAT
			Layer 8: Black asphaltic fibrous material	NAD	SAT
			Layer 9: Yellow foamy material	NAD	SAT
40035.639 -64	Built-up roof (core)	Pavilion Pool, N lower roof, W end	Layer 1: Black asphaltic material with fibrous material and sand	NAD	SAT
			Layer 2: Black asphaltic material	NAD	SAT
			Layer 3: Black asphaltic material with fibrous material	NAD	SAT
			Layer 4: Black asphaltic material	NAD	SAT
			Layer 5: Black asphaltic material with fibrous material	NAD	SAT
			Layer 6: Black asphaltic material	NAD	SAT
			Layer 7: Black asphaltic material with fibrous material	NAD	SAT

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
			Layer 8: Black asphaltic material	NAD	SAT
			Layer 9: Brown fibrous material with perlite	NAD	SAT
			Layer 10: Black asphaltic fibrous material	NAD	SAT
			Layer 11: Yellow foamy material	NAD	SAT
40035.639 -65	Window frame caulk (tan/gray)	Pavilion Pool, N lower roof, on W steel fram windows	Layer 1: Tan soft material	3% Chrysotile	SAT
40035.639 -66	Frame caulk (gray)- glass block windows	Pavilion Pool, N lower roof (350LF)	Layer 1: Tan/gray soft material	3% Chrysotile	SAT
40035.639 -67	Built-up roof (core)	NW mid-level roof (at Graves Annex/Hec Ed)	Layer 1: Black asphaltic material with fibrous material and sand	NAD	SAT
			Layer 2: Black asphaltic material	NAD	SAT
			Layer 3: Black asphaltic material with fibrous material	NAD	SAT
			Layer 4: Black asphaltic material	NAD	SAT
			Layer 5: Black asphaltic fibrous material	NAD	SAT
			Layer 6: Brown fibrous material with perlite	NAD	SAT
40035.639 -68	Caulk on counter flashing	NW mid-level roof	Layer 1: Gray soft/elastic material	NAD	SAT
40035.639 -69	Built-up roof (core)	SMC - W section	Layer 1: Black asphaltic material with fibrous material and sand	NAD	SAT
			Layer 2: Black asphaltic material	NAD	SAT
			Layer 3: Black asphaltic material with fibrous material	NAD	SAT
			Layer 4: Black asphaltic material	NAD	SAT
			Layer 5: Black asphaltic material with fibrous material	NAD	SAT
			Layer 6: Black asphaltic material	NAD	SAT
			Layer 7: Brown fibrous material with perlite	NAD	SAT
			Layer 8: Black asphaltic fibrous material	NAD	SAT
			Layer 9: Yellow foamy material	NAD	SAT

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.639 -70	Built-up roof (core)	SMC - E section	Layer 1: Black asphaltic material with fibrous material and sand	NAD	SAT
			Layer 2: Black asphaltic material	NAD	SAT
			Layer 3: Black asphaltic material with fibrous material	NAD	SAT
			Layer 4: Black asphaltic material	NAD	SAT
			Layer 5: Black asphaltic material with fibrous material	NAD	SAT
			Layer 6: Black asphaltic material	NAD	SAT
			Layer 7: Brown fibrous material with perlite	NAD	SAT
40035.639 -71	Fireproofing (gray) on column	Edmondson Pavilion 1st level - NE corner	Layer 1: Gray powdery material with fibrous material	NAD	SAT
40035.639 -72	Fireproofing on column	Edmondson Pavilion 1st level- center of E end	Layer 1: Gray powdery material with fibrous material	NAD	SAT
40035.639 -73	Gypsum wallboard, joint compound	Edmondson Pavilion 1st level - NE corner	Layer 1: White powdery maerial with paint and paper	NAD	SAT
			Layer 2: White chalky material with paper	NAD	SAT
40035.639 -74	Gypsum wallboard, joint compound	Edmondson Pavilion 1st level - center of E end	Layer 1: White powdery maerial with paint and paper	NAD	SAT
			Layer 2: White chalky material with paper	NAD	SAT
40035.639 -75	Gypsum wallboard, joint compound	Edmondson Pavilion 1st level - SE corner	Layer 1: White powdery maerial with paint and paper	NAD	SAT
			Layer 2: White chalky material with paper	NAD	SAT
40035.639 -76	Purple rubberized floor and mastic	Graves Annex weight room	Layer 1: Gray/purple rubbery material	NAD	NVL
			Layer 2: Trace tan soft mastic	NAD	
40035.639 -77	Beige vinyl flooring	Graves Annex Rm122C	Layer 1: Off-white linoleum	NAD	NVL
			Layer 2: Beige woven fibrous backing	NAD	
			Layer 3: Gold soft mastic with gray crumbly material	NAD	

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.639 -78	Gray 4" cove and mastic	Graves Annex Rm122C	Layer 1: Gray rubbery material	NAD	NVL
			Layer 2: Off-white soft mastic with paint	NAD	
40035.639 -79	Black sink undercoat	Graves Annex Rm122C	Layer 1: Black asphaltic flaky material	NAD	NVL
40035.639 -80	2x2 ceiling tile - textured	Graves Annex Rm 122B	Layer 1: white compressed fibrous material with paint	NAD	NVL
40035.639 -81	Gypsum wallboard	Graves Annex Rm 122B	Layer 1: White compacted powdery material with paint	NAD	NVL
	Joint compound		Layer 2: white compacted powdery material with paper	NAD	
			Layer 3: White chalky material with paper	NAD	
40035.639 -82	Carpet mastic	Graves Annex Rm 122B	Layer 1: Green crumbly mastic	NAD	NVL
			Layer 2: Tan crumbly mastic	NAD	
40035.639 -83	2x2 ceiling tile - fissured	Graves Annex weight room	Layer 1: Light gray compressed fibrous material	NAD	NVL
40035.639 -84	Cork 2x4 ceiling panels	P. Pool North end of pool balcony (nailed up)	Layer 1: Brown soft material with paint	NAD	NVL

AA LEAD PAINT CHIP SAMPLE INVENTORY

Sample #	Paint Color / Component or Substrate	Sample Location	Results (mg/kg)	Results (%)	Lab
40035.639 -L01	White/plaster/wall	Pav. Pool,1st foor outside restroom 3	14000.0	1.4000	NVL
40035.639 -L02	White/steel radiators	Pav. Pool, 1st floor, S end	6100.0	0.6100	NVL
40035.639 -L03	Beige/plaster/wall	Pav. Pool, 1st floor, room 8	24000.0	2.4000	NVL
40035.639 -L04	Beige/concrete/wall	Pav. Pool, 1st floor, N end	1100.0	0.1100	NVL
40035.639 -L05	Beige/plaster/wall	Pav. Pool At room G14	18000.0	1.8000	NVL
40035.639 -L06	Beige/concrete/wall	Tunnel from Pav. Pool to Hec Ed.	1100.0	0.1100	NVL
40035.639 -L12	Purple/gypsum wallboard/wall	Graves Annex (GA) weight room, SE corner	<48.0	<0.0048	NVL
40035.639 -L13	Beige/concrete/wall	GA S stair, S wall	<40.0	<0.0040	NVL
40035.639 -L14	White/concrete/wall	GA S stair, W wall	<39.0	<0.0039	NVL
40035.639 -L15	Gray/steel/stairs	GA S stair	3900.0	0.3900	NVL
40035.639 -L16	Red clay brick 1'x1' and gray grout	Stair to mechanical room	990.0	0.0990	NVL
40035.639 -L17	Ceramic tile and grout	Pool surface area	100.0	0.0100	NVL
40035.639 -L18	4"x12" glazed brick	Pav. Pool Men's locker room	<46.0	<0.0046	NVL
40035.639 -L19	Gray/gypsum wallboard/wall	Graves annex Rm. 122C	<44.0	<.0044	NVL
40035.639 -L20	Gray/steel/stair	Graves annex weight room	<67.0	<0.0067	NVL
40035.639 -L21	Yellow/gypsum wallboard/wall	Graves annex weight room	<44.0	<0.0044	NVL
40035.639 -L22	Purple/steel/door frame	Graves annex weight room	<46.0	<0.0046	NVL

mg/kg = Milligrams per kilogram
< = Less than the Limit of Detection

PBS 201409212

Project: UW ICA Basketball Ops - Hec. Ed. & Pool
Project #: 40035.639

Analysis requested: PLM
Date: 1/14/14

Relinq'd by/Signature: C, Greeb
Date/Time:

Received by/Signature: Yuiyang
Date/Time: 1/16/14 1344 SAT

Email results to:

☐ Brian Stanford
☐ Ernest Edwards
☐ Gregg Middaugh
☐ Mark Hiley

☐ Prudy Stoudt-McRae
☒ Chuck Greeb
☐ Janet Murphy
☒ Willem Mager

☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other__________

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours

☐ 24 Hours
☒ 48 Hours

☐ 3-5 Days
☐ Other__________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-01	Brown vinyl flooring	Men's Rm. - 5 perimeter	
	-02	Blue 12" Vinyl Floor tile	Women's Rm - 6	
	-03	Mastic on Brown 4" cove	Men's Rm - 5	
		+ plaster		
	-04	window putty	1st Fl. at Men's Rm.	
	-05	Grout - glass block windows	1st fl., S. wall, E. side	
	-06	1" Ceramic tile & grout	Gr. Fl. pool area floor	
	-07	clay block (1"x1") + grout	Gr. Fl. E. side	
	-08	Paster wall	Room 8 (1st Floor)	
	-09	Mastic on brown 4" cove	Room 8	
	-10	9" Vinyl Floor tile (Brown) + mastic	Room 8	
	-11	Cementation curb	Corridor at Room 8	
	-12	Caulk at sink	Men's Locker Room	
	-13	Brown 4"x12" ceramic brick + grout	Men's Locker Room	
	-14	Cork 2x4 Ceiling Panels	1st Fl. Pool area, SW (nailed up)	

PBS 201409212

Project: UW ICA Basketball Ops - Hec Ed Pool

Project #: 40035.639

Analysis requested: PLM

Date: 1/14/14

Relinq'd by/Signature: C. Greeb

Date/Time:

Received by/Signature: Yui Yang

Date/Time: 1/16/14 1344 SAT

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- ☐ Other__________

TURN AROUND TIME:

- ☐ 1 Hour
- ☐ 2 Hours
- ☐ 4 Hours
- ☐ 24 Hours
- ☒ 48 Hours
- ☐ 3-5 Days
- ☐ Other__________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-15	Cork 2'x4' Ceiling Panel	1st fl. Pool Area NW (nailed up)	
	-16	Plaster wall	Corridor at Rm. 4 1st fl.	
	-17	Grout + JC	1st fl. Pool Bleacher area, E. wall	
	-18	Plaster wall	1st fl. W. wall, center	
	-19	Grout - Glass block	1st fl. N. end	
	-20	Plaster wall	1st fl. N. end	
	-21	Caulk - glass block window	1st fl. N. end at steel framing	
	-22	Horsehair pipe insl.	Attic space	
	-23	Plaster ceiling	Attic space	
	-24	window putty	N. stair 1st fl.	
	-25	Caulk at ~~glass~~ exp. joint.	N. side at Grav Annex (ext.)	
	-26	Construction curb	1st fl. at N. entry	
	-27	vibration joint insulator	Mech. Rm. - Bsmt. Fan C-02-CT	
	-28	Valve blanket	Mech. Rm. in Bsmt.	
	-29	Pipe straight run - 10"	Mech. Rm. Crawlspace (N. side)	

S:\Masters\Office\Tech Forms & Templates\Lab Chain-of-Custody.doc

PBS 201409212

Project: UW ICA Basketball Ops - Rec Ed & Pool

Project #: 40035.639

Analysis requested: PLM

Date: 1/14/14

Relinq'd by/Signature: C. Greeb

Date/Time:

Received by/Signature: Yui Yang

Date/Time: 1/16/14 1344

Email results to:

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☐ Harry Goren
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☐ Other____________

TURN AROUND TIME:

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☐ 3-5 Days
☐ Other__________________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-30	Pipe Fitting - 8"	Mech Rm. N. Crawlspace	
	-31	Pipe St. Run - 8"	Mech Rm. N. Crawlspace	
	-32	Black Pliable Flange gasket	Mech Rm - Bsmt	
	-33	Brown Pliable Flange gasket	Bsmt. Mech Rm	
	-34	vibration joint insulator	Mech Rm. Fan 01-02-15	
	-35	Plaster wall	At Rm. G14 (By Men's Locker)	
	-36	Mastic on black 6" cove	at Rm. G14	
	-37	Plaster wall	Women's Locker Rm.	
	-38	Gray 4" Cove + mastic	Sports Medicine Clinic (SMC) - NE Corner	
	-39	GWB + JC	SMC - E. wall, N. end	
	-40	GWB + JC	SMC - center	
	~~-41~~	~~Sidewalk joint caulk/sealant~~	~~Pool Bldg. - East side~~	
	-42	Gray 12" Vinyl floor tile	SMC - Phys. Therapy	
	-43	Blue 12" vinyl floor tile	SMC - Phys. Therapy	
	-44	Yellow carpet mastic	SMC NE Office Area	
	-45	Sink undercoat	SMC - 148K Kitchenette	

PBS 20140921 2

Project: UW ICA Basketball Ops - Hec Ed + Pool

Project #: 40035.639

Analysis requested: PLM

Date: 1/14/14

Relinq'd by/Signature: C. Greeb

Date/Time:

Received by/Signature: Yui Yang

Date/Time: 1/16/14 1344 SAT

Email results to:

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☒ Chuck Greeb
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☒ Willem Mager
☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other____________

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours
☐ 24 Hours
☒ 48 Hours
☐ 3-5 Days
☐ Other________________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-46	white 2" ceramic tile grout	SMC SE Restroom	
	-47	Sink undercoat	SMC 148 H	
	-48	White~~[illegible]~~ sink undercoat	SMC 148 F	
	-49	Yellow carpet mastic	SMC 148 F	
	-50	2x2 C.T.- Fissured	SMC 148 D	
	-51	Off-wt. 12" vinyl floor tile	SMC 148 E	
	-52	Mastic on gray 4" cove	SMC 148M	
	-53	GWB + JC	Graves Annex Weight Room, SE corner	
	-54	Rubberized Floor (purple)	Graves Annex Wt. Rm., SE corner	
	-55	Mastic on beige 6" cove	Graves Annex Wt. Rm., SE corner	
	-56	Fireproofing on column	Hec Ed Pav. - SE Corner	
	-57	window Frame sealant	Pool bldg. S. Side	

SEATTLE ASBESTOS TEST

NVLAP Accreditation Lab Codes: Bellevue-200876, Lynnwood-200768

Lynnwood Laboratory: 19701 Scriber Lake Road, Suite 103, Lynnwood, WA 98036, Tel: 425.673.9850, Fax: 425.673.9810

Bellevue Laboratory: 12727 Northup Way, Suite 1, Bellevue, WA 98005, Tel: 425.861.1111, Fax: 425.861.1118

Seattle Laboratory: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel: 206.633.1111, Fax: 206.633.4747

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chuck Greeb

Client: PBS Engineering and Environmental, Seattle

Address: 2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102

Job#: 40035.639

Batch#: 201409212

Date Received: 1/16/2014

Samples Rec'd: 57

Date Analyzed: 1/20/2014

Samples Analyzed: 57

Project Loc.: UW ICA Basketball OPS - Hec. Ed. Pool

Analyzed by: Fiona Chui/Yui Yang

Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
1	1	1	Brown tile	3	**Chrysotile**	Vinyl/binder, Mineral grains	3	Cellulose
		2	Black mastic	2	**Chrysotile**	Mastic/binder	3	Cellulose
2	2	1	Blue tile		**None detected**	Vinyl/binder, Mineral grains	4	Cellulose
		2	Black mastic		**None detected**	Mastic/binder	2	Cellulose
3	3	1	Brown rubbery material		**None detected**	Rubber/binder	2	Cellulose
		2	Brown mastic		**None detected**	Mastic/binder, Paint	3	Cellulose, Talc
		3	White sandy/brittle material with paint		**None detected**	Sand, Filler, Binder, Paint	4	Cellulose
4	4	1	Gray brittle material with paint	2	**Chrysotile**	Filler, Binder, Paint	2	Cellulose
5	5	1	Gray loose sandy/brittle material with paint		**None detected**	Sand, Filler, Binder, Paint	3	Cellulose
6	6	1	White ceramic		**None detected**	Ceramic/binder		None detected
		2	Beige/gray brittle material		**None detected**	Binder, Sand	4	Cellulose
		3	Yellow mastic		**None detected**	Mastic/binder	2	Cellulose
		4	Sliver metal		**None detected**	Metal		None detected
7	7	1	Red hard brittle material with paint		**None detected**	Filler, Binder, Paint	3	Cellulose
		2	Gray hard sandy/brittle material		**None detected**	Sand, Filler, Binder	2	Cellulose
8	8	1	Gray loose sandy/brittle material with paint		**None detected**	Sand, Filler, Binder, Paint	3	Cellulose
9	9	1	Brown rubbery material		**None detected**	Rubber/binder	2	Cellulose
		2	Tan mastic		**None detected**	Mastic/binder	2	Cellulose
10	10	1	Brown tile	2	**Chrysotile**	Vinyl/binder, Mineral grains	4	Cellulose
		2	Black mastic	2	**Chrysotile**	Mastic/binder	3	Cellulose
11	11	1	Gray hard sandy/brittle material		**None detected**	Sand, Filler, Cement/binder	2	Cellulose
12	12	1	White soft/elastic material		**None detected**	Binder, Filler	2	Cellulose
13	13	1	Brown ceramic		**None detected**	Ceramic/binder		None detected

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chuck Greeb
Client: PBS Engineering and Environmental, Seattle
Address: 2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102
Job#: 40035.639
Batch#: 201409212
Date Received: 1/16/2014
Samples Rec'd: 57
Date Analyzed: 1/20/2014
Samples Analyzed: 57
Project Loc.: UW ICA Basketball OPS - Hec. Ed. Pool

Analyzed by: Fiona Chui Hui Yang
Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
		2	Tan brittle/sandy material		**None detected**	Binder, Sand	2	Cellulose
14	14	1	Brown cork		**None detected**	Cork		None detected
15	15	1	Brown cork		**None detected**	Cork		None detected
16	16	1	White woven fibrous material with paint		**None detected**	Filler, Binder, Paint	78	Cellulose
		2	Gray sandy/brittle material		**None detected**	Sand, Filler, Binder	3	Cellulose
17	17	1	White powdery material with woven fibrous material and paint		**None detected**	Binder/filler, Paint	37	Cellulose
		2	White chalky material with paper		**None detected**	Binder/filler, Gypsum/binder	26	Cellulose, Glass fibers
18	18	1	White brittle material with paint		**None detected**	Filler, Binder, Paint	2	Cellulose
		2	Gray loose sandy/brittle material		**None detected**	Sand, Filler, Binder	3	Cellulose
19	19	1	Gray loose sandy/brittle material		**None detected**	Sand, Filler, Binder	4	Cellulose
20	20	1	White woven fibrous material with paint		**None detected**	Filler, Binder, Paint	71	Cellulose
		2	Gray loose sandy/brittle material		**None detected**	Sand, Filler, Binder	2	Cellulose
21	21	1	Brown soft material	**3**	**Chrysotile**	Binder, Filler	3	Cellulose
22	22	1	Black asphaltic fibrous material		**None detected**	Asphalt/binder, Binder/filler	70	Cellulose
		2	Brown fibrous material		**None detected**	Filler	85	Cellulose, Synthetic fibers
23	23	1	Gray sandy/brittle material		**None detected**	Sand, Filler, Binder	5	Cellulose, Synthetic fibers
24	24	1	Green brittle material with paint	**4**	**Chrysotile**	Filler, Binder, Paint	3	Cellulose
25	25	1	Gray soft/elastic material with brittle material		**None detected**	Binder, Filler, Fine particles	4	Cellulose
26	26	1	Gray hard sandy/brittle material		**None detected**	Sand, Filler, Binder, Cement/binder	2	Cellulose
27	27	1	Gray fibrous material with paint	**62**	**Chrysotile**	Filler, Paint	29	Cellulose

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chuck Greeb
Client: PBS Engineering and Environmental, Seattle
Address: 2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102
Job#: 40035.639
Batch#: 201409212
Date Received: 1/16/2014
Samples Rec'd: 57
Date Analyzed: 1/20/2014
Samples Analyzed: 57
Project Loc.: UW ICA Basketball OPS - Hec. Ed. Pool

Analyzed by: Fiona Choi/Xui Yang
Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
28	28	1	White woven fibrous material		None detected	Filler, Binder	90	Glass fibers
29	29	1	White powdery material with woven fibrous material	5	Chrysotile	Binder, Filler	17	Cellulose
				3	Amosite			
30	30	1	Trace silver paint	2	Chrysotile	Paint, Filler	2	Cellulose
		2	White powdery material with woven fibrous material	6	Chrysotile	Binder, Filler	18	Cellulose
				2	Amosite			
31	31	1	White powdery material	5	Chrysotile	Binder, Filler	14	Cellulose
				4	Amosite			
32	32	1	Black soft/elastic material		None detected	Binder, Filler	2	Cellulose
33	33	1	Brown soft/elastic material		None detected	Binder, Filler	2	Cellulose
34	34	1	White soft/elastic material with woven fibrous material		None detected	Filler, Binder, Fine particles	20	Cellulose, Synthetic fibers
		2	Trace clear mastic		None detected	Mastic/binder	3	Cellulose
35	35	1	White brittle material with paint		None detected	Filler, Binder, Paint	2	Cellulose
		2	Gray sandy/brittle material		None detected	Sand, Filler, Binder	4	Cellulose
36	36	1	Black rubbery material		None detected	Rubber/binder	2	Cellulose
		2	Tan mastic		None detected	Mastic/binder	3	Cellulose
37	37	1	Gray loose sandy/brittle material with paint		None detected	Filler, Binder, Paint, Sand	2	Cellulose
38	38	1	Gray rubbery material		None detected	Rubber/binder	2	Cellulose
		2	Beige mastic		None detected	Mastic/binder	2	Cellulose
		3	White powdery material with paint and paper		None detected	Filler, Binder, Paint	3	Cellulose
39	39	1	White powdery material with paint and paper		None detected	Binder/filler, Paint	36	Cellulose
		2	White chalky material with paper		None detected	Binder/filler, Gypsum/binder	24	Cellulose, Glass fibers
40	40	1	White powdery material with paint and paper		None detected	Binder/filler, Paint	33	Cellulose

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

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Client: PBS Engineering and Environmental, Seattle
Address: 2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102
Job#: 40035.639
Batch#: 201409212
Date Received: 1/16/2014
Samples Rec'd: 57
Date Analyzed: 1/20/2014
Samples Analyzed: 57
Project Loc.: UW ICA Basketball OPS - Hec. Ed. Pool

Analyzed by: Fiona Chui/Yui Yang
Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
		2	White chalky material with paper		None detected	Binder/filler, Gypsum/binder	25	Cellulose, Glass fibers
41	41	1	Brown soft/elastic material		None detected	Binder, Filler	4	Cellulose
		2	White soft/elastic material		None detected	Binder, Filler	3	Cellulose
42	42	1	Gray tile		None detected	Vinyl/binder, Mineral grains	2	Cellulose
		2	Yellow mastic		None detected	Mastic/binder	3	Cellulose
43	43	1	Blue tile		None detected	Vinyl/binder, Mineral grains	2	Cellulose
		2	Yellow mastic		None detected	Mastic/binder	4	Cellulose
44	44	1	Yellow mastic		None detected	Mastic/binder	3	Cellulose, Synthetic fibers
45	45	1	Black soft/loose material		None detected	Filler, Fine particles	2	Cellulose
46	46	1	White ceramic		None detected	Ceramic/binder		None detected
		2	Off-white brittle/sandy material		None detected	Binder, Sand	3	Cellulose
		3	White mastic with paper		None detected	Mastic/binder, Filler	72	Cellulose
47	47	1	Gray soft/loose material		None detected	Filler, Fine particles	5	Cellulose
48	48	1	White soft/loose material		None detected	Filler, Fine particles	5	Cellulose
49	49	1	Yellow mastic		None detected	Mastic/binder	4	Cellulose, Synthetic fibers
50	50	1	Gray fibrous material		None detected	Filler, Perlite, Glass beads	64	Cellulose, Glass fibers
51	51	1	Off-white tile		None detected	Vinyl/binder, Mineral grains	3	Cellulose
		2	Yellow mastic		None detected	Mastic/binder	2	Cellulose
		3	Gray soft material		None detected	Filler, Binder	3	Cellulose
52	52	1	Gray rubbery material		None detected	Rubber/binder	2	Cellulose
		2	Beige mastic		None detected	Mastic/binder	2	Cellulose
		3	Off-white powdery material		None detected	Filler, Binder	3	Cellulose
53	53	1	Off-white powdery material with paint		None detected	Binder/filler, Paint	4	Cellulose
		2	White chalky material with paper		None detected	Binder/filler, Gypsum/binder	21	Cellulose

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

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Client: PBS Engineering and Environmental, Seattle

Address: 2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102

Job#: 40035.639

Batch#: 201409212

Date Received: 1/16/2014

Samples Rec'd: 57

Date Analyzed: 1/20/2014

Samples Analyzed: 57

Project Loc.: UW ICA Basketball OPS - Hec. Ed. Pool

Analyzed by: Fiona ChunYi Yang

Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
54	54	1	Purple rubbery material		**None detected**	Rubber/binder, Fine particles	2	Cellulose
55	55	1	Beige rubbery material		**None detected**	Rubber/binder	2	Cellulose
		2	Yellow mastic		**None detected**	Mastic/binder	2	Cellulose
		3	White powdery material with paint		**None detected**	Binder/filler, Paint	3	Cellulose
56	56	1	Gray fibrous material		**None detected**	Filler, Fine particles	89	Cellulose
57	57	1	Gray/white soft/elastic material		**None detected**	Binder, Filler, Wood debris	4	Cellulose

PBS 201409428

Project: UW ICA Basketball Ops Hec Ed Pool

Project #: 40635.639

Analysis requested: PLM

Date: 1/24/14

Relinq'd by/Signature: C. Greeb

Date/Time: 1/24/14

Received by/Signature: Fiona Chui

Date/Time: 1/24/14 12:50

Email results to:

☐ Brian Stanford
☐ Ernest Edwards
☐ Gregg Middaugh
☐ Mark Hiley
☐ Prudy Stoudt-McRac
☒ Chuck Greeb
☐ Janet Murphy
☒ Willem Mager
☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other____________

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours
☐ 24 Hours
☒ 48 Hours
☐ 3-5 Days
☐ Other____________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-58	Felt under Metal Roof	Pavilion Pool Pitched Roof	
	-59	Built-up Roof	Pavilion Pool, W. Valley at	Hec. Ed
	-60	Built-up Roof	Pavilion Pool, Roof over South	Entry
	-61	Caulk on Counter flashing	Pav. Pool, Roof over S. Entry	
	-62	Caulk on Teracotta joints	Pav. Pool, Roof over S. entry	
	-63	Built-up Roof	Pav. Pool. N. Lower Roof, E. End	
	-64	Built-up Roof	Pav. Pool N. Lower Roof, W. End	
	-65	Window Frame Caulk	Pav. Pool, N. Lower Roof, on W. steel frame	windows 3 ea
	-66	Frame Caulk ~ Glass block	windows, Pool, N. Lower Roof	350lf 50 L.F
	-67	Built-up Roof	NW Mid-level Roof (at Graves Ann.,	Hec Ed)
	-68	Caulk on counter flashing	NW Mid-level Roof	
	-69	Built-up Roof	Sports Medicine Clinic	W. Sect.
	-70	Built-up Roof	Sports Medicine Clinic	E. Sect

S:\Masters\Office\Tech Forms & Templates\Lab Chain-of-Custody.doc

SEATTLE ASBESTOS TEST

NVLAP Accreditation Lab Codes: Bellevue-200876, Lynnwood-200768

Lynnwood Laboratory: 19701 Scriber Lake Road, Suite 103, Lynnwood, WA 98036, Tel: 425.673.9850, Fax: 425.673.9810

Bellevue Laboratory: 12727 Northup Way, Suite 1, Bellevue, WA 98005, Tel: 425.861.1111, Fax: 425.861.1118

Seattle Laboratory: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel: 206.633.1111, Fax: 206.633.4747

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chuck Greeb
Client: PBS Engineering and Environmental, Seattle
Address: 2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102
Job#: 40035.639
Batch#: 201409428
Date Received: 1/24/2014
Samples Rec'd: 13
Date Analyzed: 1/28/2014
Samples Analyzed: 13
Project Loc.: UW ICA Basketball OPS Hec. Ed. Pool

Analyzed by: Fiona Chui/Yui Yang
Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
1	58	1	Black asphaltic fibrous material		**None detected**	Filler, Asphalt, Binder	69	Cellulose
2	59	1	Black asphaltic material with fibrous material and sand		**None detected**	Asphalt/binder, Binder/filler, Sand	35	Cellulose, Glass fibers
		2	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		3	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	37	Cellulose, Glass fibers
		4	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		5	Black asphaltic fibrous material		**None detected**	Filler, Asphalt, Binder	70	Cellulose
		6	Brown fibrous material with perlite		**None detected**	Filler, Perlite	64	Cellulose
		7	Tan paper		**None detected**	Filler	72	Cellulose
3	60	1	Black asphaltic material with fibrous material and sand		**None detected**	Asphalt/binder, Binder/filler, Sand	38	Cellulose, Glass fibers
		2	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		3	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	35	Cellulose, Glass fibers
		4	Black asphaltic material		**None detected**	Asphalt/binder	3	Cellulose
		5	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	36	Cellulose, Glass fibers
		6	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		7	Brown fibrous material with perlite		**None detected**	Filler, Perlite	69	Cellulose
		8	Black asphaltic fibrous material		**None detected**	Filler, Asphalt, Binder	74	Cellulose
4	61	1	Gray soft/elastic material		**None detected**	Binder, Filler	4	Cellulose
5	62	1	Beige soft/elastic material		**None detected**	Binder, Filler	3	Cellulose
6	63	1	Black asphaltic material with fibrous material and sand		**None detected**	Asphalt/binder, Binder/filler, Sand	32	Cellulose, Glass fibers

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chuck Greeb
Client: PBS Engineering and Environmental, Seattle
Address: 2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102
Job#: 40035.639
Batch#: 201409428
Date Received: 1/24/2014
Samples Rec'd: 13
Date Analyzed: 1/28/2014
Samples Analyzed: 13
Project Loc.: UW ICA Basketball OPS Hec. Ed. Pool

Analyzed by: Fiona Chui/Yui Yang
Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
		2	Black asphaltic material		**None detected**	Asphalt/binder	3	Cellulose
		3	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	38	Cellulose, Glass fibers
		4	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		5	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	36	Cellulose, Glass fibers
		6	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		7	Brown fibrous material with perlite		**None detected**	Filler, Perlite	65	Cellulose
		8	Black asphaltic fibrous material		**None detected**	Filler, Asphalt, Binder	74	Cellulose
		9	Yellow foamy material		None detected	Synthetic foam		None detected
7	64	1	Black asphaltic material with fibrous material and sand		**None detected**	Asphalt/binder, Binder/filler, Sand	37	Cellulose, Glass fibers
		2	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		3	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	31	Cellulose, Glass fibers
		4	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		5	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	34	Cellulose, Glass fibers
		6	Black asphaltic material		**None detected**	Asphalt/binder	3	Cellulose
		7	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	37	Cellulose, Glass fibers
		8	Black asphaltic material		**None detected**	Asphalt/binder	3	Cellulose
		9	Brown fibrous material with perlite		**None detected**	Filler, Perlite	65	Cellulose
		10	Black asphaltic fibrous material		**None detected**	Filler, Asphalt, Binder	76	Cellulose
		11	Yellow foamy material		**None detected**	Synthetic foam		None detected
8	65	1	Tan soft material	**3**	**Chrysotile**	Filler, Binder	5	Cellulose, Talc

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chuck Greeb
Client: PBS Engineering and Environmental, Seattle
Address: 2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102
Job#: 40035.639
Batch#: 201409428
Date Received: 1/24/2014
Samples Rec'd: 13
Date Analyzed: 1/28/2014
Samples Analyzed: 13
Project Loc.: UW ICA Basketball OPS Hec. Ed. Pool

Analyzed by: Fiona Chui/Yui Yang
Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
9	66	1	Tan/gray soft material	3	**Chrysotile**	Filler, Binder	4	Cellulose, Talc
10	67	1	Black asphaltic material with fibrous material and sand		**None detected**	Asphalt/binder, Binder/filler, Sand	39	Cellulose, Glass fibers
		2	Black asphaltic material		**None detected**	Asphalt/binder	3	Cellulose
		3	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	32	Cellulose, Synthetic fibers
		4	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		5	Black asphaltic fibrous material		**None detected**	Filler, Asphalt, Binder	71	Cellulose
		6	Brown fibrous material with perlite		**None detected**	Filler, Perlite	65	Cellulose
11	68	1	Gray soft/elastic material		**None detected**	Binder, Filler	3	Cellulose
12	69	1	Black asphaltic material with fibrous material with sand		**None detected**	Asphalt/binder, Binder/filler	38	Cellulose, Synthetic fibers
		2	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		3	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	31	Cellulose, Glass fibers
		4	Black asphaltic material		**None detected**	Asphalt/binder	3	Cellulose
		5	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	37	Cellulose, Glass fibers
		6	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose
		7	Brown fibrous material with perlite		**None detected**	Filler, Perlite	64	Cellulose
		8	Black asphaltic fibrous material		**None detected**	Filler, Asphalt, Binder	70	Cellulose
		9	Yellow foamy material		**None detected**	Synthetic foam		None detected
13	70	1	Black asphaltic material with fibrous material with sand		**None detected**	Asphalt/binder, Binder/filler	36	Cellulose, Synthetic fibers
		2	Black asphaltic material		**None detected**	Asphalt/binder	2	Cellulose

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.:	Mr. Chuck Greeb	Client:	PBS Engineering and Environmental, Seattle	Address:	2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102
Job#:	40035.639	Batch#:	201409428	Date Received:	1/24/2014
Samples Rec'd:	13	Date Analyzed:	1/28/2014	Samples Analyzed:	13
Project Loc.:	UW ICA Basketball OPS Hec. Ed. Pool				

Analyzed by: Fiona Chui/Yui Yang

Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
		3	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	31	Cellulose, Glass fibers
		4	Black asphaltic material		**None detected**	Asphalt/binder	4	
		5	Black asphaltic material with fibrous material		**None detected**	Asphalt/binder, Binder/filler	35	Cellulose, Glass fibers
		6	Black asphaltic material		**None detected**	Asphalt/binder	3	Cellulose
		7	Brown fibrous material with perlite		**None detected**	Filler, Perlite	69	Cellulose

PBS

#201409695

Project: UW ICA BB OPS - Hec Ed + Pool

Project #: 40635.639

Analysis requested: PLM

Date: 2/5/14

Relinq'd by/Signature: C. Greeb

Date/Time:

Received by/Signature: Ryan Autopeck

Date/Time: 2/6/2014 @ 1030

Email results to:

☐ Brian Stanford
☐ Ernest Edwards
☐ Gregg Middaugh
☐ Mark Hiley

☐ Prudy Stoudt-McRae
☐ Chuck Greeb
☐ Janet Murphy
☐ Willem Mager

☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other________

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours

☐ 24 Hours
☒ 48 Hours

☐ 3-5 Days
☐ Other________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-71	Fireproofing on Col.	Edmundson Pav. - NE Corner	
	-72	Fireproofing on Col.	Ed. Pav. - C. of E. end	
	-73	GWB + JC	Ed. Pav. - NE Corner	
	-74	GWB + JC	Ed. Pav. - C. of E. end	
	-75	GWB + JC	Ed. Pav. - SE Corner	

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SEATTLE ASBESTOS TEST

NVLAP Accreditation Lab Codes: Bellevue-200876, Lynnwood-200768

Lynnwood Laboratory: 19701 Scriber Lake Road, Suite 103, Lynnwood, WA 98036, Tel: 425.673.9850, Fax: 425.673.9810

Bellevue Laboratory: 12727 Northup Way, Suite 1, Bellevue, WA 98005, Tel: 425.661.1111, Fax: 425.861.1118

Seattle Laboratory: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel: 206.633.1111, Fax: 206.633.4747

ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Mr. Chuck Greeb
Client: PBS Engineering and Environmental, Seattle
Address: 2517 Eastlake Ave. E., Suite 100, Seattle, WA 98102
Job#: 40035.639
Batch#: 201409695
Date Received: 2/6/2014
Samples Rec'd: 5
Date Analyzed: 2/10/2014
Samples Analyzed: 5
Project Loc.: UW ICA BB OPS - Hec Ed & Pool

Analyzed by: April Smith
Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
1	-71	1	Gray powdery material with fibrous material		**None detected**	Filler, Fine particles	17	Cellulose
2	-72	1	Gray powdery material with fibrous material		**None detected**	Filler, Fine particles	18	Cellulose
3	-73	1	White powdery material with paint and paper		**None detected**	Binder/filler, Paint	31	Cellulose
		2	White chalky material with paper		**None detected**	Binder/filler, Gypsum/binder	25	Cellulose, Glass fibers
4	-74	1	White powdery material with paint and paper		**None detected**	Binder/filler, Paint	34	Cellulose
		2	White chalky material with paper		**None detected**	Binder/filler, Gypsum/binder	25	Cellulose, Glass fibers
5	-75	1	White powdery material with paint and paper		**None detected**	Binder/filler, Paint	36	Cellulose
		2	White chalky material with paper		**None detected**	Binder/filler, Gypsum/binder	25	Cellulose, Glass fibers

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206 547.0100 | f 206 634.1936 | www.nvllabs.com

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental (Seattle)
Address: 2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

Attention: Mr. Chuck Greeb
Project Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Batch #: 1417359.00
Client Project #: 40035.639
Date Received: 9/30/2014
Samples Received: 8
Samples Analyzed: 8
Method: EPA/600/R-93/116
& EPA/600/M4-82-020

Lab ID: 14125661 Client Sample #: 40035.639-76
Location: UW ICA Basketball Ops-Ed. Pavilion Pool
Comments: Insufficient mastic for thorough analysis

Layer 1 of 2 **Description:** Gray/purple rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Rubber/Binder, Fine particles	None Detected	ND	**None Detected ND**

Layer 2 of 2 **Description:** Trace tan soft mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Calcareous particles	Cellulose	2%	**None Detected ND**

Lab ID: 14125662 Client Sample #: 40035.639-77
Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Layer 1 of 3 **Description:** Off-white linoleum

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Linoleum/Binder, Fine particles	Cellulose	33%	**None Detected ND**

Layer 2 of 3 **Description:** Beige woven fibrous backing

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Fine particles	Cellulose	77%	**None Detected ND**

Layer 3 of 3 **Description:** Gold soft mastic with gray crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Calcareous binder, Binder/Filler	Cellulose	7%	**None Detected ND**

Lab ID: 14125663 Client Sample #: 40035.639-78
Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Layer 1 of 2 **Description:** Gray rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Rubber/Binder, Fine particles	None Detected	ND	**None Detected ND**

Sampled by: Client
Analyzed by: Jacob Laugeson **Date:** 10/01/2014
Reviewed by: Nick Ly **Date:** 10/01/2014 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental (Seattle)
Address: 2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

Attention: Mr. Chuck Greeb
Project Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Batch #: 1417359.00
Client Project #: 40035.639
Date Received: 9/30/2014
Samples Received: 8
Samples Analyzed: 8
Method: EPA/600/R-93/116
& EPA/600/M4-82-020

Layer 2 of 2 **Description:** Off-white soft mastic with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Mastic/Binder, Calcareous particles, Paint	Cellulose	2%	**None Detected ND**

Lab ID: 14125664 **Client Sample #: 40035.639-79**
Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Layer 1 of 1 **Description:** Black asphaltic flaky material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Asphalt/Binder, Fine particles	Cellulose	2%	**None Detected ND**

Lab ID: 14125665 **Client Sample #: 40035.639-80**
Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Layer 1 of 1 **Description:** White compressed fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Binder/Filler, Glass beads, Paint	Glass fibers	83%	**None Detected ND**

Lab ID: 14125666 **Client Sample #: 40035.639-81**
Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Layer 1 of 3 **Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Calcareous particles, Perlite, Paint	None Detected	ND	**None Detected ND**

Layer 2 of 3 **Description:** White compacted powdery material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Calcareous particles, Calcareous binder, Binder/Filler	Cellulose	11%	**None Detected ND**

Layer 3 of 3 **Description:** White chalky material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %
Gypsum/Binder, Binder/Filler	Cellulose	15%	**None Detected ND**
	Glass fibers	8%	

Sampled by: Client
Analyzed by: Jacob Laugeson **Date:** 10/01/2014
Reviewed by: Nick Ly **Date:** 10/01/2014 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental (Seattle)
Address: 2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

Attention: Mr. Chuck Greeb
Project Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Batch #: 1417359.00
Client Project #: 40035.639
Date Received: 9/30/2014
Samples Received: 8
Samples Analyzed: 8
Method: EPA/600/R-93/116
& EPA/600/M4-82-020

Lab ID: 14125667 Client Sample #: 40035.639-82
Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Layer 1 of 2 **Description:** Green crumbly mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Fine particles	Synthetic fibers	4%	**None Detected ND**

Layer 2 of 2 **Description:** Tan crumbly mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Mastic/Binder, Binder/Filler	Cellulose	3%	**None Detected ND**

Lab ID: 14125668 Client Sample #: 40035.639-83
Location: UW ICA Basketball Ops-Ed. Pavilion Pool

Layer 1 of 1 **Description:** Light gray compressed fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Binder/Filler, Perlite	Cellulose	35%	**None Detected ND**
	Glass fibers	20%	

Sampled by: Client
Analyzed by: Jacob Laugeson **Date:** 10/01/2014
Reviewed by: Nick Ly **Date:** 10/01/2014 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

PBS

1417359

Project: UW ICA Basketball OPS - Ed. Pavilion Pool

Project #: 40035.639

Analysis requested: PLM

Date: 9/30/14

Relinq'd by/Signature: C. Greeb

Date/Time: 9/30/14

Received by/Signature:

Date/Time: 9/30/14 1555 courier

Email results to:

☐ Brian Stanford
☐ Ernest Edwards
☐ Gregg Middaugh
☐ Mark Hiley
☐ Prudy Stoudt-McRae
☐ Chuck Greeb
☐ Janet Murphy
☐ Willem Mager
☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other__________

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours
☐ 24 Hours
☐ 48 Hours
☐ 3-5 Days
☐ Other__________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-76	Purple rubberized floor + mastic	Graves Annex Weight Room	
	-77	Beige vinyl flooring	Graves Annex Rm. 122C	
	-78	Gray 4" cove + mastic	Graves Annex Rm. 122C	
	-79	Black sink undercoat	Graves Annex Rm. 122C	
	-80	2x2 C.T. - Textured	Graves Annex Rm. 122B	
	-81	GWB + JC	Graves Annex Rm. 122B	
	-82	Carpet mastic	Graves Annex Rm. 122B	
	-83	2x2 C.T. - Fissured	Graves Annex Weight Room	

S:\Masters\Office\Tech Forms & Templates\Lab Chain-of-Custody.doc

PBS

1420642

Project: UW Pavillion Pool

Project #: 40035.639

Analysis requested: PLM

Date: 11/18/14

Relinq'd by/Signature: C. Greeb

Date/Time: 11/18/14

Received by/Signature: J. Shearer/

Date/Time: 11/18/14 1345 Courier

Email results to:

☐ Brian Stanford
☐ Ernest Edwards
☐ Gregg Middaugh
☐ Mark Hiley
☐ Prudy Stoudt-McRae
☒ Chuck Greeb
☐ Janet Murphy
☒ Willem Mager
☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other____________

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours
☐ 24 Hours
☒ 48 Hours
☐ 3-5 Days
☐ Other__________________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-84	Cork ceiling	N. end of pool balcony	

Analyzed by: Nadia NVL 11/18/14 4:05 PM

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936 | www.nvllabs.com

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: PBS Environmental (Seattle)
Address: 2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

Attention: **Mr. Chuck Greeb**
Project Location: UW Pavilion Pool

Batch #: 1420642.00
Client Project #: 40035.639
Date Received: 11/18/2014
Samples Received: 1
Samples Analyzed: 1
Method: EPA/600/R-93/116
& EPA/600/M4-82-020

Lab ID: 14141601 **Client Sample #: 40035.639-84**
Location: UW Pavilion Pool

Layer 1 of 1 **Description:** Brown soft material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%		**Asbestos Type: %**
Cork, Paint	None Detected	ND	**None Detected ND**

Sampled by: Client
Analyzed by: Nadezhda Prysyazhnyuk **Date:** 11/18/2014
Reviewed by: Nick Ly **Date:** 11/18/2014 Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100, Fax: 206.634.1936
www.nvllabs.com

Analysis Report

AIHA - IH # 101861
WA - DOE # C1765

AIHA ACCREDITED LABORATORY

Total Lead (Pb)

Client: PBS Environmental (Seattle)
Address: 2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

Attention: Mr. Chuck Greeb
Project Location: UW ICA Basketball Ops-Hec Ed and P001

Batch #: 1401018.00
Matrix: Paint Chips
Method: EPA 7000B
Client Project #: 40035.639
Date Received: 1/20/2014
Samples Received: 18
Samples Analyzed: 18

Lab ID	Client Sample #	Sample Weight (g)	RL in mg/Kg	Results in mg/Kg	Results in percent
14009121	40035.639-L01	0.1929	48.0	14000.0	1.4000
14009122	40035.639-L02	0.0963	96.0	6100.0	0.6100
14009123	40035.639-L03	0.2223	42.0	24000.0	2.4000
14009124	40035.639-L04	0.1839	50.0	1100.0	0.1100
14009125	40035.639-L05	0.2231	41.0	18000.0	1.8000
14009126	40035.639-L06	0.1992	46.0	1100.0	0.1100
14009127	40035.639-L07	0.2161	43.0	< 43.0	< 0.0043
14009128	40035.639-L08	0.2307	40.0	< 40.0	< 0.0040
14009129	40035.639-L09	0.2319	40.0	< 40.0	< 0.0040
14009130	40035.639-L10	0.1588	58.0	180.0	0.0180
14009131	40035.639-L11	0.1206	77.0	< 77.0	< 0.0077
14009132	40035.639-L12	0.1918	48.0	< 48.0	< 0.0048
14009133	40035.639-L13	0.2330	40.0	< 40.0	< 0.0040
14009134	40035.639-L14	0.2371	39.0	< 39.0	< 0.0039

Sampled by: Client
Analyzed by: Shalini Patel
Reviewed by: Nick Ly

Date Analyzed: 01/21/2014
Date Issued: 01/21/2014

Nick Ly, Technical Director

mg/ Kg =Milligrams per kilogram
Percent = Milligrams per kilogram / 10000
Note : Method QC results are acceptable unless stated otherwise.
Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.

RL = Reporting Limit
'<' = Below the reporting Limit

Analysis Report

Total Lead (Pb)

Client: PBS Environmental (Seattle)
Address: 2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

Attention: Mr. Chuck Greeb
Project Location: UW ICA Basketball Ops-Hec Ed and P001

Batch #: 1401018.00
Matrix: Paint Chips
Method: EPA 7000B
Client Project #: 40035.639
Date Received: 1/20/2014
Samples Received: 18
Samples Analyzed: 18

Lab ID	Client Sample #	Sample Weight (g)	RL in mg/Kg	Results in mg/Kg	Results in percent
14009135	40035.639-L15	0.0930	99.0	3900.0	0.3900
14009136	40035.639-L16	0.2587	36.0	990.0	0.0990
14009137	40035.639-L17	0.1996	46.0	100.0	0.0100
14009138	40035.639-L18	0.2022	46.0	< 46.0	< 0.0046

Sampled by: Client
Analyzed by: Shalini Patel
Reviewed by: Nick Ly

Date Analyzed: 01/21/2014
Date Issued: 01/21/2014

Nick Ly, Technical Director

mg/ Kg =Milligrams per kilogram
Percent = Milligrams per kilogram / 10000
Note : Method QC results are acceptable unless stated otherwise.
Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.

RL = Reporting Limit
'<' = Below the reporting Limit

PBS

NVL Batch ID
1401018

Project: UW JCA Basketball Ops - Hec Ed & Pool

Project #: 40035.639

Analysis requested: FAA - Lead

Date: 1/14/14

Relin q'd by/Signature: C. Greeb

Date/Time:

Received by/Signature:

Date/Time: 1/14/14 1130

Analyzed by: Shalini Patel

1/21/14 10:00

Email results to:

☐ Brian Stanford
☐ Ernest Edwards
☐ Gregg Middaugh
☐ Mark Hiley
☐ Prudy Stoudt-McRae
☒ Chuck Greeb
☐ Janet Murphy
☒ Willem Mager
☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours
☐ 24 Hours
☒ 48 Hours
☐ 3-5 Days
☐ Other

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-L01	white/plaster/wall	1st Fl. Outside Restroom 3	
	-L02	white/Radiators	1st Fl., S. end	
	-L03	Beige/Plaster/wall	1st Fl. Room 8	
	-L04	Beige/Concrete/wall	1st Fl. N. end	
	-L05	Beige/plaster/wall	At Rm. G14	
	-L06	Beige/concrete/wall	Tunnel From Pool To Hec. Ed	
	-L07	Blue gray/GWB/wall	SMC - Reception	
	-L08	white/GWB/wall	SMC - Center	
	-L09	Yellow/GWB/wall	SMC - 148D Treatment Rm.	
	-L10	white/Brick/wall	SMC - SW corner	
	-L11	Tan/Metal/Door frame	SMC - Reception	
	-L12	Purple/GWB/wall	Graves Annex (GA) Wt. Rm., SE Corner	
	-L13	Beige/Concrete/wall	GA S. Stair, S. wall	
	-L14	white/Concrete/wall	GA S. Stair, W. wall	
	-L15	Gray/Steel/Stairs	GA S. Stair	

S:\Masters\Office\Tech Forms & Templates\Lab Chain-of-Custody.doc

PBS

NVL Batch ID
1401018

Project: UW ICA B.B. Ops Hec Ed + pool

Project #: 40035.639

Analysis requested: FAA - Lead

Date: 1/14/14

Relinq'd by/Signature: C. Greeb

Date/Time:

Received by/Signature:

Date/Time: MK 1/20/14 1130 Courier

Email results to:

☐ Brian Stanford
☐ Ernest Edwards
☐ Gregg Middaugh
☐ Mark Hiley
☐ Prudy Stoudt-McRae
☒ Chuck Greeb
☐ Janet Murphy
☒ Willem Mager
☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours
☐ 24 Hours
☒ 48 Hours
☐ 3-5 Days
☐ Other

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	-L16	Red clay brick + grout 1x1'	stair to Mech Rm.	
	-L17	Ceramic tile + grout	Pool Area	
	-L18	4"x12" glazed brick	Men's Locker Room	

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ADVANCED ANALYTICAL

Environmental Testing Laboratory

January 24, 2014

Willem Mager
PBS Environmental
2517 Eastlake Ave. East, Suite 100
Seattle, WA 98102

Dear Mr. Mager:

Please find enclosed the analytical data report for the *UW, 40035.639* ***(B40120-1)*** Project.

Samples were received on *January 20, 2014*. The results of the analyses are presented in the attached tables. Applicable reporting limits, QA/QC data and data qualifiers are included. A copy of the chain-of-custody and an invoice for the work is also enclosed.

ADVANCED ANALYTICAL LABORATORY appreciates the opportunity to provide analytical services for this project. Should there be any questions regarding this report, please contact me at (425) 497-0110.

It was a pleasure working with you, and we are looking forward to the next opportunity to work together.

Sincerely,

V. Ivanov

Val G. Ivanov, Ph.D.
Laboratory Manager

Overlake Business Center ■ 2821 152 Avenue NE ■ Redmond, WA 98052
ph 425.497.0110 fax 425.497.8089
E-mail: aachemlab@yahoo.com

ADVANCED ANALYTICAL

Chain of Custody Record

Page of

Laboratory Job #: 1340120-1

2821 152 Avenue NE
Redmond, WA 98052
(425) 497-0110 fax: (425) 497-8089
aachemlab@yahoo.com

Client: PBS Eng. & Env.

Project Manager: Willem Mager

Address:

Phone: Fax:

Project Name: UW Hec Ed & Pool

Project Number: 40035.639

Collector: C. Greeb

Date of collection: 1/16/14

	Sample ID	Time	Matrix	Container type	8260 Volatiles	8021B Volatiles	BTEX	BTEX/NWTPH-Gx	NWTPH-Gx	NWTPH-Dx	NWTPH-HCID	8270 Semivolatiles	8270 PAH	8082 PCBs	8081 Pesticides	RCRA 8 Metals	Lead				Notes, comments	# of containers
1	PCB-01													✓							Caulk around sink 1st Fl. Men's Rm.	
2	PCB-02													✓							Caulk at Glass Block windows 1st Fl. - N.	
3	PCB-03													✓							Putty on steel frame windows N. stair	
4	PCB-04													✓							Exp. joint at Pool/Games Annex - Caulk	
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

Relinquished by:	Date/Time	Received by:	Date/Time
C. Greeb	1/17/14	V. Ivanov	01/20/14
Relinquished by:	Date/Time	Received by:	Date/Time

Sample receipt info:

Total # of containers:

Condition (temp, °C)

Seals (intact?, Y/N)

Comments:

Turnaround time:

Same day ○

24 hr ○

48 hr ○

Standard ⊗

AAL Job Number:	B40120-1
Client:	PBS Environmental
Project Manager:	Willem Mager
Client Project Name:	UW
Client Project Number:	40035.639
Date received:	01/20/14

Analytical Results				40035.639	40035.639	40035.639	40035.639
8082 (PCBs), mg/kg		**MTH BLK**	**LCS**	**PCB-01**	**PCB-02**	**PCB-03**	**PCB-04**
Matrix	Bulk	Bulk	Bulk	Bulk	Bulk	Bulk	Bulk
Date extracted	Reporting	01/20/14	01/20/14	01/20/14	01/20/14	01/20/14	01/20/14
Date analyzed	Limits	01/20/14	01/20/14	01/20/14	01/20/14	01/20/14	01/20/14
A1221	2.0	nd		nd	nd	nd	nd
A1232	2.0	nd		nd	nd	nd	nd
A1242 (A1016)	2.0	nd		nd	nd	nd	nd
A1248	2.0	nd		nd	nd	nd	nd
A1254	2.0	nd		nd	nd	nd	nd
A1260	2.0	nd	118%	nd	nd	nd	nd
Surrogate recoveries:							
Tetrachloro-m-xylene		89%	122%	85%	92%	96%	96%
Decachlorobiphenyl		84%	129%	77%	82%	88%	M

Data Qualifiers and Analytical Comments
nd - not detected at listed reporting limits
na - not analyzed
M - matrix interference
Acceptable Recovery limits: 70% TO 130%
Acceptable RPD limit: 30%

NVL LABS
INDUSTRIAL HYGIENE SERVICES
Laboratory | Management | Training

January 28, 2014

Chuck Greeb
PBS Environmental (Seattle)
2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

RE: Polychlorinated Biphenyl's (PCB) Analysis, NVL Batch # 1401428.00

Dear Mr. Greeb,

Enclosed please find test results for the samples submitted to our laboratory for analysis. Preparation and analysis of these samples were conducted for the presence of organic compounds using instruments specified in accordance with EPA, NIOSH and other published methods.

Test results for bulk sample are usually expressed in milligrams per kilogram (mg/Kg) and/or parts per million (ppm). Air samples are usually reported in milligrams per cubic meter (mg/m3). Dust wipe samples are expressed in micrograms per square foot (ug/ft2). The reported test results pertain only to items tested and are not blank corrected.

For recent regulation updates pertaining to current regulatory levels or permissable exposure limits, please call your local regulatory agencies for more details.

This report is considered highly confidential and will not be released without your approval. Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

Nick Ly, Technical Director

Enc.: Sample Results

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936 | www.nvllabs.com

Analysis Report
Polychlorinated Biphenyls (PCBs)

NVL LABS
INDUSTRIAL HYGIENE SERVICES

Client: PBS Environmental (Seattle)
Address: 2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

Attention: Mr. Chuck Greeb
Project Location: UW ICA Basketball Ops-Hec Ed and Pool

NVL Batch No. 1401428.00
Method No.: EPA 8082
Client Project #: 40035.639
Date Received: 1/27/2014
Matrix: Bulk
Samples Received: 1
Samples Analyzed: 1

Lab Sample ID:	14011301			
Client Sample ID:	40035.639-PCB-05			
Sample Description:	Frame Caulk around glass block			
Sample Weight (g)	0.5401			
PCB Type	mg/Kg(ppm)			
Aroclor 1016	ND			
Aroclor 1221	ND			
Aroclor 1232	ND			
Aroclor 1242	ND			
Aroclor 1248	ND			
Aroclor 1254	ND			
Aroclor 1260	ND			
Total: PCB Concentration	ND			
Reporting Limit (RL)	3.7			

Remarks: mg/Kg = Milligrams per kilograms
ppm = Parts per million by weight
ND = None Detected (less than RL)
<RL = Below the reporting limit of instrument

Sampled by: Client
Analyzed by: Evelyn Ahulu **Date:** 01/28/2014
Reviewed by: Nick Ly **Date:** 01/28/2014

Nick Ly, Technical Director

Preparation of these samples were conducted in accordance with EPA Method 3546 or other published test methods as noted in this report. Unless stated otherwise, the condition of all samples was acceptable at time of receipt. Reported sample results are based on dry weight and method QC results are acceptable unless stated otherwise. If samples were not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc.. Responsibility for interpretation of the reported data rests with the client.

PBS

NVL Batch ID
1401428

Project: UW ICA Basketball Ops - Hec Ed & Pool

Project #: 40035.639

Analysis requested: PCB 8082

Date: 1/24/14

Relinq'd by/Signature: C. Greeb

Date/Time: 1/27/14

Received by/Signature: Midori Kabe

Date/Time: 1/27/14 1500

Analyzed By Evelyn Atkin

1/28/14 16:30 Camer

Email results to:

☐ Brian Stanford
☐ Ernest Edwards
☐ Gregg Middaugh
☐ Mark Hiley

☐ Prudy Stoudt-McRae
☐ Chuck Greeb
☐ Janet Murphy
☐ Willem Mager

☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other__________

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours

☐ 24 Hours
☐ 48 Hours

☐ 3-5 Days
☐ Other__________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	PCB-05	Frame Caulk around glass block	Exterior side of Glass block, N. Side of bldg	

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January 22, 2014

Chuck Greeb
PBS Environmental (Seattle)
2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

RE: Metals Analysis; NVL Batch # 1401028.00

Dear Mr. Greeb,

Enclosed please find the test results for samples submitted to our laboratory for analysis. Preparation of these samples was conducted following protocol outlined in EPA Method SW 846-3051 unless stated otherwise. Analysis of these samples was performed using analytical instruments in accordance with U.S. EPA, NIOSH, OSHA and other ASTM methods.

For matrix materials submitted as paint, dust wipe, soil or TCLP samples, analysis for the presence of total metals is conducted using published U.S. EPA Methods. Paint and soil results are usually expressed in mg/Kg which is equivalent to parts per million (ppm). Lead (Pb) in paint is usually expressed in mg/Kg (ppm) , Percent (%) or mg/cm^2 by area. Dust wipe sample results are usually expressed in ug/wipe and ug/ft^2. TCLP samples are reported in mg/L (ppm). For air filter samples, analyses are conducted using NIOSH and OSHA Methods. Results are expressed in ug/filter and ug/m^3. Other matrix materials are analyzed accordingly using published methods or specified by client. The reported test results pertain only to items tested. Lead test results are not blank corrected.

For recent regulation updates pertaining to current regulatory levels or permissible exposure levels, please call your local regulatory agencies for more details.

This report is considered highly confidential and will not be released without your approval. Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. if you need further assistance please feel free to call us at 206-547-0100 or 1-888-NVLLABS.

Sincerely,

Nick Ly, Technical Director

Enclosure:

ilac-MRA

AIHA LAP, LLC
ACCREDITED LABORATORY
INDUSTRIAL HYGIENE & ENVIRONMENTAL LEAD
ISO/IEC 17025:2005
LAB # 101861

1.888.NVL.LABS
1.888.(685.5227)
www.nvllabs.com

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
p 206.547.0100 | f 206.634.1936

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100, Fax: 206.634.1936
www.nvllabs.com

Analysis Report

AIHA - IH # 101861
WA - DOE # C1765

AIHA
ACCREDITED LABORATORY

Total Metals

Client: PBS Environmental (Seattle)
Address: 2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

Attention: Mr. Chuck Greeb
Project Location: UW JCA Basketball Ops- Hec Ed and Pool

Batch #: 1401028.00
Matrix: Paint Chips
Method: EPA 6010 / 7471 (Hg)
Client Project #: 40035.639
Date Received: 1/20/2014
Samples Received: 2
Samples Analyzed: 2

Lab ID	Client Sample #	Elements	Sample wt (g)	RL mg / kg	Results in mg / kg	Results in ppm
14009245	M-01	Silver (Ag)	0.2400	17.0	< 17.0	< 17.0
		Arsenic (As)	0.2400	17.0	< 17.0	< 17.0
		Barium (Ba)	0.2400	17.0	20.0	20.0
		Cadmium (Cd)	0.2400	17.0	< 17.0	< 17.0
		Chromium (Cr)	0.2400	17.0	< 17.0	< 17.0
		Mercury (Hg)	0.2400	0.8	< 0.8	< 0.8
		Lead (Pb)	0.2400	17.0	< 17.0	< 17.0
		Selenium (Se)	0.2400	17.0	< 17.0	< 17.0
14009246	M-02	Silver (Ag)	0.2295	17.0	< 17.0	< 17.0
		Arsenic (As)	0.2295	17.0	< 17.0	< 17.0
		Barium (Ba)	0.2295	17.0	< 17.0	< 17.0
		Cadmium (Cd)	0.2295	17.0	< 17.0	< 17.0
		Chromium (Cr)	0.2295	17.0	< 17.0	< 17.0
		Mercury (Hg)	0.2295	0.9	< 0.9	< 0.9
		Lead (Pb)	0.2295	17.0	42.0	42.0
		Selenium (Se)	0.2295	17.0	< 17.0	< 17.0

Sampled by: Client
Analyzed by: Fatima Khan
Reviewed by: Nick Ly

Date Analyzed: 01/22/2014
Date Issued: 01/22/2014

Nick Ly, Technical Director

mg/ kg = Milligrams per kilogram
ppm = Parts per million

RL = Reporting Limit
'<' = Below the reporting Limit

Note : Method QC results are acceptable unless stated otherwise.
Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.

Bench Run No: 34-0121-10

PBS

NVL Batch ID
1401028

Project: UW JCA Basketball Ops - Hec Ed & Pool

Project #: 40035.639

Analysis requested: Metals - RCRA 8

Date: 1/14/14

Relinq'd by/Signature: C Greeb

Date/Time:

Received by/Signature:

Date/Time: 1/20/14 1130 courier

Email results to:

☐ Brian Stanford
☐ Ernest Edwards
☐ Gregg Middaugh
☐ Mark Hiley
☐ Prudy Stoudt-McRae
☒ Chuck Greeb
☐ Janet Murphy
☒ Willem Mager
☐ Harry Goren
☐ Tim Ogden
☐ Mike Smith
☐ Other________

TURN AROUND TIME:

☐ 1 Hour
☐ 2 Hours
☐ 4 Hours
☐ 24 Hours
☐ 48 Hours
☒ [✓ 3-5] Days
☐ Other________

BULK SAMPLE DATA FORM

Lab #	Sample #	Material	Location	Lab
	M-01	Pool Bldg Brick & Mortar		
	M-02	Hec Ed E. Side of Pool Bldg	Brick & Mortar	

S:\Masters\Office\Tech Forms & Templates\Lab Chain-of-Custody.doc

Attachments

Prior/Historical Sampling Data:

PBS Survey Data for the Alaska Airline Arena (Edmundson Pavilion)
HVAC improvements (UW 203204) dated September 27, 2011

PLM ASBESTOS SAMPLE INVENTORY

PBS Sample #	Material Type	Sample Location	Lab Description	Lab Result	Lab
40035.530 -01	Pipe insulation - chiller unit piping (Fiberglass)	Upper Mezzanine - Mechanical space, grid 21/H	Layer 1: Trace white soft mastic with woven fibrous material and paper	NAD	NVL
			Layer 2: Trace yellow brittle mastic with foil	NAD	
			Layer 3: Yellow fibrous material	NAD	
40035.530 -02	Expansion joint and insulation	Upper Mezzanine -Mechanical space, west wall	Layer 1: Green soft/elastic material with fibrous material	NAD	NVL
40035.530 -03	Fireproof on beams- white/gray	Staircase number 5 to Mechanical space	Layer 1: Gray powdery fibrous material with paint	NAD	NVL
40035.530 -04	Fireproof on column	Level 4 - Video area - column 21/F.9	Layer 1: Gray powdery fibrous material with paint	NAD	NVL
40035.530 -05	12" Floor tile (blue)	Level 4 Video area - Hallway	Layer 1: Blue vinyl tile	NAD	NVL
	Adhesive (gold)		Layer 2: Yellow brittle mastic with debris	NAD	
40035.530 -06	Joint compound	Level 4 - Video area - Middle - east wall	Layer 1: White compacted powdery material	NAD	NVL
	Gypsum wallboard composite		Layer 2: White chalky material with paper	NAD	
40035.530 -07	Joint compound	Level 4 - Video area - Middle - west wall	Layer 1: White compacted powdery material	NAD	NVL
	Gypsum wallboard composite		Layer 2: Trace white chalky material with paper	NAD	
40035.530 -08	2'x4' Ceiling tile - suspended	Level 4 - Video area - grid - 21/H middle	Layer 1: Gray compressed fibrous material with paint	NAD	NVL
40035.530 -09	Fireproof - white/gray deck	Level 4 - Video area - in ceiling, new location of A/C Unit	Layer 1: Gray powdery fibrous material with paint	NAD	NVL

NAD - No Asbestos Detected

AA LEAD PAINT CHIP SAMPLE INVENTORY

PBS Sample #	Paint Color / Component or Substrate	Sample Location	Results (mg/kg)	Results (%)	Lab
40035.530 -L01	Gray / Gypsum wallboard / Wall	Upper Mezzanine - Mechanical space - west wall	<42.0	<0.0042	NVL
40035.530 -L02	White / Gypsum wallboard / Wall	Mezzanine Level 4 - Video Area - middle, east wall	<42.0	<0.0042	NVL
40035.530 -L03	White / Gypsum wallboard / Wall	Mezzanine Level 4 - Video Area middle - west wall	<42.0	<0.0042	NVL

mg/kg = Milligrams per kilogram
< = Less than the Limit of Detection

About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of $6 billion.

More information on AECOM and its services can be found at www.aecom.com.

1111 3rd Avenue, Suite 1600
Seattle, WA 98101
206.438.2700

Appendix F

View Corridor Photos

View Corridor 3—Image A

** The red dashed line indicates the location of the proposed project. However, the project would be located behind Alaska Airlines Arena and existing vegetation and would not be visible from this location.*

View Corridor 3—Image B

** The proposed project would not be visible from this location.*

Note: This figure is not to scale.

Source: Gensler, 2022

Appendix F

View Corridor Photos