ENVIRONMENTAL CHECKLIST

for the proposed

Basketball Training Facility & Health/High Performance Center Project

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

   Contact
   Julie Blakeslee
   Environmental and Land Use Planner
   University of Washington
   Facilities, Asset Management
   Box 352205
   Seattle, WA 98195-2205
   jblakesl@uw.edu

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,

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

Figure 1
Vicinity Map

Source: University of Washington, 2022

Note: This figure is not to scale.

Basketball Training Facility & Health/High Performance Center
SEPA Checklist
Basketball Training Facility and H2P Project
SEPA Environmental Checklist

Figure 2
Existing Site Map

Note: This figure is not to scale.

Source: Gensler, 2022
Figure 3
Proposed Site Plan
Basketball Training Facility and H2P Project
SEPA Environmental Checklist

01 PROPOSED ELEVATION - EAST

Note: This figure is not to scale.

Source: Gensler, 2022

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):
      Flat, 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.
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 MTCO2e\(^3\). Based on an assumed building life of 62.5 years,\(^4\) the proposed building addition would be estimated to generate approximately 664 MTCO2e 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 MTCO2e 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:
   - deciduous tree: X
   - evergreen tree: ___
   - shrubs X
   - grass X
   - 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. 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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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 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 vicinity.
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 Intermurals 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:

[Signature]

Name of Signee:

Julie Blakeslee

Position and Agency/Organization:

SEPA Responsible Official

Date:

July 12, 2022
REFERENCES


Tree Solutions, Inc. *Tree Inventory and Assessment*. May 6, 2022.


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

File No. 0183-144-00
June 1, 2022

Prepared for:
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Attention: Sydney Thiel and Bob Dillon

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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 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.
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**

<table>
<thead>
<tr>
<th>2018 IBC Parameter[^1]</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Class</td>
<td>E</td>
</tr>
<tr>
<td>Mapped MCE&lt;sub&gt;E&lt;/sub&gt; Spectral Response Acceleration at Short Period, $S_S$ (g)</td>
<td>1.311</td>
</tr>
<tr>
<td>Mapped MCE&lt;sub&gt;E&lt;/sub&gt; Spectral Response Acceleration at 1-second period, $S_1$ (g)</td>
<td>0.455</td>
</tr>
<tr>
<td>Short Period Site Coefficient, $F_a$</td>
<td>1.20[^2]</td>
</tr>
<tr>
<td>Long Period Site Coefficient, $F_v$</td>
<td>2.29[^3]</td>
</tr>
<tr>
<td>Design Spectral Acceleration at 0.2-second period, $S_{DS}$ (g)</td>
<td>1.049</td>
</tr>
<tr>
<td>$T_S$ (sec)</td>
<td>0.66</td>
</tr>
</tbody>
</table>

[^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**

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>5 feet</th>
<th>6 feet</th>
<th>7 feet</th>
<th>8 feet</th>
<th>9 feet</th>
<th>10 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 12</td>
<td>2 inches</td>
<td>3 inches</td>
<td>3 inches</td>
<td>3 inches</td>
<td>4 inches</td>
<td>4 inches</td>
</tr>
</tbody>
</table>

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.


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

<table>
<thead>
<tr>
<th>Diameter (inches)</th>
<th>Embedment Depth in Glacial Soils (feet)</th>
<th>Lowest Finish Floor Elevation (feet) and Location in Building</th>
<th>Static Conditions</th>
<th>During Earthquake</th>
<th>Post-Earthquake</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Compression (kips)</td>
<td>Uplift (kips)</td>
<td>Compression (kips)</td>
</tr>
<tr>
<td>18</td>
<td>15</td>
<td>51 ft, East Side</td>
<td>425</td>
<td>180</td>
<td>385</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>51 ft, West Side</td>
<td>315</td>
<td>115</td>
<td>310</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>37 ft, East Side</td>
<td>300</td>
<td>120</td>
<td>285</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>37 ft, West Side</td>
<td>210</td>
<td>75</td>
<td>205</td>
</tr>
<tr>
<td>24</td>
<td>15</td>
<td>51 ft, East Side</td>
<td>680</td>
<td>240</td>
<td>625</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>51 ft, West Side</td>
<td>515</td>
<td>155</td>
<td>505</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>37 ft, East Side</td>
<td>560</td>
<td>205</td>
<td>540</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>37 ft, West Side</td>
<td>410</td>
<td>130</td>
<td>405</td>
</tr>
</tbody>
</table>

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 (N₁₀₀₀)₆₀ 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
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

<table>
<thead>
<tr>
<th>Soil Unit</th>
<th>Approximate Depth to Bottom of Soil Unit (ft)</th>
<th>LPILE Soil Model</th>
<th>Effective Unit Weight (pcf)</th>
<th>Friction Angle (degrees)</th>
<th>LPILE Soil Modulus, k (pci)</th>
<th>P-Multiplier</th>
<th>Undrained Cohesion (psf)</th>
<th>E50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill/Alluvium</td>
<td>Varies</td>
<td>Sand (Reese)</td>
<td>120</td>
<td>32</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fill/Alluvium (below GWT)</td>
<td>Varies</td>
<td>Soft Clay (Matlock)</td>
<td>57.6 (below GWT)</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
<td>175</td>
<td>0.02</td>
</tr>
<tr>
<td>Pre-Fraser Deposits</td>
<td>100</td>
<td>Sand (Reese)</td>
<td>67.6 (below GWT)</td>
<td>40</td>
<td>225</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Shaft Spacing (in terms of shaft diameter)</th>
<th>P-Multipliers, P_m², ³</th>
<th>Row 1 (leading row)</th>
<th>Row 2 (1st trailing row)</th>
<th>Row 3 and higher (2nd trailing row)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D</td>
<td>0.8</td>
<td>0.4</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>5D</td>
<td>1.0</td>
<td>0.85</td>
<td>0.7</td>
<td></td>
</tr>
</tbody>
</table>

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 3/8-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.


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


Applied Technology Council, “Hazards by Location” accessed via: https://hazards.atcouncil.org/#/.

ASCE 7-16, 2016, “Minimum design loads for buildings and other structures.”

City of Seattle, 2022, Seattle Department of Construction & Inspections GIS website, accessed via: http://seattlecitygis.maps.arcgis.com/apps/webappviewer/index.html?id=f822b2c6498c4163b0cf908e2241e9c2.

City of Seattle, 2020, “Standard Specifications for Road, Bridge and Municipal Construction.”


Washington State Department of Transportation, 2022, “Standard Specifications for Road, Bridge and Municipal Construction.”
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

Figure 1
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: GID File from Bush, Roed and Hitchings, Inc. dated 04/04/2022.
Projection: Washington State Plane, North Zone, NAD83, US Feet

Legend

AB-1: Boring by Shannon and Wilson, 1964
B-1: Boring by Dames and Moore, 1966
AB-2: Boring by Terra Associates, 1987
Boring by AMEC, 2012 and 2014
Boring with Monitoring Well by GeoEngineers, Inc., 2022
Boring by Terra Associates, 1986
Boring by Shannon and Wilson, 2006

Walla Walla Rd NE
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: GDI File from Bush, Roed and Hitchings, Inc. dated 04/04/2022.
Projection: Washington State Plane, North Zone, NAD83, US Feet

Legend
- Estimated Glacial Bearing Soil Elevation Contours (Feet)
- Boring by GeoEngineers, Inc., 2022
- Boring with Monitoring Well by GeoEngineers, Inc., 2022
- Boring by AMEC, 2012 and 2014
- Boring by Shannon and Wilson, 2006
- Boring by Terra Associates, 1987
- Boring by Terra Associates, 1986
- Boring by Dames and Moore, 1966
- Boring by Shannon and Wilson, 1964

Figure 3
ICA Basketball Center
Seattle, WA
Glacial Bearing Soil Elevation Contour Map
Figure 4

Cantilever Soldier Pile

Legend

- **H** = Height of Excavation, Feet
- **D** = Vertical Embedment Depth, Feet
- ▼ Design Groundwater Elevation for Drained Walls/ Passive Resistance Design

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

GeoEngineers

Figure 4
Lateral Earth Pressure from Point Load, $Q_p$
(Spread Footing)

\[ X = m \cdot H \]

\[ Z = n \cdot H \]

Base of Excavation

For $m \leq 0.4$
\[ a_n = k \cdot 0.280 \frac{Q_p}{m^2 + n^2} \]

For $m > 0.4$
\[ a_n = k \cdot 1.770 \frac{Q_p}{m^2 + n^2} \]

\[ \sigma_H = \begin{cases} 0.280 & m \leq 0.4 \\ 1.770 & m > 0.4 \end{cases} \]

\[ Q_p \]

\[ P \]

\[ R \]

\[ H \]

\[ X \]

\[ Z \]

Section A-A'

Pressures from Point Load $Q_p$

<table>
<thead>
<tr>
<th>$m$</th>
<th>$R$</th>
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<tbody>
<tr>
<td>0.2</td>
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<tr>
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<td>0.78</td>
</tr>
<tr>
<td>0.6</td>
<td>0.45</td>
</tr>
</tbody>
</table>

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

\[ X = m \cdot H \]

\[ Z = n \cdot H \]

Base of Excavation

For $m \leq 0.4$
\[ \sigma_H = k \cdot 0.2n \cdot \frac{Q_L}{m^2 + n^2} \]

For $m > 0.4$
\[ \sigma_H = k \cdot 1.28n \frac{Q_L}{m^2 + n^2} \]

\[ \sigma_H = \begin{cases} 0.2n & m \leq 0.4 \\ 1.28n & m > 0.4 \end{cases} \]

\[ R \]

\[ H \]

\[ X \]

\[ Z \]

Definitions:
- $Q_p$: Point load in pounds
- $Q_L$: Line load in pounds/foot
- $H$: Excavation height below footing, feet
- $a_n$: Lateral earth pressure from surcharge, psi
- $q$: Surcharge pressure in psi
- $\sigma_H$: Lateral surcharge pressure from uniform surcharge
- $\theta$: Radians
- $\sigma_{n,H}$: Distribution of $a_n$ in plan view
- $P$: 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 $a_n$ to be evaluated below the bottom of $Q_p$ or $Q_L$
- $m$: Ratio of $X$ to $H$
- $n$: Ratio of $Z$ to $H$

Notes:
2. Lateral earth pressures from surcharge should be added to earth pressures presented on Figure 3.
3. Recommended Surcharge Pressure

<table>
<thead>
<tr>
<th>$a_n$ (psi)</th>
<th>0.38 - q (psi)</th>
</tr>
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UW ICA Basketball Center
Seattle, Washington
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.
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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.
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Figure 16

18-inch Augercast Pile
Shear vs Depth (Fixed Head)
LFF at 51 feet, West Side of Building
UW ICA Basketball Center
Seattle, Washington

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.
Figure 18

18-inch Augercast Pile
Deflection vs Depth (Free Head)
LFF at 37 feet, East Side of Building
UW ICA Basketball Center
Seattle, Washington

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.
<table>
<thead>
<tr>
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<tbody>
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<td>1. Lateral pile capacities were evaluated using LPILE v2019</td>
</tr>
<tr>
<td>2. Free- and fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.</td>
</tr>
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**18-inch Augercast Pile**  
Shear vs Depth (Free Head)  
LFF at 37 feet, East Side of Building  
UW ICA Basketball Center  
Seattle, Washington
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:
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18-inch Augercast Pile
Deflection vs Depth (Fixed Head)
LFF at 37 feet, East Side of Building
UW ICA Basketball Center
Seattle, Washington
Notes:
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2. Free- and fixed-head conditions were evaluated for a range of deflections. No axial load was applied to the pile.
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18-inch Augercast Pile
Shear vs Depth (Free Head)
LFF at 37 feet, West Side of Building
UW ICA Basketball Center
Seattle, Washington
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
Seattle, Washington

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.
Figure 28

18-inch Augercast Pile Shear vs Depth (Fixed Head) LFF at 37 feet, West Side of Building
UW ICA Basketball Center Seattle, Washington

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.
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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, East Side of Building

UW ICA Basketball Center  
Seattle, Washington
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.
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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.
Figure 47

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

UW ICA Basketball Center
Seattle, Washington

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:
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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.
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

Figure 54
Compaction Criteria for Trench Backfill

UW ICA Basketball Center
Seattle, Washington

Legend

95
Concrete or Asphalt Pavement

90
Base Course

90
Trench Backfill

95
Pipe Bedding

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

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

<table>
<thead>
<tr>
<th>MAJOR DIVISIONS</th>
<th>SYMBOLS</th>
<th>TYPICAL DESCRIPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GW</td>
<td>WELL-GRATED GRAVELS, GRAVEL - SAND MIXTURES</td>
</tr>
<tr>
<td></td>
<td>GP</td>
<td>POORLY-GRATED GRAVELS, GRAVEL - SAND MIXTURES</td>
</tr>
<tr>
<td></td>
<td>GM</td>
<td>SILTY GRAVELS, GRAVEL - SAND - Silt Mixtures</td>
</tr>
<tr>
<td></td>
<td>GC</td>
<td>CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES</td>
</tr>
<tr>
<td></td>
<td>SW</td>
<td>WELL-GRATED SANDS, GRAVELLY SANDS</td>
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<td></td>
<td>SP</td>
<td>POORLY-GRATED SANDS, GRAVELLY SAND</td>
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<td></td>
<td>SM</td>
<td>SILTY SANDS, SAND - Silt Mixtures</td>
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<td></td>
<td>SC</td>
<td>CLAYEY SANDS, SAND - CLAY MIXTURES</td>
</tr>
<tr>
<td></td>
<td>ML</td>
<td>INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY</td>
</tr>
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<td></td>
<td>CL</td>
<td>INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, Silt Clay, Lean Clay</td>
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<td>OL</td>
<td>ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY</td>
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<td>MH</td>
<td>INORGANIC CLAYS OF DIATOMACEOUS OR DETRITAL ORGANIC SILTS</td>
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<td>CH</td>
<td>INORGANIC CLAYS OF HIGH PLASTICITY</td>
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<td></td>
<td>OH</td>
<td>ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY</td>
</tr>
<tr>
<td></td>
<td>PT</td>
<td>PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS</td>
</tr>
</tbody>
</table>

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

### 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.

### Groundwater Contact
- Measured groundwater level in exploration, well, or piezometer

### Graphic Log Contact
- Distinct contact between soil strata
- Approximate contact between soil strata

### Material Description Contact
- Contact between geologic units

### 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 load 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

---

**Key to Exploration Logs**

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Rev 01/2022
**FIELD DATA**

<table>
<thead>
<tr>
<th>Elevation (feet)</th>
<th>Depth (feet)</th>
<th>Interval</th>
<th>Recovered (in)</th>
<th>Blows/foot</th>
<th>Collected Sample</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Water Level</th>
<th>Moisture Content (%)</th>
<th>Fines Content (%)</th>
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</table>

**WELL LOG**

- **Steel surface monument**
- **Concrete surface seal**
- **3/8-inch bentonite seal**
- **2-inch Schedule 40 PVC well casing**
- **Colorado silica sand backfill**
- **2-inch Schedule 40 PVC screen, 0.020-inch slot width**

### Notes:

- 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

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

---

**Graphic Log**

- **Start Drilled:** 2/10/2022
- **End:** 2/10/2022
- **Total Depth (ft):** 51.5
- **Logged By:** CRG
- **Driller:** Advance Drill Technologies, Inc.
- **Drilling Equipment:** Diedrich D-50
- **Drilling Method:** Hollow-stem Auger
- **Surface Elevation (ft):** 39
- **Top of Casing Elev. (ft):** 38.5
- **Easting (X):** 1278745
- **Northing (Y):** 241215
- **Groundwater Depth to Water (ft):** 3/22/2022
- **Elevation (ft):** 11.0
- **Water Level (ft):** 27.5

---

**Acronyms:***

- **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)
- **SM:** Brown to tan silty fine to coarse sand (medium dense, moist)
- **Occasional gravel**
- **SM:** Gray silty fine to medium sand with occasional gravel (very loose to loose, wet) (alluvium)
- **ML:** Gray sandy silt (medium stiff, wet)
- **ML:** Dark brown peat with silt and sand (organic content 25 percent)
- **ML:** Gray sandy silt with occasional gravel, wood debris; slight oxidation staining (stiff, moist)
- **ML:** Tan silt with sand and occasional gravel (hard, moist) (pre-Fraser deposits)
- **SM:** Gray silty fine to medium sand with occasional gravel (very dense, wet)
- **ML:** Gray silt with sand (hard, moist to wet)
Log of Boring with Monitoring Well GEI-1 (continued)

<table>
<thead>
<tr>
<th>Depth (feet)</th>
<th>Interval</th>
<th>Recovered (in)</th>
<th>Blows/foot</th>
<th>Collected Sample</th>
<th>Sample Name</th>
<th>Testing</th>
<th>Water Level</th>
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<th>Classification</th>
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<td>Gray-brown sandy silt (hard, moist)</td>
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<td>81</td>
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<td>Gray-brown sandy silt (hard, moist)</td>
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</tbody>
</table>

Moisture Content (%): 3/8-inch bentonite seal
Fines Content (%): 3/8-inch bentonite seal

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

GeoEngineers

Figure A-2
Sheet 2 of 2
No recovery with SPT-sampler; drove California modified to collect sample.

Driller noted harder drilling at approximately 14 feet.

Groundwater observed at approximately 22 feet during drilling.

Approximately 4 inches sod
Brown silty fine to medium sand, small roots (very loose to loose, moist) (fill)

Gray-brown silty fine to medium sand with occasional gravel (very loose, moist)

Gray silty fine to medium sand with occasional gravel (very loose, moist) (alluvium)

Brown silty fine to medium sand with gravel, woody debris (loose to medium dense)

Gray silty fine to medium sand with occasional gravel (medium dense, wet)

Tan silty fine to medium sand (dense, moist) (pre-Fraser deposits)

Gray-tan silty fine to medium sand with occasional gravel (very dense, moist)

Brown silty fine to medium sand (very dense, moist to wet)

No recovery with SPT-sampler; drove California modified to collect sample.

Driller noted harder drilling at approximately 14 feet.

Groundwater observed at approximately 22 feet during drilling.

Driller noted gravel at approximately 27 feet.

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.
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.
Figure B-1

Sieve Analysis Results

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Boring Number</th>
<th>Depth (feet)</th>
<th>Moisture (%)</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GEI-1</td>
<td>2.5</td>
<td>7</td>
<td>Poorly graded sand with silt and gravel (SP-SM)</td>
</tr>
<tr>
<td></td>
<td>GEI-2</td>
<td>2.5</td>
<td>17</td>
<td>Silty sand (SM)</td>
</tr>
</tbody>
</table>

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
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.
Soil Description

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

4.5 inches asphalt pavement over:

Loose to medium dense, moist, dark gray, silty SAND/ varying to sandy SILT with some gravel and with scattered brick fragments (Fill) SP-SM

Loose, moist, mottled dark brown, silty SAND with scattered to numerous organics; primarily wood (Fill) SM

Very dense, moist, gray, silty, fine to medium SAND with some gravel (Glacial Till) SP-SM

Cuttings become wet
Soil Description

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

- Silty SAND as above
- Hard, moist, light gray, silty CLAY with trace sand (QpnI) CL
- Slow, hard drilling
- Occasional stringers of fine SAND

Boring terminated at approximately 44 feet

---

Drilling Method: HSA
Hammer Type: Cathead
Date drilled: July 02, 2012
Logged By: WJL
Drilled by: BoreTec
PROJECT: UW Basketball Practice Facility

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

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

from cuttings: wet, gray, silty SAND

wood fragments within cuttings

becomes loose, wet, mottled gray/ reddish tan

Very dense, wet to saturated, gray becoming light brown, fine to medium SAND with some silt (Glacial Till) SP-SM

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

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

**Depth**

- **25 feet:** SAND with some silt as above
- **30 feet:** Very dense, moist, light gray, silty fine SAND/ fine sandy SILT (Advance outwash)
  SP-SM
- **35 feet:** Hard, moist, gray, silty CLAY (Qpnl) CL
  becomes with trace gravel
- **40 feet:** Boring terminated at approximately 41.5 feet

**Grain Size Analysis**

- **(% fines shown)**
  - No groundwater encountered
  - Blows over inches
  - Blows per foot
  - Other

**Penetration Resistance**

- **Standard**
  - Blows per foot

**Sample Numbers**

- **S-6**
- **S-7**
- **S-8**
- **S-9**

**Drilled by:** BoreTec

**Logged By:** W.J.L

**Date drilled:** July 02, 2012

**PROJECT:** UW Basketball Practice Facility

**JOB No.:** 2-917-17444-0

**BORING No.:** AB-2
Beauty bark over topsoil mantling:

Medium dense, damp to moist, tan, silty, fine to medium SAND with some gravel (Fill) SP-SM

Medium dense, moist, tan, silty, gravelly SAND (Alluvial deposits) SP-SM

becomes rust-mottled tan, silty SAND with trace to some gravel

Medium dense, wet to saturated, tan with some rust mottling, fine to medium SAND with trace to some silt (Advance Outwash) SP

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

Drilled by: BoreTec

11610 North Creek Parkway N
Bothell, Washington 98011
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
PROJECT: UW Basketball Operations Building

JOB No. 2-917-17444-0  BORING No. AB-6

Soil Description

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

Beauty bark over topsoil mantling:
Medium dense, damp to moist, tan, silty, fine to medium SAND with some gravel (Fill)
SP-SM

Stiff, moist, dark gray, sandy SILT with trace gravel, occasional organics and a 1-inch thick lense of organic silt (Alluvial deposits)
ML

becomes wet to saturated, low plasticity

Groundwater level at time of drilling
0 feet

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

Drilled by: BoreTec
Soil Description

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

- sandy SILT as above
  - Stiff, wet to saturated, rust-mottled tan, sandy SILT/silty SAND with 1-inch thick lense of organic-rich SILT (Alluvial deposits)
  - ML

- Very dense, saturated, tan, fine to medium SAND with some silt (Advance Outwash)
  - SP
  - becomes uniform SAND with some silt

- becomes fine to coarse SAND

Boring terminated at approximately 40.5 feet
SOL DESCRIPTION

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

Medium dense, gray to brown, slightly gravelly silty, fine SAND, trace clay; moist; scattered iron-oxide stains and brick fragments; (Hf) SM.

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.

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; (Hf/Ip) CL.

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; (Oxa) SM/ML.

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.
### BORING NO. 1

Logged By: GPM  
Date: Feb 16, 1987  
ELEV.: +22.8 ft

<table>
<thead>
<tr>
<th>Graph</th>
<th>US CS</th>
<th>Soil Description</th>
<th>Depth (ft.)</th>
<th>Sample</th>
<th>(N) Blows Ft.</th>
<th>W (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML</td>
<td></td>
<td>Gray SILT with sand, some gravel; brown peat @ 4 ft, wet, soft</td>
<td></td>
<td></td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray gravelly silty SAND, wet, loose</td>
<td>10</td>
<td></td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>SP-SM</td>
<td></td>
<td>Gray medium to coarse SAND with chunks of gray till, wet, loose</td>
<td>11</td>
<td></td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>ML/SM</td>
<td></td>
<td>Gray SILT with sand, some gravel</td>
<td>20</td>
<td></td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray silty gravelly SAND, wet; brown peat @ 24 ft</td>
<td>30</td>
<td>II</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray silty gravelly SAND with peat lenses, loose</td>
<td>30</td>
<td></td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40</td>
<td></td>
<td>II*</td>
<td>21</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray gravelly silty SAND with silt lenses, very dense</td>
<td>50</td>
<td></td>
<td>50/4&quot;</td>
<td>16</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray silty gravelly SAND with silt lenses, very dense</td>
<td>50</td>
<td></td>
<td>51/6&quot;</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Same</td>
<td>50</td>
<td></td>
<td>58/6&quot;</td>
<td>12</td>
</tr>
</tbody>
</table>

**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.

---

**TERRA ASSOCIATES**  
Geotechnical Consultants  

---

**BORING LOG**  
INDOOR TENNIS FACILITY  
UNIVERSITY OF WASHINGTON  

<table>
<thead>
<tr>
<th>Proj. No. 457</th>
<th>Date</th>
<th>Figure</th>
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<tr>
<td></td>
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<td>4</td>
</tr>
<tr>
<td>Graph</td>
<td>US CS</td>
<td>Soil Description</td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray gravelly silty SAND</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Same, with lenses of silt</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Same, with lenses of silt</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray gravelly silty SAND and gray very silty fine SAND</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray gravelly silty SAND with chunks of gray sandy clay</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray gravelly silty SAND with seam of brown peat</td>
</tr>
<tr>
<td>SM/Pt</td>
<td></td>
<td>Gray silty SAND, some gravel; thick seam of brown PEAT</td>
</tr>
<tr>
<td>SP</td>
<td></td>
<td>Gray brown slightly silty gravelly SAND</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Gray brown silty gravelly SAND</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Same</td>
</tr>
</tbody>
</table>

Boring completed at depth 48 feet

See General Notes on Figure 4
## BORING NO. 1

**Logged By:** DW  
**Date:** 2-28-86  
**ELEV.:** +26.6

<table>
<thead>
<tr>
<th>Graph</th>
<th>US CS</th>
<th>Soil Description</th>
<th>Depth (ft.)</th>
<th>Sample</th>
<th>(N) Blows Ft.</th>
<th>W (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SM</td>
<td>6&quot; Black Topsoil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reddish/brown to brown, gravelly,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>silty SAND to silty SAND with gravel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>with trace of organics, loose to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>medium dense, damp to wet. (fill)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-3-86</td>
<td></td>
<td>61</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tan, fine, sandy SILT, hard, moist.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>88/11&quot;</td>
<td></td>
<td></td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SM</td>
<td>Grey/tan, gravelly, silty SAND with</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>lenses of clean sand; grades to tan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>silty SAND, with gravel, very dense,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>wet.</td>
<td></td>
<td>52/6&quot;</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>54-4&quot;</td>
<td></td>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>50-5&quot;</td>
<td></td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>50/2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

**BORING LOG**

Bandshack Site  
University of Washington  
Seattle, Washington

**Proj. No.:** 277  
**Date:** March '86  
**Figure:** 4

---

**TA86-B-1**
<table>
<thead>
<tr>
<th>Graph</th>
<th>US CS</th>
<th>Soil Description</th>
<th>Depth (ft)</th>
<th>Sample</th>
<th>(N) Blows Ft</th>
<th>W (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1&quot; AC over CRB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Brown/black, silty SAND with gravel, some brick and organics, changes to grey,</td>
<td>5</td>
<td></td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fine, sandy SILT, loose, wet (Fill)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ML</td>
<td></td>
<td>Grey, clayey, sandy SILT, soft, wet.</td>
<td>10</td>
<td></td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td></td>
<td>2</td>
<td>5.8</td>
</tr>
<tr>
<td>PT</td>
<td></td>
<td>Brown peat, soft, wet.</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-3-86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ML</td>
<td></td>
<td>Grey, clayey, sandy SILT, soft, wet.</td>
<td>10</td>
<td></td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grey, silty SAND with gravel and clay, grades to slightly, silty, gravelly SAND</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and clean, fine to medium SAND, medium dense, becomes very dense, wet.</td>
<td>30</td>
<td></td>
<td>40</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35</td>
<td></td>
<td>83/10&quot;</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>78/11&quot;</td>
<td>14</td>
</tr>
</tbody>
</table>

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.
**BORING NO. 3**

Logged By: DW  
Date: 3-3-86  
ELEV.: 39.8

<table>
<thead>
<tr>
<th>Graph</th>
<th>USCS</th>
<th>Soil Description</th>
<th>Depth (ft.)</th>
<th>Sample</th>
<th>(N) Blows</th>
<th>W (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM</td>
<td>ML</td>
<td>Grey/tan, silty SAND with gravel to sandy SILT with gravel, loose to medium dense, damp to wet. (Fill)</td>
<td>5</td>
<td>I</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td>II</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td>I</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td>II</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>I</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>PT</td>
<td>OL</td>
<td>Brown, woody PEAT with wood chunks and organic SILT with clay, stiff, moist.</td>
<td>30</td>
<td>I</td>
<td>5</td>
<td>154</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35</td>
<td>I</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grey, silty, gravelly SAND with clean sand lenses and seams of sandy SILT, medium dense to dense, damp.</td>
<td>40</td>
<td>I</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>Grey, gravelly, sandy SILT, very dense, moist.</td>
<td>45</td>
<td>I</td>
<td>50/2&quot;</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown, clean SAND with gravel, very dense, wet.</td>
<td>50</td>
<td>I</td>
<td>50/3&quot;</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>ML</td>
<td>Blue/grey, sandy SILT with clay and some gravel, very dense, moist.</td>
<td>55</td>
<td>I</td>
<td>50/3&quot;</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60</td>
<td>I</td>
<td>50/3&quot;</td>
<td>13</td>
</tr>
</tbody>
</table>

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.

**BORING LOG**  
Bandshack Site  
University of Washington  
Seattle, Washington

- Proj. No. 277  
- Date: March '86  
- Figure: 6

**TERRA ASSOCIATES**  
Geotechnical Consultants

TA86-B-3
<table>
<thead>
<tr>
<th>Graph</th>
<th>US CS</th>
<th>Soil Description</th>
<th>Depth (ft.)</th>
<th>Sample</th>
<th>(N) Blows Ft.</th>
<th>W (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SM</td>
<td>1-1/2&quot; AC over 1&quot; CRM</td>
<td>5</td>
<td>I</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown to grey, silty, fine to medium SAND with some gravel to gravelly, silty SAND with trace of organics, loose, moist. (Fill)</td>
<td>10</td>
<td>I</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td>I</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>OL PT</td>
<td>Black, organic SILT and PEAT stiff, moist.</td>
<td>20</td>
<td>I</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>II</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>SP SM</td>
<td>Brown, clean, fine to medium SAND, grades to gravelly, silty SAND, very dense, moist. (Till like)</td>
<td>30</td>
<td>I</td>
<td>58/6&quot;</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35</td>
<td>I</td>
<td>50/4&quot;</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I</td>
<td>50/4&quot;</td>
<td>10</td>
</tr>
</tbody>
</table>

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

NOTES:
ELEVATIONS REFER TO CITY OF SEATTLE DATUM.

BORING 1
ELEVATION IN FEET
45
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z

BORING 2
ELEVATION IN FEET
45
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z

BORING 3
ELEVATION IN FEET
45
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z

BORING 4
ELEVATION IN FEET
45
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z

BORING 5
ELEVATION IN FEET
45
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z

BORING 6
ELEVATION IN FEET
45
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-45

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z

KEY:
COLUMN A: FIELD WORKEE DECILUWT WITH SHAPE AND SIZE SAME AS CORE IN 10" X 10" CORE.
COLUMN B: EQUIVALENT NUMBER OF BLOW WITH EQUIVALENT DENSITY (110 BLOWS = 100 BLOWS)
COLUMN C: MOISTURE CONTENT (100 BLOWS = 50 BLOWS)
COLUMN D: DENSITY
COLUMN E: INDICATED DEPTH AT WHICH UNDISTURBED SAMPLE WAS EXTRACTED

BUILD INVESTIGATION
SUPPORT FOR FLOOR SLAB
EUGENE COURT HOUSE
U. OF W. F. D. NO. 77865-L
JULY 7, 1966
DAVIS & MOORE

PLATE 2
BORING 2
Elev. 40±

0

Brown and tan medium-dense interbedded fine to sandy SILT, and clayey SILT gravel, some organic near surface.

9

Brown, dense to very dense silty, medium to fine SAND with some gravel.

11-2-64

22

Gray, very dense, silty, gravelly fine SAND (glacial till)

37

Gray, interbedded, very dense sandy SILT and silty gravelly fine SAND

565

LEGEND

I 2" split spoon sample
II 2" Shelby sample
P Sampler pushed
\(\approx\) ground water level
\(\approx\) Observation well

NOTE

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

UNIVERSITY OF WASHINGTON
PROJECT-X

SHORANN & WILSON
SOIL MECHANICS & FOUNDATION ENGINEERS

BORING 2

W-64-272

October, 1964
BORING 3
Elev. 32 ±

0
|
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
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.

<table>
<thead>
<tr>
<th>Construction Stage</th>
<th>Monitoring Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>During excavation and until wall movements have stabilized</td>
<td>Twice weekly</td>
</tr>
<tr>
<td>During excavation if lateral wall movements exceed 1 inch and until wall movements have stabilized</td>
<td>Three times per week</td>
</tr>
<tr>
<td>After excavation is complete and wall movements have stabilized, and before the floors of the building reach the top of the excavation</td>
<td>Twice monthly</td>
</tr>
</tbody>
</table>

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

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;

1 Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.
Composition of the design team; or
Project ownership.

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

**Subsurface Conditions Can Change**

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

**Most Geotechnical and Geologic Findings are Professional Opinions**

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

**Geotechnical Engineering Report Recommendations are Not Final**

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

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

**A Geotechnical Engineering or Geologic Report Could Be Subject to Misinterpretation**

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team’s plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.
Do not Redraw the Exploration Logs

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

Give Contractors a Complete Report and Guidance

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

Contractors Are Responsible for Site Safety on Their Own Construction Projects

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

Read These Provisions Closely

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

Geotechnical, Geologic and Environmental Reports Should Not Be Interchanged

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

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

GHG Emissions Worksheet
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 one 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

<table>
<thead>
<tr>
<th>Type (Residential) or Principal Activity (Commercial)</th>
<th># Units</th>
<th>Square Feet (in thousands of square feet)</th>
<th>Embodied</th>
<th>Energy</th>
<th>Transportation</th>
<th>Lifespan Emissions (MTCO2e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family Home.....................................</td>
<td>0</td>
<td>98</td>
<td>672</td>
<td>792</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multi-Family Unit in Large Building ...............</td>
<td>0</td>
<td>33</td>
<td>357</td>
<td>766</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multi-Family Unit in Small Building ..............</td>
<td>0</td>
<td>54</td>
<td>681</td>
<td>766</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mobile Home............................................</td>
<td>0</td>
<td>41</td>
<td>475</td>
<td>709</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Education..............................................</td>
<td>0.0</td>
<td>39</td>
<td>1,541</td>
<td>282</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Food Sales............................................</td>
<td>0.0</td>
<td>39</td>
<td>1,994</td>
<td>561</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Food Service..........................................</td>
<td>0.0</td>
<td>39</td>
<td>737</td>
<td>571</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Health Care Inpatient...............................</td>
<td>0.0</td>
<td>39</td>
<td>1,338</td>
<td>582</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Health Care Outpatient.............................</td>
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<td>39</td>
<td>737</td>
<td>571</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Lodging.................................................</td>
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<td>777</td>
<td>117</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Retail (Other Than Mall)............................</td>
<td>0.0</td>
<td>39</td>
<td>577</td>
<td>247</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Office..................................................</td>
<td>0.0</td>
<td>39</td>
<td>733</td>
<td>150</td>
<td>41489</td>
<td>0</td>
</tr>
<tr>
<td>Public Assembly .......................................</td>
<td>45.0</td>
<td>39</td>
<td>733</td>
<td>150</td>
<td>41489</td>
<td>0</td>
</tr>
<tr>
<td>Public Order and Safety.............................</td>
<td>0.0</td>
<td>39</td>
<td>899</td>
<td>374</td>
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<td>0</td>
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<tr>
<td>Religious Worship....................................</td>
<td>0.0</td>
<td>39</td>
<td>339</td>
<td>129</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Service.................................................</td>
<td>0.0</td>
<td>39</td>
<td>599</td>
<td>266</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Warehouse and Storage................................</td>
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<td>39</td>
<td>352</td>
<td>181</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other....................................................</td>
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<td>39</td>
<td>1,278</td>
<td>257</td>
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<td>0</td>
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<td>Vacant..................................................</td>
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<td>162</td>
<td>47</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

## Section II: Pavement

| Pavement.............................................. | 0.00    | 0.00          | 0.00     | 0.00   | 0.00          | 0.00              |

**Total Project Emissions:** 41489
### Definition of Building Types

<table>
<thead>
<tr>
<th>Type (Residential) or Principal Activity (Commercial)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family Home</td>
<td>Unless otherwise specified, this includes both attached and detached buildings</td>
</tr>
<tr>
<td>Multi-Family Unit in Large Building</td>
<td>Apartments in buildings with more than 5 units</td>
</tr>
<tr>
<td>Multi-Family Unit in Small Building</td>
<td>Apartments in building with 2-4 units</td>
</tr>
<tr>
<td>Mobile Home</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>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 &quot;Office,&quot; dormitories are &quot;Lodging,&quot; and libraries are &quot;Public Assembly.&quot;</td>
</tr>
<tr>
<td>Food Sales</td>
<td>Buildings used for retail or wholesale of food.</td>
</tr>
<tr>
<td>Food Service</td>
<td>Buildings used for preparation and sale of food and beverages for consumption.</td>
</tr>
<tr>
<td>Health Care Inpatient</td>
<td>Buildings used as diagnostic and treatment facilities for inpatient care.</td>
</tr>
<tr>
<td>Health Care Outpatient</td>
<td>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).</td>
</tr>
<tr>
<td>Lodging</td>
<td>Buildings used to offer multiple accommodations for short-term or long-term residents, including skilled nursing and other residential care buildings.</td>
</tr>
<tr>
<td>Retail (Other Than Mall)</td>
<td>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).</td>
</tr>
<tr>
<td>Office</td>
<td></td>
</tr>
<tr>
<td>Public Assembly</td>
<td>Buildings in which people gather for social or recreational activities, whether in private or non-private meeting halls.</td>
</tr>
<tr>
<td>Public Order and Safety</td>
<td>Buildings used for the preservation of law and order or public safety.</td>
</tr>
<tr>
<td>Religious Worship</td>
<td>Buildings in which people gather for religious activities, (such as chapels, churches, mosques, synagogues, and temples).</td>
</tr>
<tr>
<td>Service</td>
<td>Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).</td>
</tr>
<tr>
<td>Warehouse and Storage</td>
<td>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.</td>
</tr>
<tr>
<td>Other</td>
<td>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.</td>
</tr>
<tr>
<td>Vacant</td>
<td></td>
</tr>
</tbody>
</table>

**Sources:**

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

**Commercial**
- Commercial Buildings Energy Consumption Survey (CBECs), Description of CBECs Building Types
## Embodied Emissions Worksheet

### Section I: Buildings

<table>
<thead>
<tr>
<th>Type (Residential) or Principal Activity</th>
<th># thousand sq feet/unit or building</th>
<th>Life span related embodied GHG missions (MTCO2e) per unit</th>
<th>Life span related embodied GHG missions (MTCO2e) per thousand square feet - See calculations in table below</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family Home</td>
<td>2.53</td>
<td>98</td>
<td>39</td>
</tr>
<tr>
<td>Multi-Family Unit in Large Building</td>
<td>0.85</td>
<td>33</td>
<td>39</td>
</tr>
<tr>
<td>Multi-Family Unit in Small Building</td>
<td>1.39</td>
<td>54</td>
<td>39</td>
</tr>
<tr>
<td>Mobile Home</td>
<td>1.06</td>
<td>41</td>
<td>39</td>
</tr>
<tr>
<td>Education</td>
<td>2.71</td>
<td>99</td>
<td>39</td>
</tr>
<tr>
<td>Food Service</td>
<td>5.6</td>
<td>217</td>
<td>39</td>
</tr>
<tr>
<td>Health Care Inpatient</td>
<td>241.4</td>
<td>9,346</td>
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<td>Health Care Outpatient</td>
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<td>403</td>
<td>39</td>
</tr>
<tr>
<td>Lodging</td>
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<td>73</td>
<td>39</td>
</tr>
<tr>
<td>Hotel (Other Than Motel)</td>
<td>9.7</td>
<td>379</td>
<td>39</td>
</tr>
<tr>
<td>Office</td>
<td>14.8</td>
<td>573</td>
<td>39</td>
</tr>
<tr>
<td>Public Assembly</td>
<td>36.9</td>
<td>554</td>
<td>39</td>
</tr>
<tr>
<td>Public Order and Safety</td>
<td>10.4</td>
<td>403</td>
<td>39</td>
</tr>
<tr>
<td>Religious Worship</td>
<td>15.5</td>
<td>600</td>
<td>39</td>
</tr>
<tr>
<td>Service</td>
<td>21.9</td>
<td>845</td>
<td>39</td>
</tr>
<tr>
<td>Warehouse and Storage</td>
<td>16.5</td>
<td>554</td>
<td>39</td>
</tr>
<tr>
<td>Vacant</td>
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<td>545</td>
<td>39</td>
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### Section II: Pavement

<table>
<thead>
<tr>
<th>All Types of Pavement</th>
<th>Intermediate Floors</th>
<th>Exterior Walls</th>
<th>Windows</th>
<th>Total Embodied Emissions (MTCO2e)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Columns and Beams</td>
<td></td>
<td></td>
<td>Total Embodied Emissions (MTCO2e)</td>
</tr>
<tr>
<td></td>
<td>9.2</td>
<td>7.8</td>
<td>19.1</td>
<td>21.3</td>
</tr>
<tr>
<td>Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building</td>
<td>2269.0</td>
<td>3206.0</td>
<td>285.0</td>
<td>6000.0</td>
</tr>
<tr>
<td>Average Materials in a 2,272-square foot single family home</td>
<td>0.0</td>
<td>8.0</td>
<td>27.3</td>
<td>6.6</td>
</tr>
</tbody>
</table>

### Sources

- King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov
- 2001 Residential Energy Consumption Survey (National Average, 2001)
- Square footage measurements and comparisons
  [http://www.eia.doe.gov/emeu/recs/sqft-measure.html](http://www.eia.doe.gov/emeu/recs/sqft-measure.html)
- Athena EcoCalculator
  Assembly Average GWP (kg) per square meter
- Average window size
  Energy Information Administration
  Appendix B, Quality of the Data. Pg. 5.
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 include 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:


## Energy Emissions Worksheet

<table>
<thead>
<tr>
<th>Type (Residential) or Principal Activity (Commercial)</th>
<th>Energy consumption per building per year (million Btu)</th>
<th>Carbon Coefficient for Buildings</th>
<th>MTCO2e per building per year</th>
<th>Floorspace per building (thousand square feet)</th>
<th>MTCE per thousand square feet per year</th>
<th>MTCO2e per thousand square feet per year</th>
<th>Average Building Life Span</th>
<th>Lifespan Energy Related MTCO2e emissions per thousand square feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family Home</td>
<td>1,079.0</td>
<td>0.106</td>
<td>8.14</td>
<td>2.53</td>
<td>4.6</td>
<td>16.8</td>
<td>57.9</td>
<td>672</td>
</tr>
<tr>
<td>Multi-Family Unit in Large Building</td>
<td>41.0</td>
<td>0.106</td>
<td>4.44</td>
<td>0.85</td>
<td>5.2</td>
<td>19.2</td>
<td>60.5</td>
<td>357</td>
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<tr>
<td>Multi-Family Unit in Small Building</td>
<td>78.1</td>
<td>0.106</td>
<td>8.45</td>
<td>1.39</td>
<td>6.1</td>
<td>22.2</td>
<td>80.5</td>
<td>681</td>
</tr>
<tr>
<td>Mobile Home</td>
<td>75.9</td>
<td>0.106</td>
<td>8.21</td>
<td>1.06</td>
<td>7.7</td>
<td>28.4</td>
<td>57.9</td>
<td>475</td>
</tr>
<tr>
<td>Education</td>
<td>2,125.0</td>
<td>0.124</td>
<td>264.2</td>
<td>25.6</td>
<td>10.3</td>
<td>37.8</td>
<td>62.5</td>
<td>16,526</td>
</tr>
<tr>
<td>Food Sales</td>
<td>1,110.0</td>
<td>0.124</td>
<td>138.0</td>
<td>5.6</td>
<td>24.6</td>
<td>90.4</td>
<td>62.5</td>
<td>8,632</td>
</tr>
<tr>
<td>Food Service</td>
<td>1,439.0</td>
<td>0.124</td>
<td>178.3</td>
<td>5.6</td>
<td>31.9</td>
<td>116.9</td>
<td>62.5</td>
<td>11,768</td>
</tr>
<tr>
<td>Health Care Inpatient</td>
<td>60,152.0</td>
<td>0.124</td>
<td>7,479.1</td>
<td>241.4</td>
<td>31.0</td>
<td>113.6</td>
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<td>467,794</td>
</tr>
<tr>
<td>Health Care Outpatient</td>
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<td>122.5</td>
<td>10.4</td>
<td>11.8</td>
<td>43.2</td>
<td>62.5</td>
<td>7,660</td>
</tr>
<tr>
<td>Lodging</td>
<td>3,576.0</td>
<td>0.124</td>
<td>444.9</td>
<td>35.6</td>
<td>12.4</td>
<td>45.6</td>
<td>62.5</td>
<td>27,826</td>
</tr>
<tr>
<td>Retail (Other Than Mall)</td>
<td>729.0</td>
<td>0.124</td>
<td>89.5</td>
<td>9.7</td>
<td>9.2</td>
<td>33.8</td>
<td>62.5</td>
<td>5,589</td>
</tr>
<tr>
<td>Office</td>
<td>1,376.0</td>
<td>0.124</td>
<td>171.1</td>
<td>14.5</td>
<td>11.6</td>
<td>42.4</td>
<td>62.5</td>
<td>10,701</td>
</tr>
<tr>
<td>Public Assembly</td>
<td>1,336.0</td>
<td>0.124</td>
<td>166.4</td>
<td>14.2</td>
<td>11.7</td>
<td>43.0</td>
<td>62.5</td>
<td>10,405</td>
</tr>
<tr>
<td>Public Order and Safety</td>
<td>1,791.0</td>
<td>0.124</td>
<td>222.7</td>
<td>15.5</td>
<td>14.4</td>
<td>52.7</td>
<td>62.5</td>
<td>13,928</td>
</tr>
<tr>
<td>Religious Worship</td>
<td>440.0</td>
<td>0.124</td>
<td>54.7</td>
<td>10.1</td>
<td>5.4</td>
<td>19.9</td>
<td>62.5</td>
<td>3,422</td>
</tr>
<tr>
<td>Service</td>
<td>501.0</td>
<td>0.124</td>
<td>62.3</td>
<td>6.5</td>
<td>9.6</td>
<td>35.1</td>
<td>62.5</td>
<td>3,896</td>
</tr>
<tr>
<td>Warehouse and Storage</td>
<td>766.0</td>
<td>0.124</td>
<td>95.0</td>
<td>16.9</td>
<td>5.6</td>
<td>20.6</td>
<td>62.5</td>
<td>5,942</td>
</tr>
<tr>
<td>Other</td>
<td>3,500.0</td>
<td>0.124</td>
<td>447.8</td>
<td>21.9</td>
<td>20.4</td>
<td>74.9</td>
<td>62.5</td>
<td>27,907</td>
</tr>
<tr>
<td>Vacant</td>
<td>294.0</td>
<td>0.124</td>
<td>36.6</td>
<td>14.1</td>
<td>2.6</td>
<td>9.5</td>
<td>62.5</td>
<td>2,286</td>
</tr>
</tbody>
</table>

### 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://buildings databook.eren.doe.gov/

Data also at: http://www.eia.doe.gov/emeu/recs/recs2001_ce/ce1-4c_housingunits2001.html

**Energy consumption for commercial buildings**


Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003


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 (MMTCO2e per Quadrillion Btu)

http://buildings databook.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 life span of buildings, estimated by replacement time method

<table>
<thead>
<tr>
<th></th>
<th>Single Family Homes</th>
<th>Multi-Family Units in Large and Small Buildings</th>
<th>All Residential Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Housing Construction, 2001</td>
<td>1,273,000</td>
<td>329,000</td>
<td>1,602,000</td>
</tr>
<tr>
<td>Existing Housing Stock, 2001</td>
<td>73,700,000</td>
<td>26,500,000</td>
<td>100,200,000</td>
</tr>
<tr>
<td>Replacement time:</td>
<td>57.0</td>
<td>80.5</td>
<td>62.5      (national average, 2001)</td>
</tr>
</tbody>
</table>

Note: Single family homes calculation is used for mobile homes as a best estimate life span.

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
## Transportation Emissions Worksheet

<table>
<thead>
<tr>
<th>Type (Residential) or Principal Activity (Commercial)</th>
<th># people/unit or building</th>
<th># thousand sq feet/unit or building</th>
<th># people or employees/thousand square feet</th>
<th>vehicle related GHG emissions (metric tonnes CO₂e per person per year)</th>
<th>MTCO₂e/year/unit</th>
<th>MTCO₂e/year/thousand square feet</th>
<th>Average Building Life Span</th>
<th>Life span transportation related GHG emissions (MTCO₂e per unit)</th>
<th>Life span transportation related GHG emissions (MTCO₂e/thousand sq feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family Home .......................................</td>
<td>2.8</td>
<td>2.03</td>
<td>1.1</td>
<td>4.9</td>
<td>13.7</td>
<td>5.4</td>
<td>57.9</td>
<td>792</td>
<td>313</td>
</tr>
<tr>
<td>Multi-Family Unit in Large Building ..........</td>
<td>1.9</td>
<td>0.85</td>
<td>2.3</td>
<td>4.9</td>
<td>9.5</td>
<td>11.2</td>
<td>80.5</td>
<td>766</td>
<td>904</td>
</tr>
<tr>
<td>Multi-Family Unit in Small Building ..........</td>
<td>1.9</td>
<td>1.39</td>
<td>1.4</td>
<td>4.9</td>
<td>9.5</td>
<td>6.8</td>
<td>80.5</td>
<td>766</td>
<td>550</td>
</tr>
<tr>
<td>Mobile Home ..............................................</td>
<td>2.5</td>
<td>1.06</td>
<td>2.3</td>
<td>4.9</td>
<td>12.2</td>
<td>11.5</td>
<td>57.9</td>
<td>709</td>
<td>668</td>
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<td>Education ..................................................</td>
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<td>147.8</td>
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<td>0.9</td>
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<td>25.2</td>
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<td>1.8</td>
<td>4.9</td>
<td>50.2</td>
<td>9.0</td>
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<td>3141</td>
<td>561</td>
</tr>
<tr>
<td>Health Care Inpatient ..................................</td>
<td>455.5</td>
<td>241.4</td>
<td>1.3</td>
<td>4.9</td>
<td>2246.4</td>
<td>9.3</td>
<td>62.5</td>
<td>140506</td>
<td>582</td>
</tr>
<tr>
<td>Health Care Outpatient ................................</td>
<td>19.3</td>
<td>10.4</td>
<td>1.9</td>
<td>4.9</td>
<td>95.0</td>
<td>9.1</td>
<td>62.5</td>
<td>5841</td>
<td>571</td>
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<tr>
<td>Lodging ....................................................</td>
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<td>0.4</td>
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<td>1.9</td>
<td>62.5</td>
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</tr>
<tr>
<td>Retail (Other Than Mall) ...............................</td>
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<td>9.7</td>
<td>0.8</td>
<td>4.9</td>
<td>38.3</td>
<td>3.9</td>
<td>62.5</td>
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### Sources

All data in black text

- King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov
- Washington State Office of Financial Management
  Kimpel, T. and Lowe, T. Research Brief No. 47. August 2007
  - 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
- 2001 Residential Energy Consumption Survey (National Average, 2001)
  Square footage measurements and comparisons
  [http://www.eia.doe.gov/emeu/recs/sqft-measure.html](http://www.eia.doe.gov/emeu/recs/sqft-measure.html)
- 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
  - 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).
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.
Note: This is a conservative estimate of emissions by fuel consumption because diesel fuel, with a emissions factor of 26.55 lbs CO2e/gallon was not estimated.

2205

4.93 lbs/metric tonne

vehicle related GHG emissions (metric tonnes CO2e per person per year)

average life span of buildings, estimated by replacement time method

See Energy Emissions Worksheet for Calculations

Commercial floorspace per unit

Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mail Buildings, 2003
Appendix C

Arborist Report
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.

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


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](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**

**Date of Inventory:** 06.16.2022

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<td>-</td>
<td>Retain</td>
<td>trunk abuts sidewalk, subdominant stem with stable union</td>
<td></td>
</tr>
<tr>
<td>504</td>
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<td>-</td>
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<td>Good</td>
<td>Good</td>
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<td>17.7</td>
<td>19.7</td>
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<td>-</td>
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<td>new sidewalk at base</td>
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<tr>
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<td>Fair</td>
<td>Fair</td>
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<td>partially enveloped ID tag ends in 3</td>
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<td>Good</td>
<td>22.4</td>
<td>15.4</td>
<td>17.4</td>
<td>16.4</td>
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<td>-</td>
<td>Remove</td>
<td>limited soil volume, large pruning wounds</td>
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<td>Poor</td>
<td>Fair</td>
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<td>30.0</td>
<td>-</td>
<td>Remove</td>
<td>large pruning wounds, stressed, limited volume</td>
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<td>Remove</td>
<td>very limited soil volume, lifting curb</td>
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<td>Remove</td>
<td>crown raised</td>
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<td>6.8</td>
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<td>-</td>
<td>Remove</td>
<td>large wound on trunk at 2 to 3 feet</td>
<td></td>
</tr>
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<td>Poor</td>
<td>Fair</td>
<td>7.2</td>
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<td>-</td>
<td>Remove</td>
<td>low vigor, crown dieback</td>
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<td>Fair</td>
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<td>Remove</td>
<td>minor dieback, pruning wounds from crown raising</td>
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<td>Styrax japonicus</td>
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<td>Good</td>
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<td>7.3</td>
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<td>-</td>
<td>Retain</td>
<td>-</td>
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<td>Japanese</td>
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<td>Good</td>
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<td>7.3</td>
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<td>Retain</td>
<td>minor dieback</td>
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<td>Good</td>
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<td>10.2</td>
<td>10.2</td>
<td>10.2</td>
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<td>-</td>
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<td>-</td>
<td>Retain</td>
<td>hypericum and blackberry at base</td>
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<tr>
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<td>Good</td>
<td>10.9</td>
<td>14.4</td>
<td>7.4</td>
<td>12.4</td>
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<td>-</td>
<td>Retain</td>
<td>limited soil volume, abuts existing ramp</td>
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<td>5,6,3,9,2</td>
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<td>16.0</td>
<td>-</td>
<td>Retain</td>
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<td>Good</td>
<td>Good</td>
<td>12.9</td>
<td>15.4</td>
<td>15.4</td>
<td>12.4</td>
<td>16.0</td>
<td>-</td>
<td>Retain</td>
<td>ivy at base, contiguous canopy with adjacent hornbeams</td>
<td></td>
</tr>
</tbody>
</table>

**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.

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**Tree Solutions, Inc.**

2940 Westlake Ave. N #200  Seattle, WA 98109

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www.treesolutions.net
206-528-4670
# Table of Trees

**Tree Solutions, Inc.**

**UW ICA Basketball Facility, Seattle, WA**

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

<table>
<thead>
<tr>
<th>Tree ID</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>DSH (inches)</th>
<th>DSH Multistem</th>
<th>Health Condition</th>
<th>Structural Condition</th>
<th>N</th>
<th>E</th>
<th>S</th>
<th>W</th>
<th>Exceptional Threshold</th>
<th>Exceptional by Size</th>
<th>Proposed Action</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>568</td>
<td>Carpinus betulus</td>
<td>European hornbeam</td>
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<td>12.4</td>
<td>12.4</td>
<td>11.4</td>
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<td>-</td>
<td>Retain</td>
<td>ivy, hypericum, blackberry at base</td>
</tr>
<tr>
<td>575</td>
<td>Acer circinatum</td>
<td>Vine maple</td>
<td>5.3</td>
<td>3.6,3.9</td>
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<td>Good</td>
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<td>6.2</td>
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<td>Remove</td>
<td>trunk 2.5 feet from building to west</td>
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<td>Good</td>
<td>17.3</td>
<td>14.3</td>
<td>10.3</td>
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<td>8.0</td>
<td>-</td>
<td>Remove</td>
<td>trunk 5 feet from building</td>
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<tr>
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<td>Good</td>
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<td>11.3</td>
<td>9.3</td>
<td>8.0</td>
<td>-</td>
<td>Remove</td>
<td>trunk 3 feet from building</td>
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<tr>
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<td>13.4</td>
<td>12.4</td>
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<td>Good</td>
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<td>15.6</td>
<td>17.6</td>
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<td>Remove</td>
<td>trunk 2 feet from concrete to east and north</td>
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<td>25.9</td>
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<td>Remove</td>
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<td>20.2</td>
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<td>28.8</td>
<td>29.8</td>
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<td>Remove</td>
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<td>22.5</td>
<td>20.5</td>
<td>30.0</td>
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<td>-</td>
<td>Remove</td>
<td>pruning wounds from past crown raising</td>
</tr>
<tr>
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<td>17.7</td>
<td>Good</td>
<td>Good</td>
<td>18.7</td>
<td>17.7</td>
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<td>-</td>
<td>Remove</td>
<td>girdling roots, trunk seven feet from building on north and east side</td>
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<td>26.5</td>
<td>Good</td>
<td>Good</td>
<td>24.5</td>
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<td>30.0</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<td>17.5</td>
<td>Good</td>
<td>Good</td>
<td>18.5</td>
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<td>Good</td>
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<td>18.7</td>
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<td>-</td>
<td>Remove</td>
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<td>Good</td>
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<td>Remove</td>
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<td>26.7</td>
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<td>-</td>
<td>Remove</td>
<td>codominant stems with narrow union, trunk 7 feet from building, trunk lean to east</td>
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<td>Good</td>
<td>Good</td>
<td>15.8</td>
<td>15.8</td>
<td>18.8</td>
<td>30.0</td>
<td>-</td>
<td>-</td>
<td>Remove</td>
<td>branches abut building, structural roots abut foundation, trunk 7.5 feet from building</td>
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<td>16.6</td>
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<td>-</td>
<td>Remove</td>
<td>-</td>
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<td>15.1</td>
<td>14.6</td>
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<td>-</td>
<td>Remove</td>
<td>trunk 13 feet from building corner</td>
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<td>Good</td>
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<td>22.8</td>
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<td>Good</td>
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<td>19.0</td>
<td>15.0</td>
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<td>Retain</td>
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<td>640</td>
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<td>Poor</td>
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<td>22.1</td>
<td>18.6</td>
<td>30.0</td>
<td>-</td>
<td>-</td>
<td>Retain</td>
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<tr>
<td>642</td>
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<td>Good</td>
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<td>6.8</td>
<td>12.8</td>
<td>12.0</td>
<td>-</td>
<td>-</td>
<td>Retain</td>
<td>mildly stressed, limited soil volume</td>
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<td>Tree ID</td>
<td>Scientific Name</td>
<td>Common Name</td>
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<td>DSH Multistem</td>
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<td>Structural Condition</td>
<td>N</td>
<td>E</td>
<td>S</td>
<td>W</td>
<td>Exceptional Threshold</td>
<td>Exceptional by Size</td>
<td>Proposed Action</td>
<td>Notes</td>
</tr>
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<td>----------------------</td>
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<td>Good</td>
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<td></td>
<td>Retain</td>
<td>trunk buried in mulch, wire beaver guard at base</td>
</tr>
<tr>
<td>9234</td>
<td>Quercus rubra</td>
<td>Red oak</td>
<td>8.3</td>
<td>Fair</td>
<td>Good</td>
<td>20.3</td>
<td>18.3</td>
<td>16.3</td>
<td>15.3</td>
<td>30.0</td>
<td>-</td>
<td>Remove</td>
<td>limited soil volume</td>
<td></td>
</tr>
<tr>
<td>9262</td>
<td>Quercus rubra</td>
<td>Red oak</td>
<td>8.0</td>
<td>Good</td>
<td>Good</td>
<td>12.3</td>
<td>11.3</td>
<td>12.3</td>
<td>14.3</td>
<td>30.0</td>
<td>-</td>
<td>Remove</td>
<td>good vigor, limited soil volume</td>
<td></td>
</tr>
<tr>
<td>9263</td>
<td>Quercus rubra</td>
<td>Red oak</td>
<td>7.7</td>
<td>Fair</td>
<td>Good</td>
<td>12.3</td>
<td>10.3</td>
<td>11.3</td>
<td>11.3</td>
<td>30.0</td>
<td>-</td>
<td>Remove</td>
<td>limited soil volume</td>
<td></td>
</tr>
<tr>
<td>9265</td>
<td>Quercus rubra</td>
<td>Red oak</td>
<td>10.4</td>
<td>Good</td>
<td>Good</td>
<td>15.9</td>
<td>15.9</td>
<td>15.9</td>
<td>15.9</td>
<td>30.0</td>
<td>-</td>
<td>Remove</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>9266</td>
<td>Quercus rubra</td>
<td>Red oak</td>
<td>10.6</td>
<td>Good</td>
<td>Good</td>
<td>15.4</td>
<td>11.4</td>
<td>15.9</td>
<td>15.4</td>
<td>30.0</td>
<td>-</td>
<td>Remove</td>
<td>very limited soil volume, signs of recent concrete work in dripline</td>
<td></td>
</tr>
<tr>
<td>9415</td>
<td>Pinus sylvestris</td>
<td>Scots pine</td>
<td>6.3</td>
<td>Good</td>
<td>Good</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>24.0</td>
<td>-</td>
<td>Retain</td>
<td>tagged as 108 in field</td>
<td></td>
</tr>
<tr>
<td>9418</td>
<td>Pinus jeffreyi</td>
<td>Jeffrey pine</td>
<td>7.0</td>
<td>Good</td>
<td>Good</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>8.3</td>
<td>30.0</td>
<td>-</td>
<td>Retain</td>
<td>tagged as 107 in field, hypericum at base</td>
<td></td>
</tr>
<tr>
<td>9873</td>
<td>Pinus densiflora</td>
<td>Japanese red</td>
<td>11.3</td>
<td>Good</td>
<td>Good</td>
<td>14.5</td>
<td>14.5</td>
<td>14.5</td>
<td>14.5</td>
<td>20.0</td>
<td>-</td>
<td>Retain</td>
<td>girdling roots at base</td>
<td></td>
</tr>
<tr>
<td>650A/1322</td>
<td>Cercis canadensis</td>
<td>Redbud</td>
<td>7.5</td>
<td>Good</td>
<td>Good</td>
<td>10.8</td>
<td>12.3</td>
<td>12.8</td>
<td>13.3</td>
<td>9.5</td>
<td>-</td>
<td>Retain</td>
<td>limited soil volume</td>
<td></td>
</tr>
<tr>
<td>650B</td>
<td>Cercis canadensis</td>
<td>Redbud</td>
<td>9.0</td>
<td>Good</td>
<td>Good</td>
<td>10.9</td>
<td>10.4</td>
<td>10.4</td>
<td>9.5</td>
<td>-</td>
<td>-</td>
<td>Retain</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
Appendix D

Nesting Bird Survey Letter
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).

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=f82b2c6498e4163bof908e241e9c2](https://seattlecitygis.maps.arcgis.com/apps/webappviewer/index.html?id=f82b2c6498e4163bof908e241e9c2), 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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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
Regulated Building Materials Assessment Report

UWMC Pavilion Pool (206829)
University of Washington Campus
Seattle, Washington
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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
Certificate IRO-21-6916B (exp. 9/10/2022)

Mr. Aaron Heath
AHERA-Accredited Building Inspector
Certificate 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

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

<table>
<thead>
<tr>
<th>HSA ID, Material Description, and AHERA Classification</th>
<th>Material Location</th>
<th>HSA Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Off-white compressed fibrous material with black brittle coating (M)</td>
<td>Mounted chalkboard on Ground Floor</td>
<td>29% chrysotile</td>
</tr>
<tr>
<td>2: Off-white concrete, gray foam, beige mastic, and gray soft material (M)</td>
<td>Residual floor mastic in G-04 area</td>
<td>Off-white concrete: ND Gray foam: ND Beige mastic: ND Gray soft material ND</td>
</tr>
<tr>
<td>3: 6” black rubber cove base, brown brittle mastic, yellow mastic, white compacted powdery material with paint, and trace white compacted material (M)</td>
<td>At base of walls in G13 corridor and corridor adjacent to G12</td>
<td>Cove base: ND Brown mastic: ND Yellow mastic: ND White compacted powdery material with paint: ND to 2% chrysotile White compacted material: ND</td>
</tr>
<tr>
<td>4: 4” white cove base, yellow mastic and trace joint compound with paint (M)</td>
<td>Base of wall in G-15</td>
<td>Cove base: ND Mastic: ND Joint compound: ND</td>
</tr>
<tr>
<td>5: Tan mastic and white crumbly material with paint (M)</td>
<td>Residual mastic in Room G14</td>
<td>Mastic: 3% chrysotile Crumbly material with paint: ND</td>
</tr>
<tr>
<td>6: Various sized dark brown vinyl floor tile and black asphaltic mastic (M)</td>
<td>Accent/perimeter floor tile in Rooms 003, 004, 005, 006, and 008</td>
<td>Tile: 3% to 4% chrysotile Mastic: ND</td>
</tr>
<tr>
<td>7: 9”x9” red vinyl floor tile and black asphaltic mastic (M)</td>
<td>Flooring in Room 003</td>
<td>Floor tile: 4% to 5% chrysotile Mastic: 3% chrysotile</td>
</tr>
<tr>
<td>8: 9”x9” red vinyl floor tile with white streaks and black asphaltic mastic (M)</td>
<td>Flooring in Room 003</td>
<td>Floor tile: 4% chrysotile Mastic: 3% to 4% chrysotile</td>
</tr>
<tr>
<td>9: 12”x12” blue vinyl floor tile and black asphaltic mastic (M)</td>
<td>Flooring in Rooms 005 and 006</td>
<td>Floor tile: ND Mastic: ND</td>
</tr>
<tr>
<td>10: Black residual mastic with paint (M)</td>
<td>On walls in Room 002</td>
<td>ND</td>
</tr>
<tr>
<td>11: Yellow carpet mastic (M)</td>
<td>Associated with carpeting in Room 002</td>
<td>ND</td>
</tr>
<tr>
<td>12: 4” brown rubber cove base and white mastic (M)</td>
<td>At base of walls in Room 002</td>
<td>Cove base: ND Mastic: ND</td>
</tr>
<tr>
<td>13: Black brittle material (M)</td>
<td>Associated with restroom privacy panels in G-08</td>
<td>ND</td>
</tr>
<tr>
<td>14: Brown flaky fibrous electrical panel backing (M)</td>
<td>Mounted electrical gauge panel at Basement Level</td>
<td>48% chrysotile</td>
</tr>
</tbody>
</table>
Table 2.4-1. Results of Bulk Sample Analyses

<table>
<thead>
<tr>
<th>HSA ID, Material Description, and AHERA Classification</th>
<th>Material Location</th>
<th>HSA Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>15: White crumbly material, off-white brittle material, brown/red crumbly material, gray cementitious material with yellow fibrous material, and gray cementitious material (M)</td>
<td>General floor debris in areas of Basement Level</td>
<td>ND (all layers)</td>
</tr>
<tr>
<td>16: Gray sandy material (M)</td>
<td>Debris in lower wall access at Basement Level</td>
<td>ND</td>
</tr>
</tbody>
</table>
| 17: Black asphalitic waterproofing and gray concrete (M) | Associated with pool walls in tunnel area at Basement Level | Asphalitic 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

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

< 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

<table>
<thead>
<tr>
<th>Other Regulated Building Materials Description</th>
<th>Approximate Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury-containing fluorescent light tubes (4’ length)</td>
<td>140 EA</td>
</tr>
<tr>
<td>Mercury-containing fluorescent light tubes (3’ length)</td>
<td>1 EA</td>
</tr>
<tr>
<td>Compact fluorescent bulbs</td>
<td>26 EA</td>
</tr>
<tr>
<td>PCB-containing ballasts (magnetic)</td>
<td>70 EA</td>
</tr>
<tr>
<td>HID lights</td>
<td>5 EA</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>HSA ID</th>
<th>Material Description</th>
<th>Material Location</th>
<th>HSA Quantity (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asbestos-containing off-white compressed fibrous material with black brittle chalkboard coating (M)</td>
<td>Mounted chalkboard on ground floor</td>
<td>1 EA</td>
</tr>
<tr>
<td>3</td>
<td>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)</td>
<td>At base of walls in G13 corridor and corridor adjacent to G12</td>
<td>40 LF</td>
</tr>
<tr>
<td>5</td>
<td>Asbestos-containing tan mastic and non-asbestos white crumbly material with paint (M)</td>
<td>Residual mastic in Room G14</td>
<td>12 SF</td>
</tr>
<tr>
<td>6</td>
<td>Asbestos-containing dark brown vinyl floor tile and non-asbestos black asphaltic mastic (M)</td>
<td>Accent/perimeter floor tile in Rooms 003, 004, 005, 006, and 008</td>
<td>170 SF</td>
</tr>
<tr>
<td>7</td>
<td>Asbestos-containing 9”x9” Red vinyl floor tile and black asphaltic mastic (M)</td>
<td>Flooring in Room 003</td>
<td>36 SF</td>
</tr>
<tr>
<td>8</td>
<td>Asbestos-containing 9”x9” Red vinyl floor tile with white streaks and black asphaltic mastic (M)</td>
<td>Flooring in Room 003</td>
<td>45 SF</td>
</tr>
<tr>
<td>14</td>
<td>Asbestos-containing brown flaky fibrous electrical panel backing (M)</td>
<td>Mounted electrical gauge panel at Basement Level</td>
<td>6 SF</td>
</tr>
</tbody>
</table>
### Table 5.1-1. Assumed and Confirmed ACM

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

*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/m³) or the Permissible Exposure Limit of 50 µg/m³. 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:  
Chris Selders  
Industrial Hygienist  
AECOM Technical Services, Inc.

Reviewed by:  
Mike Kosoff  
Environmental Scientist  
AECOM Technical Services, Inc.
Appendix A. Figures
Figure 1
Approximate Asbestos and Lead Sample Locations
Ground Floor
206829 UW Pavilion Pool

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

Job Number: 60678092  Not to scale

University of Washington
Seattle, Washington
Figure 3
Approximate Asbestos and Lead Sample Locations
Basement Level
206829 UW Pavilion Pool

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

Job Number: 60678092 Not to scale

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
Figure 5
Approximate ACM Locations
First Floor
206829 UW Pavilion Pool

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 6  
Approximate ACM Locations  
Basement Level  
206829 UW Pavilion Pool

Legend

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

Drawing should be printed in color
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
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

Enc.: Sample Results
<table>
<thead>
<tr>
<th>Lab ID: 22317116</th>
<th>Client Sample #: PP-1-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Pavilion Pool</td>
<td></td>
</tr>
<tr>
<td>Layer 1 of 1</td>
<td>Description: Off-white compressed fibrous material with black brittle coating material</td>
</tr>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:%</td>
</tr>
<tr>
<td>Binder/Filler, Fine particles</td>
<td>None Detected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID: 22317117</th>
<th>Client Sample #: PP-2-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Pavilion Pool</td>
<td></td>
</tr>
<tr>
<td>Layer 1 of 2</td>
<td>Description: Off-white sandy/brittle material</td>
</tr>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:%</td>
</tr>
<tr>
<td>Binder/Filler, Mineral grains, Fine grains</td>
<td>None Detected</td>
</tr>
<tr>
<td>Fine particles</td>
<td></td>
</tr>
<tr>
<td>Layer 2 of 2</td>
<td>Description: Beige soft mastic</td>
</tr>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:%</td>
</tr>
<tr>
<td>Mastic/Binder, Fine particles</td>
<td>None Detected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID: 22317118</th>
<th>Client Sample #: PP-2-02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Pavilion Pool</td>
<td></td>
</tr>
<tr>
<td>Layer 1 of 2</td>
<td>Description: Gray foamy material</td>
</tr>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:%</td>
</tr>
<tr>
<td>Binder/Filler, Synthetic foam</td>
<td>None Detected</td>
</tr>
<tr>
<td>Layer 2 of 2</td>
<td>Description: Beige soft mastic</td>
</tr>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:%</td>
</tr>
<tr>
<td>Mastic/Binder, Fine grains, Fine particles</td>
<td>None Detected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID: 22317119</th>
<th>Client Sample #: PP-2-03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Pavilion Pool</td>
<td></td>
</tr>
</tbody>
</table>

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

---

**Layer 1 of 3**  
**Description:** Gray foamy material  
**Non-Fibrous Materials:**  
Vinyl/Binder, Synthetic foam  
**Other Fibrous Materials:**  
None Detected  
Asbestos Type: %  
**None Detected**

**Layer 2 of 3**  
**Description:** Beige soft mastic  
**Non-Fibrous Materials:**  
Mastic/Binder, Fine grains, Fine particles  
**Other Fibrous Materials:**  
None Detected  
Asbestos Type: %  
**None Detected**

**Layer 3 of 3**  
**Description:** Gray soft material  
**Non-Fibrous Materials:**  
Binder/Filler, Fine particles  
**Other Fibrous Materials:**  
None Detected  
Asbestos Type: %  
**None Detected**

---

**Lab ID: 22317120**  
**Client Sample #:** PP-3-01  
**Location:** Pavilion Pool  
**Description:** Black rubbery material  
**Non-Fibrous Materials:**  
Vinyl/Binder, Fine particles  
**Other Fibrous Materials:**  
None Detected  
Asbestos Type: %  
**None Detected**

**Layer 2 of 2**  
**Description:** Brown brittle mastic  
**Non-Fibrous Materials:**  
Mastic/Binder, Fine particles  
**Other Fibrous Materials:**  
Talc fibers  
Asbestos Type: %  
**3%**

---

**Lab ID: 22317121**  
**Client Sample #:** PP-3-02  
**Location:** Pavilion Pool  
**Description:** Black rubbery material  
**Non-Fibrous Materials:**  
Vinyl/Binder, Fine particles  
**Other Fibrous Materials:**  
None Detected  
Asbestos Type: %  
**None Detected**

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

---

**Sampled by:** Client  
**Analyzed by:** Akane Yoshikawa  
**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.

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page 3 of 19
### Layer 2 of 3
**Description:** Brown brittle mastic
- **Non-Fibrous Materials:** Mastic/Binder, Fine particles
- **Other Fibrous Materials:** None Detected

### Layer 3 of 3
**Description:** White compacted powdery material with paint
- **Non-Fibrous Materials:** Binder/Filler, Fine grains, Fine particles
- **Other Fibrous Materials:** None Detected

#### Asbestos Type:
- **Layer 2 of 3**: None Detected
- **Layer 3 of 3**: Chrysotile 2%

---

### Layer 1 of 3
**Description:** Black rubbery material
- **Non-Fibrous Materials:** Vinyl/Binder, Fine particles

### Layer 2 of 3
**Description:** Light yellow soft mastic
- **Non-Fibrous Materials:** Mastic/Binder, Fine particles

### Layer 3 of 3
**Description:** Trace amount of white compacted powdery material
- **Non-Fibrous Materials:** Binder/Filler, Fine grains, Fine particles

#### Asbestos Type:
- **Layer 1 of 3**: None Detected
- **Layer 2 of 3**: None Detected
- **Layer 3 of 3**: None Detected

---

### Layer 1 of 3
**Description:** White rubbery material
- **Non-Fibrous Materials:** Vinyl/Binder, Fine particles

---

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.

---

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

---

ASB-02
## 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

---

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer 2</td>
<td>Light yellow soft mastic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mastic/Binder, Fine particles</td>
<td></td>
<td>None Detected</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>

| Layer 3 | Trace amount of white compacted powdery material with paint |                       |                         |               |   |
|         | Non-Fibrous Materials:                                 |                       |                         |               |   |
|         | Binder/Filler, Fine grains, Fine particles             |                       | None Detected           | ND            |   |
|         | Paint                                               |                       | None Detected           | ND            |   |

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

<table>
<thead>
<tr>
<th>Layer 1</th>
<th>Description: Yellow brittle mastic</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mastic/Binder, Fine grains, Fine particles</td>
<td></td>
<td>Cellulose</td>
<td>Chrysotile</td>
<td>3%</td>
</tr>
<tr>
<td>Layer 2</td>
<td>White crumbly material with paint</td>
<td></td>
<td></td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Layer 1</th>
<th>Description: Brown brittle tile</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Binder/Filler, Fine grains, Fine particles</td>
<td></td>
<td></td>
<td>Chrysotile</td>
<td>3%</td>
</tr>
<tr>
<td>Layer 2</td>
<td>Black asphaltic mastic</td>
<td></td>
<td></td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

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

---

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

Layer 1 of 2
Description: Brown brittle tile
Non-Fibrous Materials: Binder/Filler, Fine grains, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % Chrysotile 3%

Layer 2 of 2
Description: Black asphalpic mastic
Non-Fibrous Materials: Asphalt/Binder, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % None Detected ND

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

Layer 1 of 2
Description: Brown brittle tile
Non-Fibrous Materials: Binder/Filler, Fine grains, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % Chrysotile 4%

Layer 2 of 2
Description: Black asphalpic mastic
Non-Fibrous Materials: Asphalt/Binder, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % None Detected ND

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

Layer 1 of 2
Description: Red brittle tile
Non-Fibrous Materials: Vinyl/Binder, Fine grains, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % Chrysotile 5%

Layer 2 of 2
Description: Black asphalpic mastic
Non-Fibrous Materials: Asphalt/Binder, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % Chrysotile 3%

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

Sampled by: Client
Analyzed by: Akane Yoshikawa
Reviewed by: Nick Ly
Date: 02/15/2022
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.
### Layer 1 of 2
**Description:** Red brittle tile  
**Non-Fibrous Materials:** Vinyl/Binder, Fine grains, Fine particles  
**Asbestos Type:** Chrysotile 4%  
**Asbestos Type:** %  

### Layer 2 of 2
**Description:** Black asphaltic mastic  
**Non-Fibrous Materials:** Asphalt/Binder, Fine particles  
**Asbestos Type:** Chrysotile 3%  
**Asbestos Type:** %

### Lab ID: 22317130  
**Client Sample #:** PP-8-02  
**Location:** Pavilion Pool  
**Layer 1 of 2**  
**Description:** Red brittle tile  
**Non-Fibrous Materials:** Vinyl/Binder, Fine grains, Fine particles  
**Asbestos Type:** Chrysotile 4%  
**Asbestos Type:** %  

### Lab ID: 22317131  
**Client Sample #:** PP-9-01  
**Location:** Pavilion Pool  
**Layer 1 of 2**  
**Description:** Blue vinyl tile  
**Non-Fibrous Materials:** Vinyl/Binder, Fine grains, Fine particles  
**Asbestos Type:** None Detected ND  
**Asbestos Type:** %  

### Lab ID: 22317132  
**Client Sample #:** PP-9-02  
**Location:** Pavilion Pool  
**Layer 1 of 2**  
**Description:** Blue vinyl tile  
**Non-Fibrous Materials:** Vinyl/Binder, Fine grains, Fine particles  
**Asbestos Type:** None Detected ND  
**Asbestos Type:** %  

### Lab ID: 22317132  
**Client Sample #:** PP-9-02  
**Location:** Pavilion Pool  
**Layer 2 of 2**  
**Description:** Black asphaltic mastic  
**Non-Fibrous Materials:** Asphalt/Binder, Fine particles  
**Asbestos Type:** Cellulose 7%  
**Asbestos Type:** %  

---

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.
Layer 1 of 2
Description: Blue vinyl tile
Non-Fibrous Materials: Vinyl/Binder, Fine grains, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % None Detected ND

Layer 2 of 2
Description: Black asphaltic mastic
Non-Fibrous Materials: Asphalt/Binder, Fine particles
Other Fibrous Materials:% Cellulose 7%
Asbestos Type: % None Detected ND

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

Layer 1 of 1
Description: Brown brittle mastic with paint
Non-Fibrous Materials: Binder/Filler, Fine particles, Paint
Other Fibrous Materials:% None Detected ND
Asbestos Type: % None Detected ND

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

Layer 1 of 1
Description: Brown brittle mastic with paint
Non-Fibrous Materials: Binder/Filler, Fine particles, Paint
Other Fibrous Materials:% None Detected ND
Asbestos Type: % None Detected ND

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

Layer 1 of 1
Description: Yellow brittle mastic
Non-Fibrous Materials: Mastic/Binder, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % None Detected ND

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

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

---

<table>
<thead>
<tr>
<th>Layer 1 of 1</th>
<th>Description:</th>
<th>Yellow brittle mastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Mastic/Binder, Fine particles</td>
<td></td>
</tr>
<tr>
<td>Other Fibrous Materials:%</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td>Asbestos Type: %</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>

**Lab ID:** 22317137  
**Location:** Pavilion Pool

| Client Sample #: | PP-12-01 |

<table>
<thead>
<tr>
<th>Layer 1 of 2</th>
<th>Description:</th>
<th>Brown rubbery material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Vinyl/Binder, Fine particles</td>
<td></td>
</tr>
<tr>
<td>Other Fibrous Materials:%</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td>Asbestos Type: %</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Layer 2 of 2</th>
<th>Description:</th>
<th>White brittle mastic with paint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Mastic/Binder, Fine particles, Paint</td>
<td></td>
</tr>
<tr>
<td>Other Fibrous Materials:%</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td>Asbestos Type: %</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>

**Lab ID:** 22317138  
**Location:** Pavilion Pool

| Client Sample #: | PP-12-02 |

<table>
<thead>
<tr>
<th>Layer 1 of 2</th>
<th>Description:</th>
<th>Brown rubbery material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Vinyl/Binder, Fine particles</td>
<td></td>
</tr>
<tr>
<td>Other Fibrous Materials:%</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td>Asbestos Type: %</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Layer 2 of 2</th>
<th>Description:</th>
<th>White brittle mastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Mastic/Binder, Fine particles</td>
<td></td>
</tr>
<tr>
<td>Other Fibrous Materials:%</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td>Asbestos Type: %</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>

**Lab ID:** 22317139  
**Location:** Pavilion Pool

| Client Sample #: | PP-13-01 |

<table>
<thead>
<tr>
<th>Layer 1 of 1</th>
<th>Description:</th>
<th>Black brittle tile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Fibrous Materials:</td>
<td>Binder/Filler, Mineral grains, Fine particles</td>
<td></td>
</tr>
<tr>
<td>Other Fibrous Materials:%</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td>Asbestos Type: %</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>

---

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

**Asalyzed by:** Akane Yoshikawa  
**Date:** 02/15/2022

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.

ASB-02

---

**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

<table>
<thead>
<tr>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binder/Filler, Fine grains, Fine particles</td>
<td></td>
<td>Chrysotile 48%</td>
</tr>
</tbody>
</table>

### Lab ID: 22317141 Client Sample #: PP-15-01

**Location:** Pavilion Pool

**Layer 1 of 2**

**Description:** White crumbly material

<table>
<thead>
<tr>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binder/Filler, Fine grains, Calcareous particles</td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

**Layer 2 of 2**

**Description:** Off-white brittle material

<table>
<thead>
<tr>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binder/Filler, Fine grains, Fine grains</td>
<td>None Detected</td>
<td>ND</td>
</tr>
<tr>
<td>Perlite</td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

### Lab ID: 22317142 Client Sample #: PP-15-02

**Location:** Pavilion Pool

**Layer 1 of 3**

**Description:** White crumbly material

<table>
<thead>
<tr>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binder/Filler, Fine grains, Calcareous particles</td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

**Layer 2 of 3**

**Description:** Brown-red crumbly material

<table>
<thead>
<tr>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binder/Filler, Fine grains, Fine particles</td>
<td>None Detected</td>
<td>ND</td>
</tr>
</tbody>
</table>

**Layer 3 of 3**

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

<table>
<thead>
<tr>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete/Binder, Gravel, Cementitious particles</td>
<td>Glass fibers 11%</td>
<td>None Detected</td>
</tr>
</tbody>
</table>

---

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

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  
**City:** 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

<table>
<thead>
<tr>
<th>Lab ID: 22317143</th>
<th>Client Sample #: PP-15-03</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong> Pavilion Pool</td>
<td></td>
</tr>
<tr>
<td><strong>Layer 1 of 3</strong></td>
<td><strong>Description:</strong> White/beige crumbly material</td>
</tr>
<tr>
<td><strong>Non-Fibrous Materials:</strong></td>
<td><strong>Other Fibrous Materials:</strong></td>
</tr>
<tr>
<td>Binder/Filler, Mineral grains, Fine grains</td>
<td>None Detected ND</td>
</tr>
<tr>
<td>Fine particles</td>
<td></td>
</tr>
<tr>
<td><strong>Asbestos Type:</strong></td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID: 22317144</th>
<th>Client Sample #: PP-16-01</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong> Pavilion Pool</td>
<td></td>
</tr>
<tr>
<td><strong>Layer 1 of 1</strong></td>
<td><strong>Description:</strong> Gray sandy material</td>
</tr>
<tr>
<td><strong>Non-Fibrous Materials:</strong></td>
<td><strong>Other Fibrous Materials:</strong></td>
</tr>
<tr>
<td>Binder/Filler, Fine grains, Sand</td>
<td>Glass fibers 2%</td>
</tr>
<tr>
<td></td>
<td>None Detected ND</td>
</tr>
<tr>
<td><strong>Asbestos Type:</strong></td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID: 22317145</th>
<th>Client Sample #: PP-17-01</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong> Pavilion Pool</td>
<td></td>
</tr>
<tr>
<td><strong>Layer 1 of 2</strong></td>
<td><strong>Description:</strong> Gray crumbly material</td>
</tr>
<tr>
<td><strong>Non-Fibrous Materials:</strong></td>
<td><strong>Other Fibrous Materials:</strong></td>
</tr>
<tr>
<td>Binder/Filler, Mineral grains, Fine particles</td>
<td>None Detected ND</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Asbestos Type:</strong></td>
<td>None Detected ND</td>
</tr>
<tr>
<td><strong>Layer 2 of 2</strong></td>
<td><strong>Description:</strong> Black asphaltic material</td>
</tr>
<tr>
<td><strong>Non-Fibrous Materials:</strong></td>
<td><strong>Other Fibrous Materials:</strong></td>
</tr>
<tr>
<td>Asphalt/Binder, Fine particles</td>
<td>None Detected ND</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Asbestos Type:</strong></td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

**Sampled by:** Client  
**Analyzed by:** Akane Yoshikikawa  
**Reviewed by:** Nick Ly  
**Date:** 02/15/2022  
**Date:** 02/15/2022  
**Signed by:** Nick Ly, Technical Director

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ASB-02

page 11 of 19
Lab ID: 22317146 | Client Sample #: PP-17-02
Location: Pavilion Pool
Layer 1 of 1 | Description: Gray crumbly/sandy material
Non-Fibrous Materials:
Binder/Filler, Mineral grains, Fine particles
Sand
Other Fibrous Materials:% None Detected ND
Asbestos Type: % 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:
Binder/Filler, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % Chrysotile 34%
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:
Binder/Filler, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % Chrysotile 37%
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:
Binder/Filler, Fine particles
Other Fibrous Materials:% None Detected ND
Asbestos Type: % Chrysotile 36%
Chrysotile 36%
Amosite 8%

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.
<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Client Sample #</th>
<th>Description</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>22317150</td>
<td>PP-19-01</td>
<td>Gray flaky fibrous material</td>
<td>Binder/Filler, Fine grains, Fine particles</td>
<td>Cellulose 4%</td>
<td>Amosite 28%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wood flakes</td>
<td></td>
<td>Chrysotile 11%</td>
</tr>
<tr>
<td>22317151</td>
<td>PP-19-02</td>
<td>Off-white flaky fibrous material</td>
<td>Binder/Filler, Fine particles, Mineral grains</td>
<td>None Detected ND</td>
<td>Chrysotile 39%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sand</td>
<td></td>
<td>Amosite 3%</td>
</tr>
<tr>
<td>22317152</td>
<td>PP-19-03</td>
<td>Gray flaky fibrous material</td>
<td>Binder/Filler, Mineral grains, Fine grains</td>
<td>Cellulose 6%</td>
<td>Amosite 43%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fine particles, Wood flakes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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: _____

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Sampled by: Client
Relinquished by: Client

Received by: Kelly AuVu
Analyzed by: Akane Yoshikawa
Results Called by: NVL

Faxed: [ ] Emailed: [ ]

Date: 2/10/2022
Time: 4:58 PM
 Entered By: Fatima Khan
**Project Name/Number:** 60678092  
**Project Location:** Pavilion Pool

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

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**Print Name:** [Name]
**Signature:** [Signature]
**Company:** [Company]
**Date:** [Date]
**Time:** [Time]

**Sampled by:** [Client]
**Relinquished by:** [Client]

**Received by:** Kelly AuVu  
**NVL**  
**Date:** 2/10/22  
**Time:** 1650

**Analyzed by:** Akane Yoshikawa  
**NVL**  
**Date:** 2/15/22

**Results Called by:** [Name]
**Fax**  
**Emailed**

**Special Instructions:**

---

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

---

**NVL Batch Number:** 2202801.00  
**TAT:** 3 Days  
**AH Nolash**  
**Due Date:** 2/15/2022  
**Time:** 4:50 PM  
**Fax:** (866) 495-5288  
**Email:** Aaron.heath@aecom.com
**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  
**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**  

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**Sampled by**  Client  
**Relinquished by**  Client  

**Office Use Only**  
**Received by**  Kelly AuVu  
**Company**  NVL  
**Date**  2/10/22  
**Time**  1650

**Analyzed by**  Akane Yoshikawa  
**Company**  NVL  
**Date**  2/15/22  
**Time**  

**Results Called by**  NVL  
**Fax**  
**Emailed**  

**Special Instructions:**

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**Entered By:** Fatima Khan  
**Date:**  2/10/2022  
**Time:**  4:58 PM
# ASBESTOS
## CHAIN OF CUSTODY

### Company
- **AECOM**
- **Address**: 1111 Third Ave, Suite 1500, Seattle, WA 98101
- **Phone**: 206-438-2700

### Project Manager
- **Name**: Aaron Heath
- **Cell**: (360) 350-2361
- **Fax**: ()
- **Email**: christopher.selders@aecom.com

### Project Name/Number
- 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 1000 Points (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

### Total Number of Samples

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### Sampled by
- Chris Selders

### Relinquish by
- Chris Selders

### Office Use Only

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**ASBESTOS CHAIN OF CUSTODY**

Company: AECOM  
Address: 1111 Third Ave, Suite 1500  
Seattle, WA 98101  
Phone: 206-438-2700

Project Manager: Aaron Heath  
Cell: 360-350-2361  
Fax: 
Email: christopher.sellers@aecom.com

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<th>Project Name/Number</th>
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<td>Please email results to Aaron Heath and Chris Selders</td>
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<tr>
<td>PLM (EPA 600/R-93-116)</td>
<td>TEM (AHERA)</td>
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<td>EPA 400 Points (600/R-93-116)</td>
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<td>Asbestos in Vermiculite (EPA 600/R-04/004)</td>
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**Total Number of Samples**

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**Sampled by:** Chris Selders  
**Relinquish by:** Chris Selders

**Print Name:**  
**Signature:**  
**Company:** AECOM  
**Date:** 2/10/2020  
**Time:**

**Office Use Only**

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# ASBESTOS
## CHAIN OF CUSTODY

**Company:** AECOM  
**Address:** 1111 Third Ave, Suite 1500  
Seattle, WA 98101  
**Phone:** 206-438-2700

**Project Manager:** Aaron Heath  
**Cell:** (360) 350-2361  
**Fax:**  
**Email:** christopher.selders@aecom.com

### Project Name/Number
- [ ] PCM Air (NIOSH 7400)
- [ ] TEM (NIOSH 7402)
- [ ] TEM (AHERA)
- [X] PLM (EPA 600/R-93-116)
- [ ] EPA 400 Points (600/R-93-116)
- [X] PLM Gravimetry (600/R-93-116)
- [X] Asbestos in Vermiculite (EPA 600/R-04/004)
- [ ] Asbestos Friable/Non-Friable (EPA 600/R-93/116)
- [ ] Other

### Reporting Instructions
Please email results to Aaron Heath and Chris Selders

- [ ] Call
- [X] Fax
- [X] Email christopher.selders@aecom.com

## Total Number of Samples

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**Date:** 1/9/2020  
**Time:**

### Office Use Only

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**Date:** 2/10/2020  
**Time:** 1600
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,

[Signature]
Nick Ly, Technical Director

Enc.: Sample Results
**Layer 1 of 2**  
*Description:* Beige rubbery material

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<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials:%</th>
<th>Asbestos Type:%</th>
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**Layer 2 of 2**  
*Description:* Brown brittle mastic with very trace amount of white powder

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<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials:%</th>
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<tr>
<td>Fine grains, Mastic/Binder, Fine particles</td>
<td>Wollastonite 5%</td>
<td>None Detected ND</td>
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<td>Cellulose 2%</td>
<td>None Detected ND</td>
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**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 1**  
*Description:* Off-white sandy material with paint

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<tr>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials:%</th>
<th>Asbestos Type:%</th>
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<tbody>
<tr>
<td>Paint, Fine grains, Calcareous binder</td>
<td>Cellulose 2%</td>
<td>None Detected ND</td>
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</table>

**Layer 1 of 1**  
*Description:* Off-white sandy material with paint

<table>
<thead>
<tr>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials:%</th>
<th>Asbestos Type:%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint, Fine grains, Calcareous binder</td>
<td>Cellulose &lt;1%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

**Layer 1 of 2**  
*Description:* Off-white sandy material with paint

<table>
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<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials:%</th>
<th>Asbestos Type:%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint, Fine grains, Calcareous binder</td>
<td>Cellulose 1%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

---

**Sampled by:** Client  
**Analyzed by:** Munaf Khan  
**Reviewed by:** Nick Ly  
**Date:** 04/11/2022  
**Date:** 04/19/2022

*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

**Client Project #:** 60678092  
**Samples Received:** 7  
**Samples Analyzed:** 7  
**Method:** EPA/600/R-93/116

<table>
<thead>
<tr>
<th>Layer 2 of 2</th>
<th>Description: Off-white sandy material with paint</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint, Mineral grains, Calcareous binder</td>
<td></td>
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</tbody>
</table>

**Lab ID:** 22341331  
**Client Sample #:** PP-21-01  
**Location:** UW - Pavilion Pool

<table>
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<th>Layer 1 of 1</th>
<th>Description: Off-white sandy material with paint</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
<th>%</th>
</tr>
</thead>
<tbody>
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<td>Paint, Mineral grains, Calcareous binder</td>
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**Lab ID:** 22341332  
**Client Sample #:** PP-21-02  
**Location:** UW - Pavilion Pool

<table>
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<th>Layer 1 of 1</th>
<th>Description: Off-white sandy material with paint</th>
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<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

**Lab ID:** 22341333  
**Client Sample #:** PP-21-03  
**Location:** UW - Pavilion Pool

<table>
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<tr>
<th>Layer 1 of 1</th>
<th>Description: Off-white sandy material with paint</th>
<th>Non-Fibrous Materials:</th>
<th>Other Fibrous Materials:</th>
<th>Asbestos Type:</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paint, Mineral grains, Calcareous binder</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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: 2206650.00  
TAT: 3 Days  
Due Date: 4/13/2022  
Time: 10:00 AM  
Fax: Aaron.heath@aecom.com  
Email: Aaron.heath@aecom.com

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: No

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<tr>
<th>Lab ID</th>
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<td>22341328</td>
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<tr>
<td>7</td>
<td>22341333</td>
<td>PP-21-03</td>
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</tbody>
</table>

Print Name
Signature
Company
Date
Time
Sampled by:  
Relinquished by:  
Received by: Kelly AuVu  
NVL  
4/8/22  
1000  
Analyzed by: Munaf Khan  
NVL  
4/11/22

Special Instructions:

Date: 4/8/2022
Time: 10:09 AM
Entered By: Rachelle Miller
**CHAIN of CUSTODY SAMPLE LOG**

**Client:** AECOM-UW  
**Street:** 1111 Third Avenue Ste. 1600  
**City:** Seattle, WA 98101

**Project Manager:** Mr. Aaron Heath  
**Project Location:** UW - Pavilion Pool

**Phone:** (206) 438-2700  
**Fax:**

**NVL Batch Number:** 2206650  
**Client Job Number:** 60678092  
**Total Samples:**
- [ ] 1 Hr  
- [ ] 6 Hrs  
- [x] 3 Days  
- [ ] 10 Days  
- [ ] 2 Hrs  
- [ ] 1 Day  
- [ ] 4 Days  
- [ ] 2 Days  
- [ ] 5 Days  
**Turn Around Time:**
- Please call for TAT less than 24 Hrs

**Email address:** Aaron.heath@ae.com

### Asbestos Analysis
- [x] Asbestos Air  
- [x] PCM (NIOSH 7400)  
- [ ] TEM (NIOSH 7402)  
- [ ] TEM (AHFRA)  
- [ ] TEM (EPA Level II)  
- [ ] Other

### Mold/Fungus Analysis
- [ ] Mold Air  
- [ ] Mold Bulk  
- [ ] Rotometer Calibration

### Metals Analysis
- [ ] Total Metals  
- [ ] TCLP  
- [ ] Cr 6  
- [ ] FAAP (ppm)  
- [ ] ICP (ppm)  
- [ ] GF AaA (ppb)  
- [ ] CVAA (ppb)  
- [ ] Air Filter  
- [ ] Drinking water  
- [ ] Dust/wipe (Area)  
- [ ] Soil  
- [ ] Paint Chips in %  
- [ ] Paint Chips in cm²  
- [ ] Waste Water  
- [ ] Other

### Other Types of Analysis
- [ ] Fiberglass  
- [ ] Nuisance Dust  
- [ ] Other (Specify)

### Condition of Package
- [ ] Good  
- [ ] Damaged (no spillage)  
- [ ] Severe damage (spillage)

### Sample Information

<table>
<thead>
<tr>
<th>Seq. #</th>
<th>Lab ID</th>
<th>Client Sample Number</th>
<th>Comments (e.g. Sample are, Sample Volume, etc)</th>
<th>A/R</th>
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<td>PP-21-03</td>
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<td></td>
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</tr>
</tbody>
</table>

### Special Instructions:
Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

*Please Email Results To: christopher.sellers@ae.com*
April 20, 2022

Aaron Heath
AECOM-UW
1111 Third Avenue Ste. 1600
Seattle, WA 98101

RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2207352.00

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

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

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:%
Rubber/Synthetic Binder, Fine particles None Detected ND

Layer 2 of 3
Description: Brown brittle mastic
Non-Fibrous Materials: Other Fibrous Materials:%
Mastic/Binder, Fine particles Cellulose 3%

Layer 3 of 3
Description: White brittle skim coat material with paint
Non-Fibrous Materials: Other Fibrous Materials:%
Paint, Calcareous particles, Binder/Filler Cellulose 2%

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.
**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:**

<table>
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<tr>
<th>Lab ID</th>
<th>Sample ID</th>
<th>Description</th>
<th>A/R</th>
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<td>22345734</td>
<td>PP-3-02-C</td>
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**Sampled by:** Client  
**Relinquished by:** Client

**Office Use Only**

<table>
<thead>
<tr>
<th>Received by</th>
<th>Analyzed by</th>
<th>Results Called by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelly AuVu</td>
<td>Munaf Khan</td>
<td></td>
</tr>
</tbody>
</table>

**Fax:** No  
**Email:** Aaron.heath@aecom.com

**Print Name:** Rachelle Miller  
**Date:** 4/19/2022  
**Time:** 11:57 AM

---

**Special Instructions:**

---

**Date:** 4/19/2022  
**Time:** 11:57 AM  
**Entered By:** Rachelle Miller
# CHAIN of CUSTODY

## SAMPLE LOG

**Client:** AECOM-Seattle  
**Street:** 1111 3rd Avenue Ste 1600  
**Seattle, WA 98101**

**NVL Batch Number:** 606-788092  
**Client Job Number:**

**Total Samples:**
- □ 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

**Turn Around Time:**

**Project Manager:** Mr. Aaron Heath  
**Project Location:** UW Pavilion Pool

**Phone:** (206) 438-2700  
**Fax:** (866) 495-5288

**Email address:** Aaron.heath@aecom.com

| Asbestos Air | PCM (NIOSH 7400) | TEM (NIOSH 7402) | TEM (AHERA) | TEM (EPA Level III) | 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
- □ FAAS (ppm)
- □ ICP (ppm)
- □ GFAAS (ppb)
- □ CVAA (ppb)
- □ Soil
- □ Dust/wipe (Area)
- □ Paint Chips in %
- □ Paint Chips in cm2
- □ Waste Water
- □ Other

| RCRA Metals | All 8 |
| Arsenic (As) | Lead (Pb) |
| Barium (Ba) | Mercury (Hg) |
| Cadmium (Cd) | Selenium (Se) |
| Chromium (Cr) | Silver (Ag) |
| Other Metals | All 3 |
| Copper (Cu) | Nickel (Ni) |
| Zinc (Zn) |

| Other Types of Analysis | Fiberglass | Nuisance Dust | Respirable Dust |
| Silica |

**Condition of Package:** □ Good  
□ Damaged (no spillage)  
□ Severe damage (spillage)

<table>
<thead>
<tr>
<th>Seq. #</th>
<th>Lab ID</th>
<th>Client Sample Number</th>
<th>Comments (e.g. Sample are, Sample Volume, etc)</th>
<th>AI/R</th>
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</tr>
</tbody>
</table>

**Print Below**

**Sign Below**

**Company:** AECOM  
**Date:** 4/19/22  
**Time:** 11:30

**Sampled by:** A. Heath  
**Re林ished by:** A. Heath  
**Received by:** Kempfer  
**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.

---

Phone: 206 547.0100  | Fax: 206 634.1936  | Toll Free: 1.888.NVLLABS (685.5227)  
4708 Aurora Avenue North | Seattle, WA 98103-6516
Appendix D. Lead Analytical Results
February 14, 2022

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

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,

[Signature]
Shalini Patel, Lab Supervisor

Enc.: Sample results
**Total Lead (Pb)**

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

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

<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Client Sample #</th>
<th>Sample Weight (g)</th>
<th>RL in mg/Kg</th>
<th>Results in mg/Kg</th>
<th>Results in percent</th>
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<td>22317165</td>
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<td>0.1807</td>
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<td>22317166</td>
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</tr>
</tbody>
</table>

- **Matrix:** Paint  
- **Method:** EPA 3051/7000B  
- **Client Project #:** 60678092  
- **Date Received:** 2/10/2022  
- **Samples Received:** 5  
- **Samples Analyzed:** 5

---

**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**  
- **RL = Reporting Limit**  
- **'<' = Below the reporting Limit**  
- **Note:** Method QC results are acceptable unless stated otherwise.

---

**Bench Run No:** 2022-0211-04  
**FAA-02**

---

**Page 2 of 4**
**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: |

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<tr>
<th>Lab ID</th>
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<th>A/R</th>
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<td>22317164</td>
<td>PP-Pb2-01</td>
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<td>22317166</td>
<td>PP-Pb4-01</td>
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<td>5</td>
<td>22317167</td>
<td>PP-Pb5-01</td>
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Print Name: Sampled by Client  
Signature:  
Company:  
Date:  
Time:  

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

Office Use Only  
Print Name: Received by Kelly AuVu  
Signature:  
Company: NVL  
Date: 2/10/22  
Time: 1650  

Print Name: Analyzed by Yasuyuki Hida  
Signature:  
Company: NVL  
Date: 2/11/22  
Time:  

Print Name: Results Called by  
Signature:  
Company:  
Date:  
Time:  

Special Instructions:  

Date: 2/10/2022  
Time: 5:03 PM  
Entered By: Fatima Khan

Page 3 of 4
## METALS
### CHAIN OF CUSTODY

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<thead>
<tr>
<th>Company</th>
<th>Aecom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>1111 Third Ave, Suite 1600</td>
</tr>
<tr>
<td></td>
<td>Seattle, WA 98101</td>
</tr>
<tr>
<td>Phone</td>
<td>206-438-2700</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Manager</th>
<th>Aaron Heath</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell</td>
<td>(360) 350-2361</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:aaron.heath@aecom.com">aaron.heath@aecom.com</a></td>
</tr>
<tr>
<td>Fax</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Name/Number</th>
<th>Project Location</th>
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<tr>
<td></td>
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<tr>
<th>Total Metals</th>
<th>FIAA (ppm)</th>
<th>Air Filter</th>
<th>Point Chips (%)</th>
<th>Soil</th>
<th>RCRA 8</th>
<th>Barium</th>
<th>Chromium</th>
<th>Silver</th>
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<tr>
<td>ICP (PPM)</td>
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<td>GFAA (ppb)</td>
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<td>CVAA (ppb)</td>
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<td>GFAA (ppb)</td>
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<td>CVAA (ppb)</td>
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| Reporting Instructions | Please email results to Aaron Heath and Chris Selders |

---

## Total Number of Samples

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>PP - Pb1 - 01</td>
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<tr>
<td>2</td>
<td>Pb2 - 01</td>
</tr>
<tr>
<td>3</td>
<td>Pb3 - 01</td>
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<td>4</td>
<td>Pb4 - 01</td>
</tr>
<tr>
<td>5</td>
<td>Pb5 - 01</td>
</tr>
</tbody>
</table>

### Printed Name

- **Sampled by**: Chris Selders
- **Relinquished by**: Aecom

### Printed Name

- **PPD**: Chris Selders

---

### Date and Time

- **2/9/2020**
- **2/10/2020**

---

### Office Use Only

- **Received by**: PPD
- **Analyzed by**: PPD
- **Called by**: PPD
- **Faxed/Email by**: PPD

---

2202802
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

Expiration Date: 09/10/2022

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)

For verification of the authenticity of this certificate contact:
PBS Engineering and Environmental Inc.
4412 S Corbett Avenue
Portland, Oregon 97239
503.248.1939

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
Certificate Number 182423
Date(s) of Training Sep 10, 2021
Expires in 1 year.
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
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).
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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18/A01</td>
<td>EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples</td>
</tr>
<tr>
<td>18/A03</td>
<td>EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials</td>
</tr>
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</table>

For the National Voluntary Laboratory Accreditation Program
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
Managing Director, AIHA Laboratory Accreditation Programs, LLC

Date Issued: 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**

<table>
<thead>
<tr>
<th>IHLAP Scope Category</th>
<th>Field of Testing (FOT)</th>
<th>Technology sub-type/Detector</th>
<th>Published Reference Method/Title of In-house Method</th>
<th>Component, parameter or characteristic tested</th>
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</thead>
<tbody>
<tr>
<td>Asbestos/Fiber Microscopy Core</td>
<td>Phase Contrast Microscopy (PCM)</td>
<td>-</td>
<td>NIOSH 7400</td>
<td>Asbestos/Fibers</td>
</tr>
<tr>
<td>Miscellaneous Core</td>
<td>Gravimetric</td>
<td>-</td>
<td>NIOSH 0500</td>
<td>Total Dust</td>
</tr>
<tr>
<td>Miscellaneous Core</td>
<td>Gravimetric</td>
<td>-</td>
<td>NIOSH 0600</td>
<td>Respirable Dust</td>
</tr>
<tr>
<td>Spectrometry Core</td>
<td>Atomic Absorption</td>
<td>FAA</td>
<td>NIOSH 7082</td>
<td>Lead</td>
</tr>
<tr>
<td>Spectrometry Core</td>
<td>Inductively-Coupled Plasma</td>
<td>ICP/AES</td>
<td>NIOSH 7300</td>
<td>RCRA Metals</td>
</tr>
<tr>
<td>Spectrometry Core</td>
<td>X-ray Diffraction (XRD)</td>
<td>-</td>
<td>NIOSH 7500</td>
<td>Silica</td>
</tr>
</tbody>
</table>

A complete listing of currently accredited IHLAP laboratories is available on the AIHA-LAP, LLC website at: [http://www.aihaaccreditedlabs.org](http://www.aihaaccreditedlabs.org)
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**

<table>
<thead>
<tr>
<th>Component, parameter or characteristic tested</th>
<th>Technology sub-type/Detector</th>
<th>Method</th>
<th>Method Description (for internal methods only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airborne Dust</td>
<td>AA</td>
<td>EPA SW-846 3051A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA SW-846 7000B</td>
<td>N/A</td>
</tr>
<tr>
<td>Paint</td>
<td>AA</td>
<td>EPA SW-846 3051A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPA SW-846 7000B</td>
<td>N/A</td>
</tr>
<tr>
<td>Settled Dust by Wipe</td>
<td>AA</td>
<td>EPA SW-846 3051A</td>
<td>N/A</td>
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<tr>
<td></td>
<td></td>
<td>EPA SW-846 7000B</td>
<td>N/A</td>
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<tr>
<td>Soil</td>
<td>AA</td>
<td>EPA SW-846 3051A</td>
<td>N/A</td>
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<tr>
<td></td>
<td></td>
<td>EPA SW-846 7000B</td>
<td>N/A</td>
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</table>

A complete listing of currently accredited ELLAP laboratories is available on the AIHA-LAP, LLC website at: [http://www.aihaaccreditedlabs.org](http://www.aihaaccreditedlabs.org)
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**

<table>
<thead>
<tr>
<th>EMLAP Scope Category</th>
<th>Field of Testing (FOT)</th>
<th>Component, parameter or characteristic tested</th>
<th>Method</th>
<th>Method Description (for internal methods only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungal</td>
<td>Air - Direct Examination</td>
<td>Spore Trap</td>
<td>SOP 12.133</td>
<td>In House: Analysis of Spore Trap</td>
</tr>
<tr>
<td>Fungal</td>
<td>Bulk - Direct Examination</td>
<td>Bulk</td>
<td>SOP 12.133</td>
<td>In House: Analysis of Spore Trap</td>
</tr>
<tr>
<td>Fungal</td>
<td>Surface - Direct Examination</td>
<td>Surface Wipe</td>
<td>SOP 12.133</td>
<td>In House: Analysis of Spore Trap</td>
</tr>
</tbody>
</table>

A complete listing of currently accredited EMLAP laboratories is available on the AIHA-LAP, LLC website at: [http://www.aihaaccreditedlabs.org](http://www.aihaaccreditedlabs.org)
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**

<table>
<thead>
<tr>
<th>Unique Scopes Scope Category</th>
<th>Field of Testing (FOT)</th>
<th>Component, parameter or characteristic tested</th>
<th>Method</th>
<th>Method Description (for internal methods only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Product Testing</td>
<td>Lead in Paint and Other Similar Surface Coatings</td>
<td>Surface paint</td>
<td>CPSC-CH-E1003-09</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Total Lead in Metal Children's Products</td>
<td>Metallic jewelry</td>
<td>CPSC-CH-E1001-08</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Total Lead in Non-Metal Children's Products</td>
<td>Non-metallic</td>
<td>CPSC-CH-E1002-08</td>
<td>-</td>
</tr>
</tbody>
</table>

A complete listing of currently accredited Unique Scopes laboratories is available on the AIHA-LAP, LLC website at: [http://www.aihaaccreditedlabs.org](http://www.aihaaccreditedlabs.org)
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 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:

<table>
<thead>
<tr>
<th>Material</th>
<th>General Location (Pavilion Pool)</th>
<th>Asbestos Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue 12&quot; vinyl floor tile and black mastic</td>
<td>1st Floor restrooms</td>
<td>No-Asbestos Detected (NAD)</td>
</tr>
<tr>
<td>Plaster wall and ceiling material</td>
<td>Throughout building</td>
<td>NAD</td>
</tr>
<tr>
<td>Gypsum wallboard and joint compound</td>
<td>1st Floor</td>
<td>NAD</td>
</tr>
<tr>
<td>2'x4' cork ceiling panels (nailed to ceiling)</td>
<td>1st floor pool area ceiling</td>
<td>NAD</td>
</tr>
<tr>
<td>Tan mastic associated with brown 4&quot; cove base</td>
<td>Throughout building</td>
<td>NAD</td>
</tr>
<tr>
<td>Material</td>
<td>General Location (Pavilion Pool)</td>
<td>Asbestos Results</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Brown mastic associated with brown 4” cove base</td>
<td>Throughout building</td>
<td>NAD</td>
</tr>
<tr>
<td>Cementatious floor curbing</td>
<td>Throughout building</td>
<td>NAD</td>
</tr>
<tr>
<td>Grout associated with glass block windows</td>
<td>1st floor, north and south ends</td>
<td>NAD</td>
</tr>
<tr>
<td>1” ceramic tile, grout and yellow mastic</td>
<td>Ground floor pool area</td>
<td>NAD</td>
</tr>
<tr>
<td>Red 1” clay wall block and gray mortar</td>
<td>Ground floor</td>
<td>NAD</td>
</tr>
<tr>
<td>Brown 4”x12” ceramic brick and mortar/grout</td>
<td>Ground floor locker rooms</td>
<td>NAD</td>
</tr>
<tr>
<td>Horsehair pipe insulation with asphaltic wrap</td>
<td>Attic</td>
<td>NAD</td>
</tr>
<tr>
<td>Caulk (beige/white) on sinks</td>
<td>Ground floor locker rooms</td>
<td>NAD</td>
</tr>
<tr>
<td>Valve blanket</td>
<td>Basement mechanical room</td>
<td>NAD</td>
</tr>
<tr>
<td>Black flange gasket</td>
<td>Basement mechanical room</td>
<td>NAD</td>
</tr>
<tr>
<td>Brown flange gasket</td>
<td>Basement mechanical room</td>
<td>NAD</td>
</tr>
<tr>
<td>Caulk (brown/tan) at exterior expansion joint</td>
<td>Exterior, north end of building</td>
<td>NAD</td>
</tr>
<tr>
<td>Sidewalk joint sealant</td>
<td>East entry to building</td>
<td>NAD</td>
</tr>
<tr>
<td>Gray/white window frame sealant</td>
<td>Exterior, south entry to building</td>
<td>NAD</td>
</tr>
<tr>
<td>Felt under metal roof</td>
<td>Main (pitched) roof</td>
<td>NAD</td>
</tr>
<tr>
<td>Built-up asphaltic roof</td>
<td>Valley roof west of pitched roof</td>
<td>NAD</td>
</tr>
<tr>
<td>Built-up asphaltic roof</td>
<td>Roof above the south entry</td>
<td>NAD</td>
</tr>
<tr>
<td>Gray caulk on counter flashing</td>
<td>Roof above the south entry</td>
<td>NAD</td>
</tr>
<tr>
<td>Beige caulk on terracotta joints</td>
<td>Roof above the south entry</td>
<td>NAD</td>
</tr>
<tr>
<td>Built-up asphaltic roof</td>
<td>North lower</td>
<td>NAD</td>
</tr>
<tr>
<td>Built-up asphaltic roof</td>
<td>Northwest mid-level roof</td>
<td>NAD</td>
</tr>
<tr>
<td>Gray caulk on counter flashing</td>
<td>Northwest mid-level roof</td>
<td>NAD</td>
</tr>
</tbody>
</table>

**Sports Medicine Clinic**

<table>
<thead>
<tr>
<th>Material</th>
<th>General Location (Sports Med. Clinic)</th>
<th>Asbestos Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray 12” vinyl floor tile and Yellow mastic</td>
<td>Throughout Clinic</td>
<td>NAD</td>
</tr>
<tr>
<td>Gray 12” vinyl floor tile and Yellow mastic</td>
<td>Throughout Clinic</td>
<td>NAD</td>
</tr>
<tr>
<td>Off-white 12” vinyl floor tile and Yellow mastic</td>
<td>Throughout Clinic</td>
<td>NAD</td>
</tr>
<tr>
<td>Yellow carpet mastic</td>
<td>Throughout Clinic</td>
<td>NAD</td>
</tr>
<tr>
<td>Gray 4” vinyl cove base and beige mastic</td>
<td>Throughout Clinic</td>
<td>NAD</td>
</tr>
<tr>
<td>Gypsum wallboard and joint compound</td>
<td>Throughout Clinic</td>
<td>NAD</td>
</tr>
<tr>
<td>Sink undercoating (black, gray or white)</td>
<td>Throughout Clinic</td>
<td>NAD</td>
</tr>
<tr>
<td>Material</td>
<td>General Location (Sports Med. Clinic)</td>
<td>Asbestos Results</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>2’x2’ lay-in ceiling tile</td>
<td>Throughout Clinic</td>
<td>NAD</td>
</tr>
<tr>
<td>White ceramic tile, grout and white mastic</td>
<td>Throughout Clinic</td>
<td>NAD</td>
</tr>
<tr>
<td>Built-up asphaltic roof</td>
<td>Roof, west section</td>
<td>NAD</td>
</tr>
</tbody>
</table>

**Edmondson Pavilion and Graves Annex**

<table>
<thead>
<tr>
<th>Material</th>
<th>General Location (Edm. Pavilion and Grave Annex)</th>
<th>Asbestos Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fireproofing (gray)</td>
<td>Edmondson Pavilion East end</td>
<td>NAD</td>
</tr>
<tr>
<td>Gypsum wallboard and joint compound</td>
<td>Edmondson Pavilion East end</td>
<td>NAD</td>
</tr>
<tr>
<td>Purple rubberized flooring</td>
<td>Graves Annex Weight Room, south end</td>
<td>NAD</td>
</tr>
<tr>
<td>Beige 6” vinyl cove base and yellow mastic</td>
<td>Graves Annex Weight Room, south end</td>
<td>NAD</td>
</tr>
<tr>
<td>Joint compound associated with gypsum</td>
<td>Graves Annex Weight Room, south end</td>
<td>NAD</td>
</tr>
<tr>
<td>wallboard walls</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

Report prepared by:
PBS Engineering and Environmental Inc.

Chuck Greeb
Project Surveyor, AHERA Building Inspector
Cert. #145124, exp. 12/30/2014

Willem Mager
Project Mgr., AHERA Building Inspector
Cert. #145669, exp. 2/19/2015

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.
<table>
<thead>
<tr>
<th>PBS Sample #</th>
<th>Material Type</th>
<th>Sample Location</th>
<th>Lab Description</th>
<th>Lab Result</th>
<th>Lab</th>
</tr>
</thead>
</table>
| 40035.639 -01 | Brown vinyl flooring Black mastic    | P. Pool Men's restroom - Room 5  | Layer 1: Brown tile<br>Layer 2: Black mastic                                  | 3% Chrysotile<br>2% Chrysotile | SAT
|              |                                      | (P. Pool = Pavilion Pool)        |                                                                                  |            |     |
| 40035.639 -02 | Blue 12" vinyl floor tile Black mastic | P. Pool Women's restroom - Room 6 | Layer 1: Blue tile<br>Layer 2: Black mastic                                | NAD        | SAT |
| 40035.639 -03 | Brown 4" vinyl cove base Brown mastic Wall plaster | P. Pool Men's restroom - Room 5 | Layer 1: Brown rubbery material<br>Layer 2: Brown mastic<br>Layer 3: White sandy/brittle material with paint | NAD<br>NAD<br>NAD | SAT
| 40035.639 -04 | Window putty (tan/gray) Grout (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 Grout (gray) Yellow mastic | P. Pool Ground floor, pool area floor | Layer 1: White ceramic<br>Layer 2: Beige/gray brittle material<br>Layer 3: Yellow mastic<br>Layer 4: Silver metal | NAD<br>NAD<br>NAD<br>NAD | SAT
| 40035.639 -07 | Clay block (1'x1') wall Mortar (gray) | P. Pool Ground floor E side      | Layer 1: Red hard brittle material with paint                                  | 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 Tan mastic             | P. Pool Room 8                   | Layer 1: Brown rubbery material<br>Layer 2: Tan mastic                         | NAD<br>NAD | SAT
| 40035.639 -10 | Brown 9" vinyl floor tile Black mastic | P. Pool Room 8                   | Layer 1: Brown tile<br>Layer 2: Black mastic                                  | 2% Chrysotile<br>2% Chrysotile | SAT
<p>| 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 |</p>
<table>
<thead>
<tr>
<th>PBS Sample #</th>
<th>Material Type</th>
<th>Sample Location</th>
<th>Lab Description</th>
<th>Lab Result</th>
<th>Lab</th>
</tr>
</thead>
</table>
| 40035.639 -13 | Brown 4”x12” ceramic brick | P. Pool Men's locker room | Layer 1: Brown ceramic  
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 paint  
Layer 2: Gray sandy/brittle material | NAD | SAT |
| 40035.639 -17 | Joint compound  
Gypsum wallboard | P. Pool 1st floor pool bleacher area, E wall | Layer 1: White powdery material with woven fibrous material and paint  
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  
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  
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  
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

<table>
<thead>
<tr>
<th>PBS Sample #</th>
<th>Material Type</th>
<th>Sample Location</th>
<th>Lab Description</th>
<th>Lab Result</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>40035.639-24</td>
<td>Window putty - green gray</td>
<td>P. Pool N stair 1st floor</td>
<td>Layer 1: Green brittle material with paint</td>
<td>4% Chrysotile</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-25</td>
<td>Caulk at expansion joint</td>
<td>P. Pool N side at Graves Annex</td>
<td>Layer 1: Gray soft/elastic material with brittle material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-26</td>
<td>Cementitious curb</td>
<td>P. Pool 1st floor of N entry</td>
<td>Layer 1: Gray hard sandy/brittle material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-27</td>
<td>Vibration joint insulator</td>
<td>P. Pool Mechanical room - basement fan 0-02-17</td>
<td>Layer 1: Gray fibrous material with paint</td>
<td>62% Chrysotile</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-28</td>
<td>Valve blanket</td>
<td>P. Pool Mechanical room in basement</td>
<td>Layer 1: White woven fibrous material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-29</td>
<td>Pipe straight run - 10&quot;</td>
<td>P. Pool Mechanical room crawlspace (N side)</td>
<td>Layer 1: White powdery material with woven fibrous material</td>
<td>5% Chrysotile, 3% Amosite</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-30</td>
<td>Pipe fitting - 8&quot;</td>
<td>P. Pool Mechanical room N crawlspace, plastic sheeting over dirt</td>
<td>Layer 1: Trace silver paint</td>
<td>2% Chrysotile</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-31</td>
<td>Pipe straight run - 8&quot;</td>
<td>P. Pool Mechanical room N crawlspace</td>
<td>Layer 1: White powdery material</td>
<td>5% Chrysotile, 2% Amosite</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-32</td>
<td>Black pliable flange gasket</td>
<td>P. Pool Mechanical room basement</td>
<td>Layer 1: Black soft/elastic material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-33</td>
<td>Brown pliable flange gasket</td>
<td>P. Pool Mechanical room basement</td>
<td>Layer 1: Brown soft/elastic material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-34</td>
<td>Vibration joint insulator</td>
<td>P. Pool Mechanical room fan 01-02-15</td>
<td>Layer 1: White soft/elastic material with woven fibrous material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 2: Trace clear mastic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40035.639-35</td>
<td>Plaster wall</td>
<td>P. Pool At room 614 (by men's locker)</td>
<td>Layer 1: White brittle material with paint</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-36</td>
<td>Black 6&quot; cove</td>
<td>P. Pool At room 614</td>
<td>Layer 1: Black rubbery material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>PBS Sample #</td>
<td>Material Type</td>
<td>Sample Location</td>
<td>Lab Description</td>
<td>Lab Result</td>
<td>Lab</td>
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<td>------------------------------------------------------------</td>
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<td>-----</td>
</tr>
<tr>
<td>40035.639-37</td>
<td>Plaster wall</td>
<td>P. Pool Women's locker room</td>
<td>Layer 1: Gray loose sandy/brittle material with paint</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 2: Tan mastic</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-53</td>
<td>Joint compound</td>
<td>Graves Annex weight room, SE corner</td>
<td>Layer 1: Off-white powdery material with paint</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td>Gypsum wallboard</td>
<td></td>
<td>Layer 2: White chalky material with paper</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-54</td>
<td>Rubberized floor (purple)</td>
<td>Graves Annex weight room, SE corner</td>
<td>Layer 1: Purple rubbery material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-55</td>
<td>Beige 6&quot; cove base</td>
<td>Graves Annex weight room, SE corner</td>
<td>Layer 1: Beige rubbery material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td>Yellow mastic</td>
<td></td>
<td>Layer 2: Yellow mastic</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td>Joint compound</td>
<td></td>
<td>Layer 3: White powdery material with paint</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-56</td>
<td>Fireproofing on column</td>
<td>Hec Ed Pav - SE corner</td>
<td>Layer 1: Gray fibrous material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-57</td>
<td>Window frame sealant</td>
<td>Pool building, S side</td>
<td>Layer 1: Gray/white soft/elastic material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-58</td>
<td>Felt under metal roof</td>
<td>Pavilion Pool pitched roof</td>
<td>Layer 1: Black asphaltic fibrous material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-59</td>
<td>Built-up roof (core)</td>
<td>Pavilion Pool, west valley adj. to Hec Ed Pavillion east wall</td>
<td>Layer 1: Black asphaltic material with fibrous material and sand</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 2: Black asphaltic material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 3: Black asphaltic material with fibrous material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 4: Black asphaltic material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 5: Black asphaltic fibrous material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 6: Brown fibrous material with perlite</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 7: Tan paper</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-60</td>
<td>Built-up roof (core)</td>
<td>Pavilion Pool, roof over S entry</td>
<td>Layer 1: Black asphaltic material with fibrous material and sand</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td></td>
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<td>Layer 2: Black asphaltic material</td>
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<td>PBS Sample #</td>
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<tr>
<td>40035.639-61</td>
<td>Caulk on counter flashing</td>
<td>Pavilion Pool, roof over S entry</td>
<td>Layer 1: Gray soft/elastic material</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-62</td>
<td>Caulk on terracotta joints</td>
<td>Pavilion Pool, roof over S entry</td>
<td>Layer 1: Beige soft/elastic material</td>
<td>NAD</td>
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<tr>
<td>40035.639-63</td>
<td>Built-up roof (core)</td>
<td>Pavilion Pool, N lower roof, E end</td>
<td>Layer 1: Black asphaltic material with fibrous material and sand</td>
<td>NAD</td>
<td>SAT</td>
</tr>
<tr>
<td>40035.639-64</td>
<td>Built-up roof (core)</td>
<td>Pavilion Pool, N lower roof, W end</td>
<td>Layer 1: Black asphaltic material with fibrous material and sand</td>
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<td>PBS Sample #</td>
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<td>40035.639 -65</td>
<td>Window frame caulk (tan/gray)</td>
<td>Pavilion Pool, N lower roof, on W steel fram windows</td>
<td>Layer 1: Tan soft material</td>
<td>3% Chrysotile</td>
<td>SAT</td>
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<tr>
<td>40035.639 -66</td>
<td>Frame caulk (gray)- glass block windows</td>
<td>Pavilion Pool, N lower roof (350LF)</td>
<td>Layer 1: Tan/gray soft material</td>
<td>3% Chrysotile</td>
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<tr>
<td>40035.639 -67</td>
<td>Built-up roof (core)</td>
<td>NW mid-level roof (at Graves Annex/Hec Ed)</td>
<td>Layer 1: Black asphalitic material with fibrous material and sand</td>
<td>NAD</td>
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<td>Layer 2: Black asphalitic material</td>
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<td>Layer 3: Black asphalitic material with fibrous material</td>
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<td>Layer 4: Black asphalitic material</td>
<td>NAD</td>
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<td>Layer 5: Black asphalitic fibrous material</td>
<td>NAD</td>
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<td></td>
<td>Layer 6: Black fibrous material with perlite</td>
<td>NAD</td>
<td>SAT</td>
</tr>
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<td>40035.639 -68</td>
<td>Caulk on counter flashing</td>
<td>NW mid-level roof</td>
<td>Layer 1: Gray soft/elastic material</td>
<td>NAD</td>
<td>SAT</td>
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<tr>
<td>40035.639 -69</td>
<td>Built-up roof (core)</td>
<td>SMC - W section</td>
<td>Layer 1: Black asphalitic material with fibrous material and sand</td>
<td>NAD</td>
<td>SAT</td>
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<td>Layer 2: Black asphalitic material</td>
<td>NAD</td>
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<td>Layer 3: Black asphalitic material with fibrous material</td>
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<td>Layer 7: Brown fibrous material with perlite</td>
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<td>Layer 8: Black asphalitic fibrous material</td>
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<td>Layer 9: Yellow foamy material</td>
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<td>PBS Sample #</td>
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</table>
| 40035.639 -70 | Built-up roof (core)                  | SMC - E section                   | Layer 1: Black asphaltic material with fibrous material and sand  
Layer 2: Black asphaltic material  
Layer 3: Black asphaltic material with fibrous material  
Layer 4: Black asphaltic material  
Layer 5: Black asphaltic material with fibrous material  
Layer 6: Black asphaltic material  
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  
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  
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  
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  
Layer 2: Trace tan soft mastic                                                                                                                | NAD        | NVL |
| 40035.639 -77 | Beige vinyl flooring                  | Graves Annex Rm122C                | Layer 1: Off-white linoleum  
Layer 2: Beige woven fibrous backing  
Layer 3: Gold soft mastic with gray crumbly material                                                                                      | NAD        | NVL |
<table>
<thead>
<tr>
<th>PBS Sample #</th>
<th>Material Type</th>
<th>Sample Location</th>
<th>Lab Description</th>
<th>Lab Result</th>
<th>Lab</th>
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<tr>
<td>40035.639-78</td>
<td>Gray 4” cove and mastic</td>
<td>Graves Annex Rm122C</td>
<td>Layer 1: Gray rubbery material</td>
<td>NAD</td>
<td>NVL</td>
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<td>Layer 2: Off-white soft mastic with paint</td>
<td>NAD</td>
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<td>40035.639-79</td>
<td>Black sink undercoat</td>
<td>Graves Annex Rm122C</td>
<td>Layer 1: Black asphaltic flaky material</td>
<td>NAD</td>
<td>NVL</td>
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<tr>
<td>40035.639-80</td>
<td>2x2 ceiling tile - textured</td>
<td>Graves Annex Rm 122B</td>
<td>Layer 1: white compressed fibrous material with paint</td>
<td>NAD</td>
<td>NVL</td>
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<td>40035.639-81</td>
<td>Gypsum wallboard</td>
<td>Graves Annex Rm 122B</td>
<td>Layer 1: White compacted powdery material with paint</td>
<td>NAD</td>
<td>NVL</td>
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<td>Layer 2: white compacted powdery material with paper</td>
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<td>Layer 3: White chalky material with paper</td>
<td>NAD</td>
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<td>40035.639-82</td>
<td>Carpet mastic</td>
<td>Graves Annex Rm 122B</td>
<td>Layer 1: Green crumbly mastic</td>
<td>NAD</td>
<td>NVL</td>
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<tr>
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<td></td>
<td>Layer 2: Tan crumbly mastic</td>
<td>NAD</td>
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<tr>
<td>40035.639-83</td>
<td>2x2 ceiling tile - fissured</td>
<td>Graves Annex weight room</td>
<td>Layer 1: Light gray compressed fibrous material</td>
<td>NAD</td>
<td>NVL</td>
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<tr>
<td>40035.639-84</td>
<td>Cork 2x4 ceiling panels</td>
<td>P. Pool North end of pool balcony (nailed up)</td>
<td>Layer 1: Brown soft material with paint</td>
<td>NAD</td>
<td>NVL</td>
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<tr>
<td>Sample #</td>
<td>Paint Color / Component or Substrate</td>
<td>Sample Location</td>
<td>Results (mg/kg)</td>
<td>Results (%)</td>
<td>Lab</td>
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<tr>
<td>40035.639-L01</td>
<td>White/plaster/wall</td>
<td>Pav. Pool,1st floor outside restroom 3</td>
<td>14000.0</td>
<td>1.4000</td>
<td>NVL</td>
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<tr>
<td>40035.639-L02</td>
<td>White/steel radiators</td>
<td>Pav. Pool, 1st floor, S end</td>
<td>6100.0</td>
<td>0.6100</td>
<td>NVL</td>
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<tr>
<td>40035.639-L03</td>
<td>Beige/plaster/wall</td>
<td>Pav. Pool, 1st floor, room 8</td>
<td>24000.0</td>
<td>2.4000</td>
<td>NVL</td>
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<tr>
<td>40035.639-L04</td>
<td>Beige/concrete/wall</td>
<td>Pav. Pool, 1st floor, N end</td>
<td>1100.0</td>
<td>0.1100</td>
<td>NVL</td>
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<tr>
<td>40035.639-L05</td>
<td>Beige/plaster/wall</td>
<td>Pav. Pool At room G14</td>
<td>18000.0</td>
<td>1.8000</td>
<td>NVL</td>
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<tr>
<td>40035.639-L06</td>
<td>Beige/concrete/wall</td>
<td>Tunnel from Pav. Pool to Hec Ed.</td>
<td>1100.0</td>
<td>0.1100</td>
<td>NVL</td>
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<tr>
<td>40035.639-L12</td>
<td>Purple/gypsum wallboard/wall</td>
<td>Graves Annex (GA) weight room, SE corner</td>
<td>&lt;48.0</td>
<td>&lt;0.0048</td>
<td>NVL</td>
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<td>40035.639-L13</td>
<td>Beige/concrete/wall</td>
<td>GA S stair, S wall</td>
<td>&lt;40.0</td>
<td>&lt;0.0040</td>
<td>NVL</td>
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<tr>
<td>40035.639-L14</td>
<td>White/concrete/wall</td>
<td>GA S stair, W wall</td>
<td>&lt;39.0</td>
<td>&lt;0.0039</td>
<td>NVL</td>
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<tr>
<td>40035.639-L15</td>
<td>Gray/steel/stairs</td>
<td>GA S stair</td>
<td>3900.0</td>
<td>0.3900</td>
<td>NVL</td>
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<tr>
<td>40035.639-L16</td>
<td>Red clay brick 1’x1’ and gray grout</td>
<td>Stair to mechanical room</td>
<td>990.0</td>
<td>0.0990</td>
<td>NVL</td>
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<tr>
<td>40035.639-L17</td>
<td>Ceramic tile and grout</td>
<td>Pool surface area</td>
<td>100.0</td>
<td>0.0100</td>
<td>NVL</td>
</tr>
<tr>
<td>40035.639-L18</td>
<td>4”x12” glazed brick</td>
<td>Pav. Pool Men's locker room</td>
<td>&lt;46.0</td>
<td>&lt;0.0046</td>
<td>NVL</td>
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<td>40035.639-L19</td>
<td>Gray/gypsum wallboard/wall</td>
<td>Graves annex Rm. 122C</td>
<td>&lt;44.0</td>
<td>&lt;0.0044</td>
<td>NVL</td>
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<tr>
<td>40035.639-L20</td>
<td>Gray/steel/stair</td>
<td>Graves annex weight room</td>
<td>&lt;67.0</td>
<td>&lt;0.0067</td>
<td>NVL</td>
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<td>40035.639-L21</td>
<td>Yellow/gypsum wallboard/wall</td>
<td>Graves annex weight room</td>
<td>&lt;44.0</td>
<td>&lt;0.0044</td>
<td>NVL</td>
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<td>40035.639-L22</td>
<td>Purple/steel/door frame</td>
<td>Graves annex weight room</td>
<td>&lt;46.0</td>
<td>&lt;0.0046</td>
<td>NVL</td>
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</table>

**mg/kg = Milligrams per kilogram**

< = Less than the Limit of Detection
### Bulk Sample Data Form

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<th>Sample #</th>
<th>Material</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>-01</td>
<td>Brown vinyl flooring</td>
<td>Men's Room - 5 perimeter</td>
</tr>
<tr>
<td>-02</td>
<td>Blue 12&quot; x 12&quot; floor tile</td>
<td>Women's Room - 6</td>
</tr>
<tr>
<td>-03</td>
<td>Mastic on Brown 4&quot; Cove  + Plaster</td>
<td>Men's Room - 6</td>
</tr>
<tr>
<td>-04</td>
<td>Window Pall 7</td>
<td>1st Fl, at Men's Room</td>
</tr>
<tr>
<td>-05</td>
<td>Gray, glass block windows</td>
<td>1st Fl, S. wall, E. side</td>
</tr>
<tr>
<td>-06</td>
<td>1&quot; Ceramic Tile on floor</td>
<td>Gr. Fl, Pool Area, Floor</td>
</tr>
<tr>
<td>-07</td>
<td>Clay block (14&quot;) x gray</td>
<td>Gr. Fl, E. side</td>
</tr>
<tr>
<td>-08</td>
<td>Pants wall</td>
<td>Room 8 (1st floor)</td>
</tr>
<tr>
<td>-09</td>
<td>Mastic on 3/4&quot; cove</td>
<td>Room 8</td>
</tr>
<tr>
<td>-10</td>
<td>9&quot; Vinyl Floor tile (Brown) + Mastic</td>
<td>Room 8</td>
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<td>-11</td>
<td>Cementation Corp</td>
<td>Corridor at Room 8</td>
</tr>
<tr>
<td>-12</td>
<td>Caulk at sink</td>
<td>Men's Locker Room</td>
</tr>
<tr>
<td>-13</td>
<td>8&quot; x 12&quot; Ceramic Brick + gray</td>
<td>Men's Locker Room</td>
</tr>
<tr>
<td>-14</td>
<td>Cork 2x4 Ceiling Panels</td>
<td>1st Fl, Pool area, SW</td>
</tr>
</tbody>
</table>

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### Additional Information
- **Project:** UW ICA basketball, OSS - Hec. Ed. & Pool
- **Date:** 11/4/14
- **Turn Around Time:** 48 Hours
- **Email Results To:**
  - Brian Stanford
  - Ernest Edwards
  - Gregg Middaugh
  - Mark Hiley
  - Prudy Stormt-McRae
  - Chuck Grebe
  - Janet Murphy
  - Willem Mager
  - Harry Gorn
  - Tim Ogden
  - Mike Smith
  - Other

---

**Note:**
- This form is used for recording bulk sample data collected during analysis. The samples listed include various materials found in facilities such as floors, walls, and ceilings, along with their respective locations and details.
### BULK SAMPLE DATA FORM

<table>
<thead>
<tr>
<th>Lab</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Lab</th>
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</thead>
<tbody>
<tr>
<td>-15</td>
<td>Cork 2'x4' Ceiling Panel</td>
<td>1st Fl. Race Area NW (mined-up)</td>
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<tr>
<td>-16</td>
<td>Gbak/Nk Plaster wall</td>
<td>Corridor at Rm. 4 1st Fl.</td>
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<tr>
<td>-17</td>
<td>Gub &amp; JC</td>
<td>1st Fl. Pnl Bleacher Area, Small</td>
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<td>-18</td>
<td>Plaster wall</td>
<td>1st Fl. W. Wall, Center</td>
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<tr>
<td>-19</td>
<td>Graet - Glass Block</td>
<td>1st Fl. N. End</td>
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<td>-20</td>
<td>Plaster wall</td>
<td>1st Fl. M. End</td>
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<td>-21</td>
<td>Caulk - Glass block window</td>
<td>1st Fl. M. End at steel framing</td>
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<tr>
<td>-22</td>
<td>Horsehair pipe insl</td>
<td>Attic Space</td>
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<tr>
<td>-23</td>
<td>Plaster ceiling</td>
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<td>-24</td>
<td>Window putty</td>
<td>N. stair 1st Fl.</td>
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<td>-25</td>
<td>Caulk at Green exptnt</td>
<td>N. Side at Gravt Annex (ext)</td>
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<td>-26</td>
<td>Cemento face curd</td>
<td>1st Fl. N. Entry</td>
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<td>-27</td>
<td>Vibration joint insulant</td>
<td>Mech. Rm. - Bsmnt. Fan 02-17</td>
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<td>-28</td>
<td>Valve blanket</td>
<td>Mech Rm. in Bsmnt.</td>
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<tr>
<td>-29</td>
<td>Pipe straight run - 114</td>
<td>Mech Rm. Crawlspace (N. Side)</td>
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S:\Masters\Office\Tech Forms & Templates\Lab Chain-of-Custody.doc
**PBS** 201409212

Project: UW ICA Basketball Ops - Rec Educ Pools  
Analysis requested: PLM  
Relinqu'd by/Signature: C. Greath  
Received by/Signature: Y. Yang  
Date: 1/14/14  
Date/Time: 11/16/14 1344

Email results to:  
- Brian Stanford  
- Ernest Edwards  
- Gregg Middaugh  
- Mark Hiley  
- Prudy Soudt-McRae  
- Chuck Greath  
- Janet Murphy  
- Willem Mager  
- Harry Goen  
- Tim Ogden  
- Mike Smith  
- Other________

**TURN AROUND TIME:**  
- 1 Hour  
- 2 Hours  
- 48 Hours  
- 24 Hours  
- 3-5 Days  
- Other________

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**BULK SAMPLE DATA FORM**

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<thead>
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<th>Lab #</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Lab</th>
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<td>P#3 Fitting - 8&quot;</td>
<td>Mech Rm. N. Crawl Space</td>
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<td>P#3 St. Rm. - 8&quot;</td>
<td>Mech Rm. N. Crawl Space</td>
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<td>Black Pipe Flange Gasket</td>
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<tr>
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<td>Brown Pipe Flange Gasket</td>
<td>Bsm. Mech Rm</td>
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<td>Blue 12&quot; vinyl floor tile</td>
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<td>Yellow Carpet Mastic</td>
<td>SMC - N. Office Area</td>
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<td>-45</td>
<td>Black Undercoat</td>
<td>SMC - 4th floor Kitchens</td>
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S/Masters/Offer/Tool/Tech Foms & Templates/Lab Claim of Custody.doc
**BULK SAMPLE DATA FORM**

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<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Lab</th>
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<td>-46</td>
<td>W/b 2&quot; Ceramic tile</td>
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<td>-48</td>
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<td>Window Frame sealant</td>
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### Analytical Laboratory Report

**PLM by Method EPA/800/R-93/116**

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<th>Lab ID</th>
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<th>Description</th>
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<th>Non-Mineral Components</th>
<th>Non-asbestos Fibers</th>
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**TURN AROUND TIME:**
- 1 Hour
- 2 Hours
- 4 Hours
- 24 Hours
- 48 Hours
- 3-5 Days
- Other

**BULK SAMPLE DATA FORM**

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<td></td>
</tr>
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**Email results to:**
- Brian Stanford
- Ernest Edwards
- Gregg Mildaus
- Mark Hiley
- Prudy Stoudt-McRae
- Clark Greub
- Janet Murphy
- Wileen Mager
- Harry Goen
- Tim Ogden
- Mike Smith
- Other

**Received by/Signature:** (Signature)

**Analysis requested:** P< M

**Relinqu'd by/Signature:** (Signature)

**Project #: 40535 639**

**Date:** 1/24/14

**Date/Time:** 1/24/14 12:50
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<th>Non-fibrous Components</th>
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<p>| 8      | 65               | 1 | Tan soft material | 3 | Chrysotile | Filler, Binder | 5 | Cellulose, Talc |</p>
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<th>Lab ID</th>
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<th>Description</th>
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<td>2 Cellulose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
<td>Brown fibrous material with perlite</td>
<td>None detected</td>
<td>Filler, Perlite</td>
<td>64 Cellulose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>Black asphaltic fibrous material</td>
<td>None detected</td>
<td>Filler, Asphalt, Binder</td>
<td>70 Cellulose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td>Yellow foamy material</td>
<td>None detected</td>
<td>Synthetic foam</td>
<td>None detected</td>
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<tr>
<td>13</td>
<td>70</td>
<td>1</td>
<td>Black asphaltic material with fibrous material</td>
<td>None detected</td>
<td>Asphalt/binder</td>
<td>36 Cellulose, Synthetic fibers</td>
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<tr>
<td></td>
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<td>2</td>
<td>Black asphaltic material</td>
<td>None detected</td>
<td>Asphalt/binder</td>
<td>2 Cellulose</td>
</tr>
<tr>
<td>Lab ID</td>
<td>Client Sample ID</td>
<td>Layer Description</td>
<td>Asbestos Fibers</td>
<td>Non-fibrous Components</td>
<td>%</td>
<td>Non-asbestos Fibers</td>
</tr>
<tr>
<td>--------</td>
<td>------------------</td>
<td>-------------------</td>
<td>-----------------</td>
<td>------------------------</td>
<td>---</td>
<td>---------------------</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Black asphaltic material with fibrous material</td>
<td>None detected</td>
<td>Asphalt/binder, Binder/filler</td>
<td>31</td>
<td>Cellulose, Glass fibers</td>
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<tr>
<td>4</td>
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<td>Asphalt/binder</td>
<td>4</td>
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<tr>
<td>5</td>
<td></td>
<td>Black asphaltic material with fibrous material</td>
<td>None detected</td>
<td>Asphalt/binder, Binder/filler</td>
<td>35</td>
<td>Cellulose, Glass fibers</td>
</tr>
<tr>
<td>6</td>
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<td>Black asphaltic material</td>
<td>None detected</td>
<td>Asphalt/binder</td>
<td>3</td>
<td>Cellulose</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Brown fibrous material with perlite</td>
<td>None detected</td>
<td>Filler, Perlite</td>
<td>69</td>
<td>Cellulose</td>
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### BULK SAMPLE DATA FORM

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 71</td>
<td></td>
<td>Fireproofing on COI.</td>
<td>Edmonton Pav. - NE Corner</td>
</tr>
<tr>
<td>- 72</td>
<td></td>
<td>Fireproofing on COI.</td>
<td>Ed. Pav. - C.W. East</td>
</tr>
<tr>
<td>- 73</td>
<td></td>
<td>GWB &amp; JIC</td>
<td>Ed. Pav. - NE Corner</td>
</tr>
<tr>
<td>- 74</td>
<td></td>
<td>GWB &amp; JIC</td>
<td>Ed. Pav. - C. of E. East</td>
</tr>
<tr>
<td>- 75</td>
<td></td>
<td>GWB &amp; JIC</td>
<td>Ed. Pav. - S. Corner</td>
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<td>Layer</td>
<td>Description</td>
</tr>
<tr>
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<td>------------------</td>
<td>-------</td>
<td>--------------------------------------------------</td>
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<tr>
<td>1</td>
<td>-71</td>
<td>1</td>
<td>Gray powdery material with fibrous material</td>
</tr>
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<td>-72</td>
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<tr>
<td>3</td>
<td>-73</td>
<td>1</td>
<td>White powdery material with paint and paper</td>
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<td></td>
<td></td>
<td>2</td>
<td>White chalky material with paper</td>
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<td>-74</td>
<td>1</td>
<td>White powdery material with paint and paper</td>
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<tr>
<td>5</td>
<td>-75</td>
<td>1</td>
<td>White powdery material with paint and paper</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>White chalky material with paper</td>
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</table>
### 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

---

<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Client Sample #:</th>
<th>Location</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14125661</td>
<td>40035.639-76</td>
<td>UW ICA Basketball Ops-Ed. Pavilion Pool</td>
<td>Gray/purple rubbery material</td>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
<td>Asbestos Type:</td>
<td>Insufficient mastic for thorough analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rubber/Binder, Fine particles</td>
<td></td>
<td>None Detected</td>
<td>ND</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Trace tan soft mastic</td>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
<td>Asbestos Type:</td>
<td>None Detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mastic/Binder, Calcareous particles</td>
<td></td>
<td>Cellulose</td>
<td>2%</td>
<td></td>
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<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Client Sample #:</th>
<th>Location</th>
<th>Description</th>
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<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14125662</td>
<td>40035.639-77</td>
<td>UW ICA Basketball Ops-Ed. Pavilion Pool</td>
<td>Off-white linoleum</td>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
<td>Asbestos Type:</td>
<td>None Detected</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Linoleum/Binder, Fine particles</td>
<td></td>
<td>Cellulose</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Beige woven fibrous backing</td>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
<td>Asbestos Type:</td>
<td>None Detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Binder/Filler, Fine particles</td>
<td></td>
<td>Cellulose</td>
<td>77%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gold soft mastic with gray crumbly material</td>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
<td>Asbestos Type:</td>
<td>None Detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mastic/Binder, Calcareous binder, Binder/Filler</td>
<td></td>
<td>Cellulose</td>
<td>7%</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Client Sample #:</th>
<th>Location</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>14125663</td>
<td>40035.639-78</td>
<td>UW ICA Basketball Ops-Ed. Pavilion Pool</td>
<td>Gray rubbery material</td>
<td>Non-Fibrous Materials:</td>
<td>Other Fibrous Materials:</td>
<td>Asbestos Type:</td>
<td>None Detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rubber/Binder, Fine particles</td>
<td></td>
<td>None Detected</td>
<td>ND</td>
<td></td>
</tr>
</tbody>
</table>

---

**Sampled by:** Client
**Analyzed by:** Jacob Laugeson
**Reviewed by:** Nick Ly
**Date:** 10/01/2014

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

<table>
<thead>
<tr>
<th>Layer 2 of 2</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Off-white soft mastic with paint</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mastic/Binder, Calcareous particles, Paint</td>
<td></td>
<td>Cellulose</td>
<td>2%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

**Lab ID:** 14125664  
**Client Sample #:** 40035.639-79  
**Location:** UW ICA Basketball Ops-Ed. Pavilion Pool

<table>
<thead>
<tr>
<th>Layer 1 of 1</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Black asphaltic flaky material</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asphalt/Binder, Fine particles</td>
<td></td>
<td>Cellulose</td>
<td>2%</td>
<td>None Detected ND</td>
</tr>
</tbody>
</table>

**Lab ID:** 14125665  
**Client Sample #:** 40035.639-80  
**Location:** UW ICA Basketball Ops-Ed. Pavilion Pool

<table>
<thead>
<tr>
<th>Layer 1 of 1</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White compressed fibrous material with paint</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Binder/Filler, Glass beads, Paint</td>
<td></td>
<td>Glass fibers</td>
<td>83%</td>
<td>None Detected ND</td>
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**Lab ID:** 14125666  
**Client Sample #:** 40035.639-81  
**Location:** UW ICA Basketball Ops-Ed. Pavilion Pool

<table>
<thead>
<tr>
<th>Layer 1 of 3</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White compacted powdery material with paint</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Calcareous particles, Perlite, Paint</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Layer 2 of 3</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White compacted powdery material with paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Calcareous particles, Calcareous binder, Binder/Filler</td>
<td></td>
<td>Cellulose</td>
<td>11%</td>
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<table>
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<tr>
<th>Layer 3 of 3</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Other Fibrous Materials</th>
<th>Asbestos Type</th>
<th>%</th>
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<tbody>
<tr>
<td></td>
<td>White chalky material with paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gypsum/Binder, Binder/Filler</td>
<td></td>
<td>Glass fibers</td>
<td>8%</td>
<td>None Detected ND</td>
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</table>

**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

**Sampled by:** Client  
**Analyzed by:** Jacob Laugeson  
**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 NVLAF 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

### Lab ID: 14125667  Client Sample #: 40035.639-82
Location: UW ICA Basketball Ops-Ed. Pavilion Pool

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 of 2</td>
<td>Green crumbly mastic</td>
<td>Other Fibrous Materials:</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>Non-Fibrous Materials:</td>
<td>Mastic/Binder, Fine particles</td>
<td>Synthetic fibers</td>
</tr>
<tr>
<td></td>
<td>Mastic/Binder, Fine particles</td>
<td></td>
<td>None Detected ND</td>
</tr>
<tr>
<td>2 of 2</td>
<td>Tan crumbly mastic</td>
<td>Other Fibrous Materials:</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>Non-Fibrous Materials:</td>
<td>Mastic/Binder, Binder/Filler</td>
<td>Cellulose</td>
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<tr>
<td></td>
<td>Mastic/Binder, Binder/Filler</td>
<td></td>
<td>None Detected ND</td>
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### Lab ID: 14125668  Client Sample #: 40035.639-83
Location: UW ICA Basketball Ops-Ed. Pavilion Pool

<table>
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<tr>
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<th>Description</th>
<th>Non-Fibrous Materials</th>
<th>Asbestos Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 of 1</td>
<td>Light gray compressed fibrous material</td>
<td>Other Fibrous Materials:</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>Non-Fibrous Materials:</td>
<td>Binder/Filler, Perlite</td>
<td>Cellulose</td>
</tr>
<tr>
<td></td>
<td>Mastic/Binder, Fine particles</td>
<td></td>
<td>Glass fibers</td>
</tr>
</tbody>
</table>

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**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

---

**Sampled by:** Client  
**Analyzed by:** Jacob Laugeson  
**Reviewed by:** Nick Ly  
**Date:** 10/01/2014  
**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**

Project: UW JCA Basketball Ops - Ed. Pavilion Pool

Analysis requested: PLM

Relinq'd by/Signature: C. Greeb

Received by/Signature: [Signature]

Email results to:
- Brian Stanford
- Ernest Edwards
- Gregg Middaugh
- Mark Hiley
- Prody 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**

<table>
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<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Lab</th>
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</thead>
<tbody>
<tr>
<td>-76</td>
<td></td>
<td>Purple rubberized floor &amp; mastic</td>
<td>Graves Annex Weight Room</td>
<td></td>
</tr>
<tr>
<td>-77</td>
<td></td>
<td>Beige vinyl flooring</td>
<td>Graves Annex Rm. 122C</td>
<td></td>
</tr>
<tr>
<td>-78</td>
<td></td>
<td>Gray 4&quot; Cove &amp; mastic</td>
<td>Graves Annex Rm. 122C</td>
<td></td>
</tr>
<tr>
<td>-79</td>
<td></td>
<td>Black sink undercoat</td>
<td>Graves Annex Rm. 122C</td>
<td></td>
</tr>
<tr>
<td>-80</td>
<td></td>
<td>2x2 C.T. - Textured</td>
<td>Graves Annex Rm. 122B</td>
<td></td>
</tr>
<tr>
<td>-81</td>
<td></td>
<td>GB81 JC</td>
<td>Graves Annex Rm. 122B</td>
<td></td>
</tr>
<tr>
<td>-82</td>
<td></td>
<td>Carpet mastic</td>
<td>Graves Annex Rm. 122B</td>
<td></td>
</tr>
<tr>
<td>-83</td>
<td></td>
<td>2x2 C.T. - Fissured</td>
<td>Graves Annex Weight Room</td>
<td></td>
</tr>
</tbody>
</table>
### PBS

**Project:** UW Pavilion Pool
**Analysis requested:** PLM
**Relinq'd by/Signature:** C. Greb
**Received by/Signature:** J. Shears

**Email results to:**
- Brian Stanford
- Ernest Edwards
- Gregg Middaugh
- Mark Hiley
- Prudy Stoudt-MoRae
- Chuck Greb
- Janet Murphy
- Willem Mager

**Date:** 11/18/14
**Date/Time:** 11/18/14 13:46

### TURN AROUND TIME:
- 1 Hour
- 2 Hours
- 4 Hours
- 24 Hours
- 48 Hours
- 3-5 Days
- Other

### BULK SAMPLE DATA FORM

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- B4</td>
<td>Cork Ceiling</td>
<td>N. end of pool balcony</td>
<td></td>
</tr>
</tbody>
</table>
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: Cork, Paint
Other Fibrous Materials: None Detected ND
Asbestos Type: % None Detected ND

Sampled by: Client
Analyzed by: Nadezhda Prysazhnyuk Date: 11/18/2014
Reviewed by: Nick Ly Date: 11/18/2014

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.

**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

<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Client Sample #</th>
<th>Sample Weight (g)</th>
<th>RL in mg/Kg</th>
<th>Results in mg/Kg</th>
<th>Results in percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>14009121</td>
<td>40035.639-L01</td>
<td>0.1929</td>
<td>48.0</td>
<td>14000.0</td>
<td>1.4000</td>
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<tr>
<td>14009122</td>
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<td>0.0963</td>
<td>96.0</td>
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<td>0.6100</td>
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<tr>
<td>14009123</td>
<td>40035.639-L03</td>
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<td>2.4000</td>
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<tr>
<td>14009124</td>
<td>40035.639-L04</td>
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<td>14009125</td>
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<td>14009126</td>
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<tr>
<td>14009127</td>
<td>40035.639-L07</td>
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<td>14009129</td>
<td>40035.639-L09</td>
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<td>14009130</td>
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<td>0.1588</td>
<td>58.0</td>
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<td>14009132</td>
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<td>0.1918</td>
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<td>&lt; 0.0048</td>
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<td>14009133</td>
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<td>40035.639-L14</td>
<td>0.2371</td>
<td>39.0</td>
<td>&lt; 39.0</td>
<td>&lt; 0.0039</td>
</tr>
</tbody>
</table>

**Sampled by:** Client  
**Analyzed by:** Shalini Patel  
**Reviewed by:** Nick Ly  
**Date Analyzed:** 01/21/2014  
**Date Issued:** 01/21/2014

---

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:** 34-0121-02  
**Page 1 of 2**
Client: PBS Environmental (Seattle)
Address: 2517 Eastlake Ave E, Suite 100
Seattle, WA 98102

Attention: Mr. Chuck Green
Project Location: UW ICA Basketball Ops-Hec Ed and P001

<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Client Sample #</th>
<th>Sample Weight (g)</th>
<th>RL in mg/Kg</th>
<th>Results in mg/Kg</th>
<th>Results in percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>14009135</td>
<td>40035.639-L.15</td>
<td>0.0930</td>
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<td>14009136</td>
<td>40035.639-L.16</td>
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<td>14009138</td>
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<td>&lt; 46.0</td>
<td>&lt; 0.0046</td>
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</tbody>
</table>

Batch #: 1401018.00
Matrix: Paint Chips
Method: EPA 7000B
Client Project #: 40035.639
Date Received: 1/20/2014
Samples Received: 18
Samples Analyzed: 18

Sampled by: Client
Analyzed by: Shalini Patel
Reviewed by: Nick Ly

Date Analyzed: 01/21/2014
Date Issued: 01/21/2014

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: 34-0121-02
### TURN AROUND TIME:

- [ ] 1 Hour
- [ ] 2 Hours
- [x] 48 Hours
- [ ] 24 Hours
- [ ] 3-5 Days
- [ ] Other

### BULK SAMPLE DATA FORM

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>- L01</td>
<td></td>
<td>white/ plaster/wall</td>
<td>1st Fl. Outside Reception B</td>
<td></td>
</tr>
<tr>
<td>- L02</td>
<td></td>
<td>white/ radiators</td>
<td>1st Fl. S. End</td>
<td></td>
</tr>
<tr>
<td>- L03</td>
<td></td>
<td>beige/ plaster/wall</td>
<td>1st Fl. Room B</td>
<td></td>
</tr>
<tr>
<td>- L04</td>
<td></td>
<td>beige/ concrete/wall</td>
<td>1st Fl. N. End</td>
<td></td>
</tr>
<tr>
<td>- L05</td>
<td></td>
<td>beige/ plaster/wall</td>
<td>At Rm G14</td>
<td></td>
</tr>
<tr>
<td>- L06</td>
<td></td>
<td>beige/ concrete/wall</td>
<td>Tunnel From Pool To Heck Ed</td>
<td></td>
</tr>
<tr>
<td>- L07</td>
<td></td>
<td>blue grey/ Gub/wall</td>
<td>SMC - Reception</td>
<td></td>
</tr>
<tr>
<td>- L08</td>
<td></td>
<td>white/ Gub/wall</td>
<td>SMC - Center</td>
<td></td>
</tr>
<tr>
<td>- L09</td>
<td></td>
<td>yellow/ Gub/wall</td>
<td>SMC - L&amp;D Treatment Rm.</td>
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</tr>
<tr>
<td>- L10</td>
<td></td>
<td>white/ brick/wall</td>
<td>SMC - SW Corner</td>
<td></td>
</tr>
<tr>
<td>- L11</td>
<td></td>
<td>Tan/Neutral Doorframe</td>
<td>SMC - Reception</td>
<td></td>
</tr>
<tr>
<td>- L12</td>
<td></td>
<td>purple/ Gub/wall</td>
<td>Graves Annex (GA) Wt. Rm. S.E Corner</td>
<td></td>
</tr>
<tr>
<td>- L13</td>
<td></td>
<td>beige/ concrete/wall</td>
<td>GA S. Stair S. wall</td>
<td></td>
</tr>
<tr>
<td>- L14</td>
<td></td>
<td>grey/ concrete/wall</td>
<td>GA S. Stair, W. wall</td>
<td></td>
</tr>
<tr>
<td>- L15</td>
<td></td>
<td>grey/stair/stairs</td>
<td>GA S. Stair</td>
<td></td>
</tr>
</tbody>
</table>
**Bulk Sample Data Form**

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L16</td>
<td>Red clay brick &amp; grout 1'1&quot; Stair to Mech Rm.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L17</td>
<td>Ceramic tile &amp; grout</td>
<td>Pool Area</td>
</tr>
<tr>
<td></td>
<td>L18</td>
<td>4&quot; x 12&quot; glazed brick</td>
<td>Men's Locker Room</td>
</tr>
</tbody>
</table>

**Project:** UVJCA 68.08 HS E1 Pool

**Analysis requested:** FAA - Lead

**Relinqu'd by/Signature:** Chuck Greeb

**Received by/Signature:**

**Email results to:**
- Brion Stanford
- Ernest Edwards
- Gregg Middaugh
- Mark Hile
- Prudy Stoudt-McRae
- Chuck Greeb
- Janet Murphy
- William Mager
- Harry Goren
- Tim Ogden
- Mike Smith
- Other

**Turn Around Time:**
- 1 Hour
- 2 Hours
- 48 Hours
- 24 Hours
- 3-5 Days
- Other

**NVL Batch ID**

**Batch ID:** 1401018

**Project #:** 40035.639

**Date:** 1/14/14

**Date/Time:** 1130 AM

**Carrier:**

---

[Image: S:\Masters\Office\Tech Forms & Templates\Lab Chain-of-Custody.doc]
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
### Chain of Custody Record

#### Laboratory Job #:

#### 2821 152 Avenue NE
Redmond, WA 98052
(425) 497-0110  fax: (425) 497-8089
aachemlab@yahoo.com

#### Client:
PBS Eng. & Env.

#### Project Manager:
William Mayer

#### Project Name:
UW Hec Ed (W)

#### Project Number:
40035, 639

#### Collector:
C. Greed

#### Date of collection:
1/16/14

#### Sample ID | Time | Matrix | Container type | Notes, comments
---|---|---|---|---
1. | PCB-01 |  | |  
2. | PCB-02 |  | |  
3. | PCB-03 |  | |  
4. | PCB-04 |  | |  

#### Relinquished by:
C. Greed

#### Date/Time:
1/17/14

#### Received by:

#### Date/Time:
01/20/14

---

#### Total # of containers:

#### Turnaround time:
- Same day ☒
- 24 hr ☒
- 48 hr ☒
- Standard ☒

#### Condition (temp, °C):

#### Seals (intact?, Y/N):

#### Comments:

**Analytical Results**

<table>
<thead>
<tr>
<th>Matrix</th>
<th>40035.639</th>
<th>40035.639</th>
<th>40035.639</th>
<th>40035.639</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8082 (PCBs), mg/kg</strong></td>
<td>MTH BLK</td>
<td>LCS</td>
<td>PCB-01</td>
<td>PCB-02</td>
</tr>
<tr>
<td>Date extracted</td>
<td>Reporting</td>
<td>01/20/14</td>
<td>01/20/14</td>
<td>01/20/14</td>
</tr>
<tr>
<td>Date analyzed</td>
<td>Limits</td>
<td>01/20/14</td>
<td>01/20/14</td>
<td>01/20/14</td>
</tr>
<tr>
<td>A1221</td>
<td>2.0</td>
<td>nd</td>
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</tr>
<tr>
<td>A1232</td>
<td>2.0</td>
<td>nd</td>
<td>nd</td>
<td>nd</td>
</tr>
<tr>
<td>A1242 (A1016)</td>
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<td>nd</td>
<td>nd</td>
<td>nd</td>
</tr>
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<td>A1248</td>
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<td>A1260</td>
<td>2.0</td>
<td>nd</td>
<td>118%</td>
<td>nd</td>
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</tbody>
</table>

**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%
January 26, 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
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

---

<table>
<thead>
<tr>
<th>Lab Sample ID: 14011301</th>
<th>40035.639-PCB-05</th>
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<tbody>
<tr>
<td>Client Sample ID: 40035.639-PCB-05</td>
<td></td>
</tr>
<tr>
<td>Sample Description: Frame Caulk around glass block</td>
<td></td>
</tr>
</tbody>
</table>

| Sample Weight (g) 0.5401 mg/Kg(ppm) |
|-----------------|-----------------|
| Aroclor 1016 ND |
| Aroclor 1221 ND |
| Aroclor 1232 ND |
| Aroclor 1242 ND |
| Aroclor 1248 ND |
| Aroclor 1254 ND |
| Aroclor 1260 ND |

<table>
<thead>
<tr>
<th>PCB Type</th>
<th>ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aroclor 1016</td>
<td>ND</td>
</tr>
<tr>
<td>Aroclor 1221</td>
<td>ND</td>
</tr>
<tr>
<td>Aroclor 1232</td>
<td>ND</td>
</tr>
<tr>
<td>Aroclor 1242</td>
<td>ND</td>
</tr>
<tr>
<td>Aroclor 1248</td>
<td>ND</td>
</tr>
<tr>
<td>Aroclor 1254</td>
<td>ND</td>
</tr>
<tr>
<td>Aroclor 1260</td>
<td>ND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total: PCB Concentration ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting Limit (RL) 3.7</td>
</tr>
</tbody>
</table>

Remarks:  
mg/Kg = Milligrams per kilograms  
ND = None Detected (less than RL)  
<RL = Below the reporting limit of instrument  
ppm = Parts per million by weight

Sampled by: Client  
Date: 01/28/2014  
Reviewed 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.
**BULK SAMPLE DATA FORM**

<table>
<thead>
<tr>
<th>Lab #</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PCB-05</td>
<td>Framed asphalt</td>
<td>Exterior side of glass block, N. Side of Rd.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>glass block</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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/cm² by area. Dust wipe sample results are usually expressed in ug/wipe and ug/ft². TCLP samples are reported in mg/L (pm). For air filter samples, analyses are conducted using NIOSH and OSHA Methods. Results are expressed in ug/filter and ug/m³. 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:
### Total Metals

Client: PBS Environmental (Seattle)  
Address: 2517 Eastlake Ave E, Suite 100  
Seattle, WA 98102

**Attention:** Mr. Chuck Green  
Project Location: UW JCA Basketball Ops- Hec Ed and Pool

<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Client Sample #</th>
<th>Elements</th>
<th>Sample wt (g)</th>
<th>RL mg / kg</th>
<th>Results in mg / kg</th>
<th>Results In ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>14009245</td>
<td>M-01</td>
<td>Silver (Ag)</td>
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<td>17.0</td>
<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
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<tr>
<td></td>
<td></td>
<td>Arsenic (As)</td>
<td>0.2400</td>
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<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
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<td></td>
<td></td>
<td>Barium (Ba)</td>
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<td>Cadmium (Cd)</td>
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<td>&lt; 17.0</td>
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<td>&lt; 17.0</td>
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<td></td>
<td></td>
<td>Lead (Pb)</td>
<td>0.2400</td>
<td>17.0</td>
<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selenium (Se)</td>
<td>0.2400</td>
<td>17.0</td>
<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab ID</th>
<th>Client Sample #</th>
<th>Elements</th>
<th>Sample wt (g)</th>
<th>RL mg / kg</th>
<th>Results in mg / kg</th>
<th>Results In ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>14009246</td>
<td>M-02</td>
<td>Silver (Ag)</td>
<td>0.2295</td>
<td>17.0</td>
<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arsenic (As)</td>
<td>0.2295</td>
<td>17.0</td>
<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Barium (Ba)</td>
<td>0.2295</td>
<td>17.0</td>
<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cadmium (Cd)</td>
<td>0.2295</td>
<td>17.0</td>
<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chromium (Cr)</td>
<td>0.2295</td>
<td>17.0</td>
<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mercury (Hg)</td>
<td>0.2295</td>
<td>0.9</td>
<td>&lt; 0.9</td>
<td>&lt; 0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lead (Pb)</td>
<td>0.2295</td>
<td>17.0</td>
<td>42.0</td>
<td>42.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selenium (Se)</td>
<td>0.2295</td>
<td>17.0</td>
<td>&lt; 17.0</td>
<td>&lt; 17.0</td>
</tr>
</tbody>
</table>

---

**Sampled by:** Client  
**Analyzed by:** Fatima Khan  
**Reviewed by:** Nick Ly  
**Date Analyzed:** 01/22/2014  
**Date Issued:** 01/22/2014

---

**Note:** Method QC results are acceptable unless stated otherwise.  
Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.
<table>
<thead>
<tr>
<th>Lab #</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-01</td>
<td>Pool Bldg</td>
<td>Brick Mortar</td>
<td></td>
</tr>
<tr>
<td>M-02</td>
<td>Hec Ed E, side of Pool Bldg</td>
<td>Brick Mortar</td>
<td></td>
</tr>
</tbody>
</table>
Attachments

Prior/Historical Sampling Data:

PBS Survey Data for the Alaska Airline Arena (Edmundson Pavilion)
HVAC improvements (UW 203204) dated September 27, 2011
<table>
<thead>
<tr>
<th>PBS Sample #</th>
<th>Material Type</th>
<th>Sample Location</th>
<th>Lab Description</th>
<th>Lab Result</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>40035.530 -01</td>
<td>Pipe insulation - chiller unit piping (Fiberglass)</td>
<td>Upper Mezzanine - Mechanical space, grid 21/H</td>
<td>Layer 1: Trace white soft mastic with woven fibrous material and paper</td>
<td>NAD</td>
<td>NVL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 2: Trace yellow brittle mastic with foil</td>
<td>NAD</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 3: Yellow fibrous material</td>
<td>NAD</td>
<td></td>
</tr>
<tr>
<td>40035.530 -02</td>
<td>Expansion joint and insulation</td>
<td>Upper Mezzanine - Mechanical space, west wall</td>
<td>Layer 1: Green soft/elastic material with fibrous material</td>
<td>NAD</td>
<td>NVL</td>
</tr>
<tr>
<td>40035.530 -03</td>
<td>Fireproof on beams-white/gray</td>
<td>Staircase number 5 to Mechanical space</td>
<td>Layer 1: Gray powdery fibrous material with paint</td>
<td>NAD</td>
<td>NVL</td>
</tr>
<tr>
<td>40035.530 -04</td>
<td>Fireproof on column</td>
<td>Level 4 - Video area - column 21/F.9</td>
<td>Layer 1: Gray powdery fibrous material with paint</td>
<td>NAD</td>
<td>NVL</td>
</tr>
<tr>
<td>40035.530 -05</td>
<td>12&quot; Floor tile (blue) Adhesive (gold)</td>
<td>Level 4 Video area - Hallway</td>
<td>Layer 1: Blue vinyl tile</td>
<td>NAD</td>
<td>NVL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 2: Yellow brittle mastic with debris</td>
<td>NAD</td>
<td></td>
</tr>
<tr>
<td>40035.530 -06</td>
<td>Joint compound</td>
<td>Level 4 - Video area - Middle - east wall</td>
<td>Layer 1: White compacted powdery material</td>
<td>NAD</td>
<td>NVL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 2: White chalky material with paper</td>
<td>NAD</td>
<td></td>
</tr>
<tr>
<td>40035.530 -07</td>
<td>Joint compound</td>
<td>Level 4 - Video area - Middle - west wall</td>
<td>Layer 1: White compacted powdery material</td>
<td>NAD</td>
<td>NVL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Layer 2: Trace white chalky material with paper</td>
<td>NAD</td>
<td></td>
</tr>
<tr>
<td>40035.530 -08</td>
<td>2'x4' Ceiling tile - suspended</td>
<td>Level 4 - Video area - grid - 21/H middle</td>
<td>Layer 1: Gray compressed fibrous material with paint</td>
<td>NAD</td>
<td>NVL</td>
</tr>
<tr>
<td>40035.530 -09</td>
<td>Fireproof - white/gray deck</td>
<td>Level 4 - Video area - in ceiling, new location of A/C Unit</td>
<td>Layer 1: Gray powdery fibrous material with paint</td>
<td>NAD</td>
<td>NVL</td>
</tr>
</tbody>
</table>

September 27, 2011  NAD - No Asbestos Detected
## AA LEAD PAINT CHIP SAMPLE INVENTORY

<table>
<thead>
<tr>
<th>PBS Sample #</th>
<th>Paint Color / Component or Substrate</th>
<th>Sample Location</th>
<th>Results (mg/kg)</th>
<th>Results (%)</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>40035.530 -L01</td>
<td>Gray / Gypsum wallboard / Wall</td>
<td>Upper Mezzanine - Mechanical space - west wall</td>
<td>&lt;42.0</td>
<td>&lt;0.0042</td>
<td>NVL</td>
</tr>
<tr>
<td>40035.530 -L02</td>
<td>White / Gypsum wallboard / Wall</td>
<td>Mezzanine Level 4 - Video Area - middle, east wall</td>
<td>&lt;42.0</td>
<td>&lt;0.0042</td>
<td>NVL</td>
</tr>
<tr>
<td>40035.530 -L03</td>
<td>White / Gypsum wallboard / Wall</td>
<td>Mezzanine Level 4 - Video Area middle - west wall</td>
<td>&lt;42.0</td>
<td>&lt;0.0042</td>
<td>NVL</td>
</tr>
</tbody>
</table>

*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.
Appendix F

View Corridor Photos
* 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.

* The proposed project would not be visible from this location.

Note: This figure is not to scale.