

# ENVIRONMENTAL CHECKLIST

---

---

*for the proposed*

## ***Barnabie Point K-8 School Project***

**March 2024**

---

*EA Engineering, Science, and Technology, Inc., PBC  
AESI  
Davey Resource Group  
Raedeke Associates, Inc.  
The Transpo Group*

---

## **PREFACE**

The purpose of this Environmental Checklist is to identify and evaluate probable environmental impacts that could result from the **Barnabie Point K-8 School Project** and to identify measures to mitigate those impacts. The proposed project would provide a new three-story building in the northwest corner of the Herzl Ner Tamid campus to serve as a K-8 private school and office uses. In total, the proposed building would contain approximately 47,300 gross square feet of building space.

The State Environmental Policy Act (SEPA)<sup>1</sup> requires that all governmental agencies consider the environmental impacts of a proposal before the proposal is decided upon. This Final 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); and the Mercer Island City Code (MICC 19.21), 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 **Barnabie Point K-8 School Project**. Analysis associated with the proposed project contained in this Environmental Checklist is based on plans for the project, which are on-file with the City of Mercer Island. While not construction-level detail, the plans accurately represent the eventual size, location and configuration of the proposed project and are considered adequate for analysis and disclosure of environmental impacts.

This Environmental Checklist is organized into three major sections. *Section A* of the Checklist (starting 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 33) contains the signature of the proponent, confirming the completeness of this Environmental Checklist.

---

<sup>1</sup> Chapter 43.21C. RCW

# Table of Contents

---

<b>A. Background</b> .....	<b>1</b>
1. Project Name .....	1
2. Applicant: .....	1
3. Address of Contact Person: .....	1
4. Date Checklist Prepared: .....	1
5. Agency Requesting Checklist: .....	1
6. Proposed Timing or Schedule .....	1
7. Future Plans .....	1
8. Additional Environmental Information .....	2
9. Pending Applications .....	2
10. Government Approvals .....	2
11. Project Description .....	3
12. Location of the proposal. ....	8
<b>B. Environmental Elements</b> .....	<b>9</b>
1. Earth .....	9
2. Air .....	11
3. Water .....	13
4. Plants .....	15
5. Animals .....	17
6. Energy and Natural Resources .....	18
7. Environmental Health .....	19
8. Land and Shoreline Use .....	21
9. Housing .....	24
10. Aesthetics .....	25
11. Light and Glare .....	25
12. Recreation .....	26
13. Historic and Cultural Preservation .....	27
14. Transportation .....	28
15. Public Services .....	30
16. Utilities .....	31
<b>C. Signature</b> .....	<b>33</b>

Appendix A: Greenhouse Gas Emissions Worksheet

# SEPA ENVIRONMENTAL CHECKLIST

## **Purpose of checklist**

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization, or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

## **Instructions for applicants**

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. **You may use “not applicable” or “does not apply” only when you can explain why it does not apply and not when the answer is unknown.** You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to **all parts of your proposal**, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

## **Instructions for lead agencies**

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

## **Use of checklist for nonproject proposals**

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B, plus the [Supplemental Sheet for Nonproject Actions \(Part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in “Part B: Environmental Elements” that do not contribute meaningfully to the analysis of the proposal.

## **A. Background**

### **1. Name of proposed project, if applicable:**

*Barnabie Point K-8 School Project*

### **2. Name of applicant:**

Herzl Ner Tamid Conservative Congregation

### **3. Address and phone number of applicant and contact person:**

**Anjali Grant**

Project Architect – Anjali Grant Design

3427 Beacon Avenue S

Seattle, WA 98144

206-512-4029

[anjali@agrantdesign.com](mailto:anjali@agrantdesign.com)

### **4. Date checklist prepared:**

March 27, 2024

### **5. Agency requesting checklist:**

City of Mercer Island

### **6. Proposed timing or schedule (including phasing, if applicable):**

The *Barnabie Point K-8 School Project* that is analyzed in this Environmental Checklist involves site preparation work, construction, and operation of the project. Site preparation and construction could begin in December 2024 and would be anticipated to last approximately 12 to 18 months.

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

While no future additions or expansions are anticipated for the proposed *Barnabie Point K-8 School Project*, it should be noted that a separate project is also proposed for the existing Herzl Ner Tamid Conservative Congregation building for interior tenant improvements to the existing building that would renovate existing interior areas and convert four existing weekend religious school classroom areas to two classrooms that can be utilized for Pre-K weekday school as well as weekend religious school use.

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

The following environmental information has been prepared for the project and is included as part of the permit submittal to the City of Mercer Island.

- *Geotechnical Report* (AESI, October 2023);
- *Greenhouse Gas Emissions Worksheet* (EA Engineering, March 2024);
- *Arborist Report* (Davey Resource Group, September 2023);
- *Wetland Delineation Report* (Raedeke Associates, Inc., March 2024);
- *Transportation Impact Analysis Scope Memo* (The Transpo Group, February 2024)

**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 *Barnabie Point K-8 School Project* site.

As noted above in Section A.8, a separate project is also proposed for the existing Herzl Ner Tamid Conservative Congregation building for interior tenant improvements to the building that would renovate existing interior areas and convert four existing weekend religious school classroom areas to two classrooms that can be utilized for Pre-K weekday school as well as weekend religious school use.

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

**City of Mercer Island**

Permits/approvals associated with the proposed project, including:

- Clearing and Grading Permit
- Land Use Permit
- Building Permit
- Mechanical Permits
- Electrical and Fire Alarm Permits
- Drainage and Sewer Permit
- Comprehensive Drainage Control Plan Approval
- Drainage Control Plan with Construction Best Management Practices, Erosion and Sediment Control Approval

**King County**

- Plumbing Permit
- Health Department Approval

**Washington State Department of Ecology**

- NPDES Construction Stormwater General Permit

**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 overall Herzl Ner Tamid campus is comprised of three parcels (Parcel Nos. 0824059045, 2107000010, and 1515600010). The proposed **Barnabie Point K-8 School Project** site is located on the northwestern-most parcel (Parcel No. 0824059045). The existing, approximately 26,800-square foot **Barnabie Point K-8 School Project** site is currently undeveloped and comprised of existing trees and vegetation. Small seating areas and a gravel pathway are located in portions of the development site (see **Figure 1** for a vicinity map and **Figure 2** for an aerial view of the site).

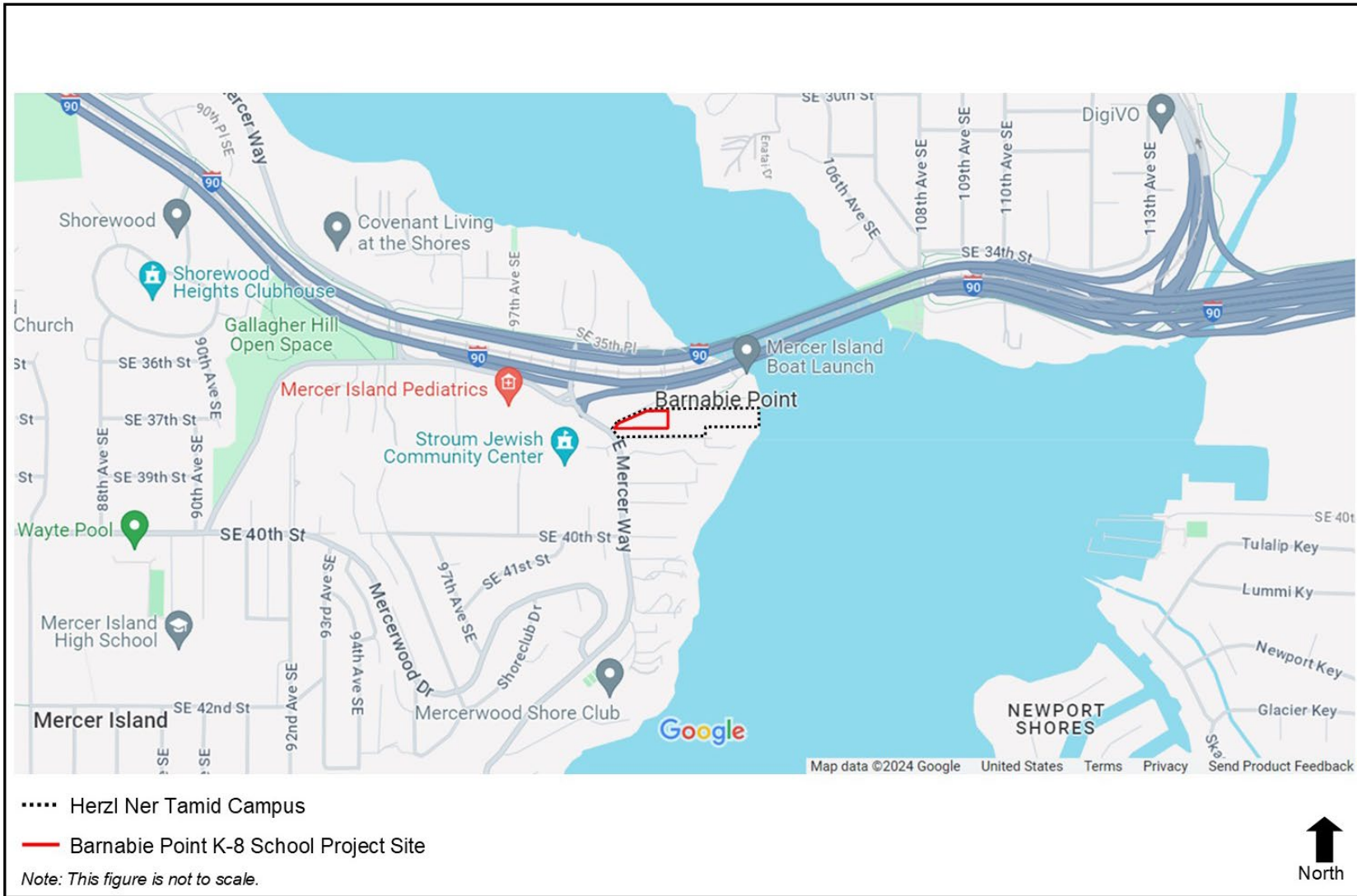
The remainder of the Herzl Ner Tamid campus consists of the existing developed area for the Herzl Ner Tamid Conservative Congregation. Parcel No. 2107000010 (the southwestern-most parcel) is comprised of existing paved areas for vehicle access and parking for the Herzl Ner Tamid campus.

Parcel No. 1515600010 contains the existing development associated with the Herzl Ner Tamid Conservative Congregation including existing buildings, recreation and outdoor gathering areas, walkways, parking, and site vehicle circulation areas. The existing, single-story, approximately 22,000-square foot building is utilized by Herzl Ner Tamid Conservative Congregation for religious services, weekend religious school activities, and other gatherings and events. Existing landscape areas, outdoor gathering space, walkways and parking are located to the east of the existing building along with the existing access loop driveway. Further to the east are an existing caretaker's residence building and existing recreation areas, including playground areas and associated equipment, gathering space/amphitheater areas, landscape areas and waterfront access to Lake Washington.

Proposed Project

The proposed **Barnabie Point K-8 School Project** would provide a new three-story building in the northwest corner of the Herzl Ner Tamid campus (Parcel No. 0824059045) to serve as a K-8 private school and office uses. In total, the proposed building would contain approximately 47,300 gross square feet of building space.

## Barnabie Point K-8 School Project Environmental Checklist



Source: Google Maps and EA Engineering, 2024.



**Figure 1**

Vicinity Map



## Barnabie Point K-8 School Project Environmental Checklist



Source: Raedeke Associates, 2024.



**Figure 2**  
Aerial Map

The basement level of the proposed building would include a multi-purpose room/gymnasium, classrooms, music/stage space, faculty areas, a kitchen, storage and mechanical/electrical rooms. Level 1 would include classrooms, school offices, administrative space, and a breakout room. Level 2 would contain classrooms and leased office areas. Level 3 would contain leased office areas (see **Figure 3** for the proposed site plan for the project). Office areas on Level 2 and 3 of the proposed building would be intended to be leased to regional/local non-profit organizations.

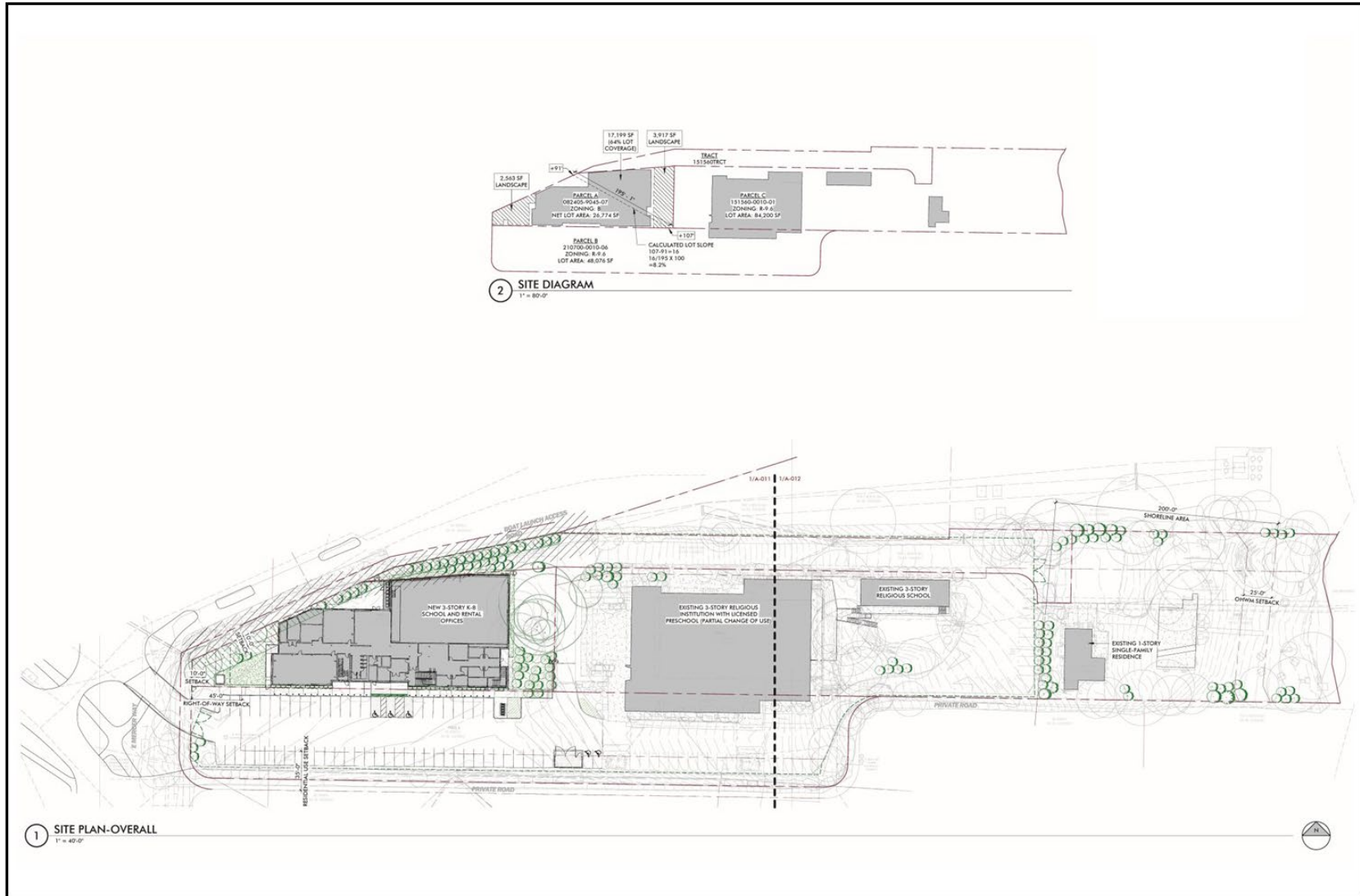
Once completed, the proposed **Barnabie Point K-8 School Project** building would have the capacity to serve approximately 150 students in grades K-8<sup>th</sup>. The proposed project would also result approximately 35 full-time faculty and 8 part-time faculty to serve the anticipated student population. The private school program space would be operated by the Jewish Day School which is currently located in Bellevue and would transfer their operations to the proposed building once it is operational.

Recreational space for the proposed project would be provided at the basement level of the building in the form of the multi-purpose/gymnasium room. This proposed area would be provide indoor recreation space for the school which is not currently available on the site and allow for various sports and other activities for students. The proposed **Barnabie Point K-8 School Project** building would also utilize the existing recreation areas on the Herzl Ner Tamid campus including the playground area and associated equipment, outdoor gathering space/open space/amphitheater areas, landscape areas and waterfront access to the Lake Washington shoreline.

The proposed **Barnabie Point K-8 School Project** would utilize existing vehicle access from Frontage Road via E Mercer Way and existing parking areas on the Herzl Ner Tamid campus. Existing parking areas to the south of the proposed building project site (on Parcel No. 2107000010) would be utilized during the school day for staff and visitor parking. Approximately 57 parking stalls and two ADA parking stalls are currently located on this parcel to serve the campus. With the proposed project, three new ADA parking stalls and bicycle parking for approximately 10 bicycles would be provided in this area. Additional parking areas are located near the existing Herzl Ner Tamid building, including approximately 37 existing parking stalls; one new ADA parking stall would also be added to this area. In total, approximately 94 parking stalls and six ADA parking stalls would be available on the Herzl Ner Tamid campus. Parent vehicle drop-off and pickup would occur via the existing access loop driveway on the Herzl Ner Tamid campus.

Construction of the **Barnabie Point K-8 School Project** is anticipated to begin in December 2024 and would last for a duration of approximately 12 to 18 months.

## Barnabie Point K-8 School Project Environmental Checklist



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

**Figure 3**  
Site Plan

As indicated above in Section A.9, it should be noted that a separate project is also proposed for the existing Herzl Ner Tamid Conservative Congregation building for interior tenant improvements to the building that would renovate existing interior areas and convert four existing weekend religious school classrooms to two classrooms that can be utilized for Pre-K weekday school uses as well as the current weekend religious school use. On its own, this project would not typically be subject to SEPA review. However, to provide a comprehensive review of changes to the overall Herzl Ner Tamid campus, this separate project is referenced in this SEPA Checklist along with the *Barnabie Point K-8 School Project*, where applicable.

**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, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.**

The Herzl Ner Tamid campus is located at 3700 E Mercer Way in the northeast corner of Mercer Island (a portion of the SW Quarter of Section 8, Township 24, and Range 5). The campus is comprised of three parcels (Parcel Nos. 0824059045, 2107000010, and 1515600010). The site of the proposed *Barnabie Point K-8 School Project* is located on the northwestern-most parcel (Parcel No. 0824059045). See **Figure 1** for a vicinity map, **Figure 2** for an aerial view of the site, and **Figure 3** for a site plan of the proposed project.

## **B. Environmental Elements**

### **1. Earth**

#### **a. General description of the site:**

Circle or highlight one: Flat, rolling, hilly, steep slopes, mountainous, other: gentle slope

The *Barnabie Point K-8 School Project* site is located in the northwest corner of the campus. The topography of the site slopes gently to the north and gradually steepens beyond the property boundary toward Frontage Road. Overall topographic change across the site ranges from approximately 5 to 10 feet. Slopes that are adjacent to the north of the site are inclined at approximately 60 percent over a maximum height of approximately 20 feet (AESI, 2023).

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

As noted above, the area of the proposed project gently slopes to the north. The steepest slope is located along the north property boundary and is approximately 30 percent.

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

A Geotechnical Report was prepared for the project by AESI and included three soil exploration borings across the proposed project site area to define the general soil conditions (AESI, 2023). Exploration borings were completed to a depth of approximately 21 to 42 feet below ground surface. Near-surface native sediments generally consisted of a surficial layer of existing fill overlying native nonglacial sediments of pre-Fraser age.

Fill generally consisted of dry to slightly moist, primarily gray with zones of brown and tan, soft to stiff fine sandy silt ranging to silt with variable gravel and organic content. Existing fill would not be considered suitable for foundation support and would require removal and replacement with structural fill in areas where the building foundation would be close to existing grades.

Directly below the existing fill are pre-Fraser nonglacial sediments which contained occasional silt and clay interbeds, slightly disturbed textures, sandy laminations, micas, scattered fine organics and dark orange-brown to black iron-oxide staining. Directly below the pre-Fraser nonglacial sediments are pre-Fraser lacustrine deposits consisting of stiff to hard, bluish gray to light brown silt with trace fine micas and trace to absent sand content.

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

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

There are no indications or history of unstable soils on the site or adjacent to the site and no evidence of landslide activity or unstable soils has been observed. The Geotechnical Report prepared by AESI includes a review of geologic hazards, including landslide hazards, seismic hazards, and erosion hazards. The report concludes that the existing landslide area to the immediate north of the site appears to be the result of grading for the development of Frontage Road and shows no signs of landsliding activity. Therefore, the potential risk of slope movement is anticipated to be low. Potential risk from seismic hazards is also anticipated to be low. Onsite soils could be susceptible to erosion during construction and best management practices (BMPs) are identified in the Geotechnical Report and summarized below to minimize erosion (AESI, 2023).

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

Approximately 700 cubic yards of stripped forest floor material would be removed from the site along with excavation of approximately 10,000 cubic yards of cut material for building excavations. Approximately 500 cubic yards of structural fill material would be imported to the site as part of building development. The specific source of fill material is not known at this time but would be obtained from an approved source.

- f. Could erosion occur because of clearing, construction, or use? If so, generally describe.**

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 and the implementation of best management practices (BMPs) during construction would mitigate any potential impacts. The Geotechnical Report identifies measures to minimize potential erosion. Those measures are summarized in Section B.1.h.

Once the project is operational, no erosion is anticipated.

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

The proposed project site is almost entirely covered with existing vegetation, trees and other natural surfaces.

With the completion of the proposed **Barnabie Point K-8 School Project**, approximately 72 percent of the site would be covered with impervious surfaces. Impervious surfaces would primarily consist of the proposed building, walkways, and other impervious surfaces.

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

No significant erosion is anticipated with the construction of the proposed project. The proposed project would comply with City of Mercer Island regulations, including providing a Temporary Erosion and Sedimentation Control (TESC) Plan and Best Management Practices (BMPs). The Geotechnical Report (*AESI, 2023*) for the project identifies several measures to minimize erosion, including:

- Construction activity should be scheduled or phased as much as possible to reduce the amount of earthwork activity that is performed during winter months.
- The winter performance of a site is dependent on a well conceived plan for control of site erosion and stormwater runoff. The TESC Plan should include ground-cover measures, access roads, and staging areas.
- TESC measures for a given area, to be graded or otherwise worked, should be installed prior to any activity within that area.
- During the wetter months, or when large storm events are predicted during the summer months, each work area should be stabilized so that if precipitation occurs, the work area can receive the rainfall without excessive erosion or sedimentation transport.
- All disturbed areas should be revegetated as soon as possible.
- Surface runoff and discharge should be controlled during and following development.
- Soils that are to be reused around the site should be stored in a manner as to reduce erosion from the stockpile.

**2. Air**

**a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.**

During construction, the *Barnabie Point K-8 School 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 air quality emissions would result from particulates associated with 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, with the implementation of a TESC plan and construction BMPs, air quality emission impacts are not anticipated to be significant. Temporary, localized emissions associated with carbon monoxide and hydrocarbons would also result from diesel and gasoline-powered construction equipment operating on-site, construction traffic accessing the project site, and construction worker traffic. 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 continue to be from vehicles travelling to and from the site, including staff and parent vehicles. The increase in vehicles travelling to the site would not be anticipated to substantially increase emissions in the area.

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, a Greenhouse Gas Emissions Worksheet has been prepared (see **Appendix A** 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 new building would be approximately 53,280 MTCO<sub>2</sub>e<sup>2</sup>. Based on an assumed building life of 62.5 years<sup>3</sup>, the proposed building project would be estimated to generate approximately 853 MTCO<sub>2</sub>e annually. For reference, the Washington State Department of Ecology threshold for potential significant GHG emissions is 25,000 MTCO<sub>2</sub>e annually. Therefore, the proposed project would not be anticipated to generate a significant amount of GHG emissions.

**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 Interstate-90 and E Mercer Way. There are no known off-site sources of air emissions or odors that may affect the proposed project.

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

No significant air quality impacts are anticipated with the construction of the proposed project. Construction activities would be required to comply with Puget Sound Clean Air Agency (PSCAA) regulations, including Regulation I, Section 9.11 (prohibiting the emission of air contaminants that would be injurious to human health) and Regulation I, Section 9.15 (prohibiting the emission of fugitive dust, unless reasonable precautions are employed).

---

<sup>2</sup> MTCO<sub>2</sub>e is defined as Metric Ton Carbon Dioxide Equivalent and is a standard measure of amount of CO<sub>2</sub> emissions reduced or sequestered.

<sup>3</sup> According to the Greenhouse Gas Emissions Worksheet, 62.5 years is the assumed building lifespan for educational buildings.



### **3. Water**

#### **a. Surface Water:**

- 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.**

The proposed *Barnabie Point K-8 School Project* site is located immediately to the west of Lake Washington. The shoreline area of Lake Washington was documented by Raedeke Associates, Inc. as part of the critical areas review for the project (see **Figure 2**).

- 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.**

Construction of the proposed *Barnabie Point K-8 School Project* building would not occur over, in, or adjacent (within 200 feet) to Lake Washington. Proposed stormwater management features, including stormwater outfalls would be located in and adjacent to the shoreline area.

- 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 a 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.

- 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 Water:**

- 1. Will groundwater be withdrawn from a well for drinking water or other purposes? 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 a general description, purpose, and approximate quantities if known.**

No groundwater would be withdrawn, or water discharged to ground water as part of the proposed project. Geotechnical investigations that were completed in September 2023 did not encounter any groundwater within the excavation boring locations on the site (approximately 21 to 42 feet deep).

- 2. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (domestic sewage; 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 stormwater):**

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

The existing ***Barnabie Point K-8 School Project*** site is entirely covered by natural vegetation including existing trees, shrubs and other natural material. Existing stormwater management for the overall Herzl Ner Tamid campus is separated into two areas. The western third of the campus (including the ***Barnabie Point K-8 School Project*** site and the existing surface parking lot) drains off-site to the northwest and connects with a private stormwater system located in the Boat Launch Access Drive which is owned by PSE; this system ultimately drains to Lake Washington. Stormwater for the eastern two-thirds of the campus (including the existing buildings, parking, access driveway loop, etc.) is collected onsite in a series of existing drains and pipes which flow to the east and discharge into Lake Washington. In this area there is also some surface flow adjacent to the lake as it is not collected into the piped system.

With completion of the ***Barnabie Point K-8 School Project***, approximately 72 percent of the development site would be covered with impervious surfaces, including the proposed building, walkways, and other hard surfaces. Stormwater management for the proposed project would be designed to be consistent with the City of Mercer Island's current stormwater code (Mercer Island City Code [MICC] Chapter 15.09). The new private stormwater system would collect new and replaced impervious surfaces and convey

stormwater to the east. Water quality treatment would be provided consistent with MICC 15.09 and stormwater would ultimately discharge into Lake Washington above the ordinary high-water mark.

It should be noted that the separate project to renovate two classrooms in the existing Herzl Ner Tamid building for use as a Pre-K weekday school would include some level of landscape work to the east of the existing building and would be anticipated to result in a net zero change in impervious surface in this portion of the campus.

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

The existing stormwater management system for the site and the proposed system for the **Barnabie Point K-8 School Project** would 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.

**4. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any.**

The following measures would be implemented to control surface, ground and runoff water impacts:

- A Temporary Erosion and Sedimentation Control (TESC) Plan and Construction Best Management Practices (BMPs) would be implemented during construction to reduce erosion and minimize impacts to water resources.
- Stormwater management for the proposed project would comply with applicable City requirements, including the City of Mercer Island’s Stormwater Code (MICC Chapter 15.09).

**4. Plants**

**a. Check the types of vegetation found on the site:**

- deciduous tree: alder, maple, aspen, other: cherry, purple leaf plum, willow, ash, hawthorn, locust
- evergreen tree: fir, cedar, pine, other: cypress
- shrubs
- grass
- pasture

- crop or grain**
- orchards, vineyards, or other permanent crops.**
- wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other**
- water plants: water lily, eelgrass, milfoil, other**
- other types of vegetation**

An Arborist Report (including tree inventory and tree protection plan) was completed for the **Barnabie Point K-8 School Project** by the Davey Resources Group. The tree inventory included an assessment of approximately 131 large regulated trees<sup>4</sup> on the site. Tree species that were identified included Western red cedar, Douglas fir, Norway maple, Purple leaf plum, Ash, Willow, Big leaf maple, Yellow cedar, Vine maple, Lawsons cypress, Deodar cedar, Sugar maple, Cherry, Black locust, Red alder, and English hawthorn. The existing trees range in size from approximately 10 inches in diameter to approximately 42 inches in diameter (*Davey Resources Group, 2023*).

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

Development of the proposed **Barnabie Point K-8 School Project** would require the removal of existing vegetation and trees within the proposed building development area. It is anticipated that approximately 65 trees would be removed as part of the construction process, along with understory vegetation such as shrubs and groundcover. Removed trees would include existing deciduous trees (e.g., Big leaf maple and Red alder) and existing evergreen trees (e.g., Western red cedar and Douglas fir). The proposed project design would retain approximately 66 existing trees (retention of approximately 50 percent of the existing trees on the site). Retained trees would be protected during the construction process in accordance with the recommendations identified in the Arborist Report and Tree Protection Plan (*Davey Resources Group, 2023*).

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

No known threatened or endangered plant 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.**

New landscaping would be provided onsite as part of the project and would be consistent with City of Mercer Island requirements (MICC 19.12.040) at the time of permitting. Proposed landscaping for the project would include outdoor spaces adjacent to the

---

<sup>4</sup> Large regulated trees are considered any tree with a diameter of 10 inches or more, and any tree that meets the definition of an Exceptional Tree (MICC 19.16).

building and landscape plantings throughout the site area to reinforce the natural and wooded character of Mercer Island.

Replacement trees would be provided for trees removed during the construction process and would be in accordance with the City's requirements at the time of permit submittal. Approximately 50 new native trees would be planted on the site as part of the proposed landscaping for the project. Native shrubs and groundcovers would also be planted adjacent to the new building. Existing trees that are proposed to be retained would be protected during construction by following the tree protection measures that are outlined in the Arborist Report (*Davey Resources Group, 2023*).

**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 English Ivy and Himalayan blackberry.

**5. Animals**

**a. List any birds and other animals that have been observed on or near the site or are known to be on or near the site.**

Examples include:

- **Birds:** hawk, heron, eagle, songbirds, other: crows, pigeons, seagulls
- **Mammals:** deer, bear, elk, beaver, other: squirrels, raccoons, rats, opossums
- **Fish:** bass, salmon, trout, herring, shellfish, other:

Urban wildlife have been observed on and in the vicinity of the ***Barnabie Point K-8 School Project*** site, including, crows, pigeons, squirrels, raccoons, rats, and opossums. Eagles are known to have been observed around the shoreline areas of Lake Washington. Data from the U.S. Fish and Wildlife Service indicates that eagles could be found in the vicinity; however, there are no known observations of eagle nesting areas within the site or adjacent areas (*US Fish and Wildlife, 2024*). The Washington State Department of Fish and Wildlife Priority Habitat and Species Map also indicates that several species of trout and salmon are known to be present within Lake Washington, including steelhead, sockeye, coho, Resident Coastal Cutthroat, bull trout/dolly varden, chinook, and kokanee (*Raedeke Associates, 2024*).

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

The following are listed threatened, endangered or candidate species in the vicinity based on data from the U.S. Fish and Wildlife Service: marbled murrelet, yellow-billed cuckoo, northwestern pond turtle, monarch butterfly, bull trout, and north american wolverine (*US Fish and Wildlife, 2024*). 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 proposed project site is not located within a specific migration route. However, in general, 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.**

New landscaping and trees would be provided as part of the project in accordance with City of Mercer Island requirements at the time of permit submittal. The project is not anticipated to have a substantial impact on wildlife located in the vicinity of the site.

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

There are no known invasive animal species on or adjacent to the project site; however, 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 is currently utilized by the existing buildings that are located on the Herzl Ner Tamid campus. The proposed **Barnabie Point K-8 School Project** would utilize electricity for lighting, heating, and electronics.

**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 potential use of solar energy by adjacent properties.

**c. 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 proposed project would be designed to meet the requirements of MICC 17.09 which adopts the Washington State Energy Code by reference. Energy conservation features that would be provided as part of the project include the following:

- Photovoltaic panels included in the proposed building design.
- An energy-efficient mechanical system, including heat pumps and heat recovery systems.
- LED lighting and advanced lighting system controls.

## 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 because of this proposal? If so, describe.

The existing *Barnabie Point K-8 School Project* site does not contain any existing buildings that could contain potential environmental health hazards. The proposed project is not anticipated to utilize any environmental health hazards as part of their operations.

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

The Washington State Department of Ecology website was reviewed to identify any potential contaminated soils on or in the vicinity of the site, as well as potential issues related to the former Tacoma Asarco Smelter Plume. There are no records of any existing or former cleanup actions on or adjacent to the project site and the site is located in an area where levels of arsenic and lead associated with the former smelter plume are anticipated to be below state cleanup levels.

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

No existing hazardous chemicals/conditions are located within the project area that would affect the proposed project.

#### b. 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.

Chemicals stored and used during construction would be limited to gasoline and other petroleum products that are utilized by construction equipment and vehicles.

Once the proposed project is operational, the potential chemicals that would be used on the site would generally be limited to cleaning supplies and would be stored in an appropriate and safe location.

**c. 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 Mercer Island or Eastside Fire and Rescue.

**d. Proposed measures to reduce or control environmental health hazards, if any.**

No environmental health impacts are anticipated and no mitigation measures are proposed.

**b. Noise**

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

There are no existing sources of noise in the area that would affect the proposed **Barnabie Point K-8 School Project**. Noise from vehicular traffic associated with adjacent roadways (e.g., Interstate-90 and E Mercer Way) is the primary source of noise in the vicinity of the project site.

**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 the site)?**

Short-Term Noise

Temporary construction-related noise would occur as a result of on-site construction activities associated with the proposed **Barnabie Point K-8 School Project**. Construction activities including, excavation, grading, and construction of the building would be the primary sources of construction noise during the development process.

Existing residential land uses surrounding the school, as well as the existing Herzl Ner Tamid operations that would remain on the overall campus during the construction process, would be the most sensitive noise receptors and could experience occasional noise-related impacts during construction activities.

Pursuant to Mercer Island City Code (MICC 8.24.Q.2), construction activities are allowed to occur between 7 AM and 7 PM on weekdays and 9 AM to 6 PM on Saturdays. Construction of the proposed project would comply with the provisions of the Mercer Island City Code as it relates to construction-related noise to reduce noise impacts during construction.



### Long-Term Noise

The proposed **Barnabie Point K-8 School Project** would likely result in a potential minor increase in noise from human voices and vehicles travelling to and from the site, particularly during the school day and during student drop-off and pickup. 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.**

No significant noise impacts are anticipated with the proposed project. However, the project includes the following measures would be provided to minimize noise during the construction process.

- As noted, the proposed project would comply with provisions of the Mercer Island City Code (MICC 8.24.Q); specifically construction hours would be limited to standard construction hours from 7 AM to 7 PM on weekdays and Saturdays from 9 AM to 6 PM.

### **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 proposed **Barnabie Point K-8 School Project** site is currently undeveloped and comprised of existing trees and vegetation. Small seating areas and a gravel pathway are located in portions of the development site. See **Figure 2** for an aerial photo of the existing site and **Figure 3** for the proposed site plan for the project. The proposed project would not be anticipated to affect current land uses on adjacent properties.

The remainder of the overall Herzl Ner Tamid campus consists of the existing developed area for the Herzl Ner Tamid Conservative Congregation including existing paved areas for vehicle access and parking for the Herzl Ner Tamid campus, existing buildings, recreation and outdoor gathering areas, walkways, parking, and site vehicle circulation areas. The existing, single-story, approximately 22,000-square foot building is centrally located on the campus and is utilized by Herzl Ner Tamid Conservative Congregation for religious services, weekend religious school activities, and other gatherings and events. Existing landscape areas, outdoor gathering space, walkways and parking are located to the east of the existing building along with the existing access loop driveway. Further to the east are an existing caretaker's residence building and existing recreation areas, including playground areas and associated equipment, gathering space/amphitheater areas, landscape areas and waterfront access to the Lake Washington shoreline.

Existing land uses surrounding the proposed **Barnabie Point K-8 School Project** site include Frontage Road, Interstate-90, PSE-owned property, and Aubrey Davis Park and

parking areas associated with the Mercer Island Boat Ramp to the north. The existing Herzl Ner Tamid building and associated parking, walkways and outdoor space are located to the east; Lake Washington is located at the eastern edge of the Herzl Ner Tamid campus. Existing single family residences are located to the south. Frontage Road and E Mercer Way are located to the west of the site; further to the west are the French American School of Puget Sound, the Stroum Jewish Community Center, and commercial/office uses.

- b. Has the project 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 because of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?**

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

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

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

- c. Describe any structures on the site.**

There are no existing structures on the proposed *Barnabie Point K-8 School Project* site.

An existing, single-story, approximately 22,000-square foot Herzl Ner Tamid Conservative Congregation building is located to the east of the proposed development site and is utilized for religious services, weekend religious school activities, and other gatherings and events. Two additional associated buildings are located further to the east on the campus.

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

No existing structures are anticipated to be demolished with the proposed project.

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

The current zoning classification for the site is Business (B) (*City of Mercer Island, 2024*).

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

The comprehensive plan future land use designation for the site is Single Family (*City of Mercer Island, 2024*)

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

The proposed ***Barnabie Point K-8 School Project*** site development area is not located within the City of Mercer Island designated shoreline master program area.

However, the eastern edge of the overall Herzl Ner Tamid campus that is adjacent to Lake Washington is located within the shoreline area and is designated as Urban Residential Environment.

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

The Geotechnical Report prepared by AESI includes a review of geologic hazards, including landslide hazards, seismic hazards, and erosion hazards. The report concludes that the existing landslide area to the immediate north of the ***Barnabie Point K-8 School Project*** site appears to be the result of grading for the development of Frontage Road and shows no signs of landsliding activity. No other geologic critical areas are located on or adjacent to the site.

A review of critical areas (e.g., wetlands and streams) was completed for the ***Barnabie Point K-8 School Project*** site by Raedeke Associates, Inc. (Raedeke Associates, 2024). Onsite investigations were completed, including review of background information, collection of information and samples for soils, vegetation and hydrology to characterize existing conditions and determine if any wetlands, streams or fish/wildlife habitat were on or in the vicinity of the development site. No wetlands, streams or fish/wildlife habitat areas were identified on the site. As noted above, the shoreline of Lake Washington is located east of the development site at the east edge of the overall Herzl Ner Tamid campus. The ordinary high water mark (OHWM) was flagged during field investigations (see **Figure 3**). Mercer Island City Code (MICC 19.13.050) requires a 25-foot standard building setback from the OHWM.

No other environmentally critical areas are located on or adjacent to the project site.

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

The proposed project would not provide any residential opportunities.

Operation of the ***Barnabie Point K-8 School Project*** would be anticipated to require approximately 35 full-time faculty and 8 part-time faculty to serve the estimated student population (approximately 150 students at full capacity).

**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 would occur and therefore 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 proposed project would be intended to be compatible with existing land uses and plans. The proposed design for the ***Barnabie Point K-8 School Project*** would be consistent with the applicable provisions of the Mercer Island City Code, including the City's Unified Land Development Code (MICC Title 19).

**m. Proposed measures to reduce or control impacts to 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 ***Barnabie Point K-8 School Project***.

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

An existing caretaker's residence building is located on the eastern end of the Herzl Ner Tamid campus and would remain with the proposed project.

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

No housing impacts would occur, and no mitigation would be necessary.

## 10. Aesthetics

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

The height of the proposed **Barnabie Point K-8 School Project** building at its tallest point would be approximately 36 feet. Principal exterior building materials would include sheet metal and prefinished fiber cement panel.

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

Existing views of the site are generally limited to areas to the south of the site since Interstate-90, Lake Washington and E Mercer Way abut the north, east and west edges of the site and overall Herzl Ner Tamid campus, respectively. Views of the development site would change from the existing, primarily vegetated site to reflect the proposed three-story, approximately 47,300-square foot building. New landscaping would be provided consistent with City of Mercer Island requirements and include approximately 50 new native trees and new native shrubs and groundcovers that would be planted adjacent to the proposed building. New landscaping would serve as a partial visual screen and enhance the aesthetic character of the site.

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

No significant impacts are anticipated with regard to aesthetics and no additional measures are proposed.

## 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 job site (to meet safety requirements) may be necessary, which would be noticeable proximate to the project site; however, such lighting would be temporary and is not anticipated to occur on a regular basis during construction. In general, light and glare from construction of the proposed project is not anticipated to adversely affect adjacent land uses.

### Long-Term Light and Glare

Under the proposed **Barnabie Point K-8 School Project**, there would be an increase in light and glare with the proposed building. Light and glare sources would primarily consist of interior and exterior building lighting, as well as lights from additional vehicles travelling to and from the site. Exterior building lighting and other proposed outdoor lighting would

be designed in accordance with applicable provisions of MICC 19.12.070 and would be intended to focus light on the site and minimize impacts to adjacent properties. The presence of retained trees as well as proposed landscaping and new trees would provide a buffer between the proposed building and existing off-site uses and minimize light and glare toward adjacent properties. Measures to further minimize light spillage on adjacent properties are also identified below and significant light and glare impacts would not be anticipated.

Glare from building materials (e.g., window glazing or other building materials) could also occur during certain times of day but would not be anticipated to create a significant impact.

**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 proposed design for the new building is intended to minimize lighting energy use by utilizing high-efficiency electric LED lights and advanced lighting controls to optimize lighting system operations as efficiently as possible. The proposed lighting design would be consistent with the City's lighting design standards (MICC 19.12.070).

## **12. Recreation**

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

The existing ***Barnabie Point K-8 School Project*** site is currently undeveloped and comprised of existing vegetation and trees. No designated recreation uses are located on the project site; however, informal pathways and a small seating area are located on a small portion of the site. The overall Herzl Ner Tamid campus contains several existing recreation amenities on the eastern portion of the campus. Existing landscape areas, outdoor gathering space, and walkways are located to the east of the existing Herzl Ner Tamid building. Further to the east are existing recreation areas, including playground areas and associated equipment, gathering space/amphitheater areas, landscape areas and waterfront access to the Lake Washington shoreline.

There are also several parks and recreation areas in the vicinity of the project site (approximately 1.0 mile), including:

- Aubrey Davis Park and Boat Ramp is located immediately to the north of the site.
- Gallanger Hill Open Space is located approximately 0.5 miles to the west.
- Upper Luther Burbank Park is located approximately 0.8 miles to the west.
- Rotary Park is located approximately 0.9 miles to the southwest.
- Hollerbach Park is located approximately 0.9 miles to the southwest.
- Luther Burbank Park is located approximately 1.0 miles to the northwest.

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

The proposed project require the removal of some existing trees and vegetation on the ***Barnabie Point K-8 School Project*** site but would not displace any existing designated recreation uses. New recreation uses that would be provided as part of the proposed project would include the proposed gymnasium/multi-purpose room that would be located on the lower level of the new building. This space would provide new, indoor recreation space to allow opportunities for different sports and indoor activities for students. Students would also be able to utilize the existing recreation areas on the overall Herzl Ner Tamid campus, including the playground areas and associated equipment, gathering space/amphitheater areas, landscape areas and waterfront areas of the Lake Washington shoreline.

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

As noted above, the proposed ***Barnabie Point K-8 School Project*** would not displace any existing, formal recreation uses on the site. New recreation space would be provided in the form of the proposed gymnasium/multi-purpose room which would create new, indoor recreation opportunities on the site for students. No additional mitigation measures would be necessary.

### **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? If so, specifically describe.**

There are no existing buildings located on the proposed ***Barnabie Point K-8 School Project*** development site. The existing Herzl Ner Tamid building was constructed in 1972. Based on information of the Washington Department of Archaeology and Historic Preservation's

(DAHP) Washington Information System for Architectural and Archaeological Records Data (WISAARD), the existing building is not listed or determined to be eligible for national, state or local preservation registers. There are also no listed or eligible buildings adjacent to the site (DAHP, 2024).

- 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.**

There are no known landmarks, features or other evidence of Indian or historic use or occupation of the site. There is no known material evidence, artifacts or areas of cultural importance on or near the site. The DAHP WISAARD predictive model indicates that the project site is comprised of area that could be considered high risk for archaeological resources. The predictive model is a statewide planning tool that utilizes statistical predictive modeling based on several environmental factors such as soils, geology, distance to water, slopes and elevation.

- 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 and WISAARD were consulted to identify any potential historic or cultural resource sites in the surrounding area, as well as the potential for encountering archaeological resources in the area.

- 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.**

No significant impacts to historic or cultural resources are anticipated and no mitigation measures are proposed.

## **14. Transportation**

A Transportation Impact Analysis (TIA) Scope Memorandum was prepared for the **Barnabie Point K-8 School Project** by the Transpo Group and submitted to the City of Mercer Island on February 6, 2024. Information from that memorandum is summarized below. The Transpo Group is also currently preparing the TIA for the project.



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

Vehicular access to the **Barnabie Point K-8 School Project** site and the overall Herzl Ner Tamid campus is provided along the western edge of the site from Frontage Road via E Mercer Way. E Mercer Way is considered a collector arterial adjacent to the project site. Access ramps to Interstate-90 are located approximately 400 feet to the northwest of the site.

The area to the south of the proposed development area (Parcel No. 2107000010) is comprised of existing paved areas for vehicle access and parking for the Herzl Ner Tamid campus. Approximately 57 parking stalls and two ADA parking stalls are currently located on this parcel to serve the campus. With the proposed project, three new ADA parking stalls and bicycle parking for approximately 10 bicycles would be provided in this area as well. Vehicle access through the site continues to the east via the loop driveway that circles the existing Herzl Ner Tamid building. Additional parking areas are located near the existing building, including approximately 37 existing parking stalls; one new ADA parking stall would also be added to this area.

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

There are no existing King County Metro Transit (Metro) or Sound Transit routes that provide public transit service to the site or immediate site vicinity. Transit service on Mercer Island is generally centered around two park and ride lots – the Mercer Island Park and Ride (located approximately 1.4 miles to the northwest) and the Mercer Island Presbyterian Church Park and Ride (located 1.0 miles to the west). The Mercer Island Park and Ride is served by Metro routes 204, 216, 630 and 989, as well as Sound Transit routes 550 and 554. The Mercer Island Presbyterian Church Park and Ride is generally served by Metro routes 204 and 630.

**c. 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 project would provide connections to the existing asphalt sidewalk in the public right-of-way. No other additional street or frontage improvements are proposed

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

The proposed project would not use water or air transportation.

An existing boat ramp is located to the north of the site within Audrey Davis Park; however, the proposed project would not utilize or affect the use of the boat ramp.

- e. **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?**

Based on information prepared by the Transpo Group as part of the TIA Scope Memorandum, it is anticipated that operation of the proposed ***Barnabie Point K-8 School Project*** (school use and office use) would generate approximately 171 vehicle trips (101 in and 69 out) during the weekday AM peak hour. During the weekday PM peak hour, approximately 53 vehicle trips (20 in and 33 out) would be generated. It should be noted that additional vehicle trips to the site could be generated by the separate project to renovate two classrooms in the existing Herzl Ner Tamid building for use as a Pre-K weekday school. Potential vehicle trips associated with the Pre-K weekday school will be analyzed as part of the TIA that is being prepared by the Transpo Group.

Project trip generation estimates were developed based on information contained in the Institute of Transportation Engineers (ITE) Trip Generation (11<sup>th</sup> Edition, 2021). Trips were calculated using the private school and general office land uses.

- f. **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.**

The proposed project would not interfere with the movement of agricultural or forest products on streets in the area because no agricultural or working forest lands are located within the vicinity of the project site.

- g. **Proposed measures to reduce or control transportation impacts, if any.**

Any potential measures to reduce or control transportation impacts would be identified as part of the TIA that is currently being prepared by the Transpo Group.

## **15. Public Services**

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

While the proposed ***Barnabie Point K-8 School Project*** would result in new student capacity and new staff at the school, it 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 new student and staff populations on the site may result in some incremental increase in demand for emergency services; however, it is anticipated that adequate service capacity is available from the Mercer Island Police Department and Eastside Fire and Rescue to preclude the need for additional public facilities/services.

**16. Utilities**

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

All utilities that are underlined above are currently available at the Herzl Ner Tamid campus; however, the proposed *Barnabie Point K-8 School Project* would not utilize natural gas.

**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 the immediate vicinity which might be needed.**

The proposed *Barnabie Point K-8 School Project* would continue to utilize the existing utilities that serve the Herzl Ner Tamid campus as noted below:

- Electrical (Puget Sound Energy) – Existing electrical service is provided to the Herzl Ner Tamid campus by Puget Sound Energy (PSE). New electrical service would be provided to the proposed building through a transformer located at the southeast corner of the building which would ultimately connect with PSE utility interace in the public right-of-way.
- Water (City of Mercer Island) – The City of Mercer Island provides water service to the existing Herzl Ner Tamid campus and new water connections would be provided for the proposed building. A new eight-inch ductile iron public water main would be located to the south of the proposed building to provide water service. A new fire hydrant and fire service connection would also be located near the southeast corner of the proposed building.
- Sewer (City of Mercer Island) – The City of Mercer Island also provides sanitary sewer service to the existing Herzl Ner Tamid campus. Sanitary sewer service would be provided through a new, eight-inch private sanitary sewer main that would be located near the southwest corner of the proposed building and ultimately connect with the City’s public system.

- Refuse Service (Recology) – Recology has provided refuse service for the City of Mercer Island since 2019 and would provide service for the proposed project. Refuse collection areas would be located to the south of the proposed building.
- Telecommunications (Various franchise communication providers) – New telecommunications service connections would be provided for the proposed building.

### **C. Signature**

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

A handwritten signature in blue ink, appearing to be 'Jeff Ding', written over a faint rectangular stamp.

**Type name of signee:** Jeff Ding

**Position and agency/organization:** Planner, EA Engineering, Science and Technology, PBC, Inc.

**Date submitted:** 3/27/2024

## REFERENCES

- Associated Earth Sciences, Inc. (AESI). *Herzl Ner Tamid Conservative Congregation Preliminary Geotechnical Report*. October 27, 2023.
- City of Mercer Island. *City of Mercer Island Comprehensive Plan* [https://library.municode.com/wa/mercer\\_island/codes/comprehensive\\_plan](https://library.municode.com/wa/mercer_island/codes/comprehensive_plan). Accessed March 2024.
- City of Mercer Island. *City of Mercer Island GIS Portal website:* <https://chgis1.mercergov.org/Html5Viewer/Index.html?viewer=PubMaps&viewer=PubMaps>. Accessed March 2024.
- City of Mercer Island. *City of Mercer Island City Code* [https://library.municode.com/wa/mercer\\_island/codes/city\\_code](https://library.municode.com/wa/mercer_island/codes/city_code). Accessed March 2024
- Davey Resource Group, Inc. *Arborist Report and Tree Protection Plan for Herzl Ner Tamid Conservative Congregation*. September 29, 2023.
- Raedeke Associates, Inc. *Wetland Delineation Report: Herzl Ner Tamid Property*. March 26, 2024.
- The Transpo Group. *Private School (HNT Site) – Transportation Impact Analysis Scope Memorandum*. February 6, 2024.
- U.S. Fish and Wildlife Service. *IPaC*. <https://ecos.fws.gov/ipac/location/index>. Accessed March 2024.
- Washington State Department of Archaeology and Historic Preservation. *Washington Information System for Architectural and Archaeological Records Data*. Accessed March 2024.
- Washington State Department of Ecology. *Washington State Department of Ecology Website:* <https://ecology.wa.gov/>. Accessed March 2024.



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

Introduction

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

Emissions created by Development

GHG emissions associated with development come from multiple sources:

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

GHG Emissions Worksheet

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

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

Using the Worksheet

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

## Barnabie Point K-8 School Project

### Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO <sub>2</sub> e)			Lifespan Emissions (MTCO <sub>2</sub> e)
			Embodied	Energy	Transportation	
Single-Family Home.....	0		98	672	792	0
Multi-Family Unit in Large Building .....	0		33	357	766	0
Multi-Family Unit in Small Building .....	0		54	681	766	0
Mobile Home.....	0		41	475	709	0
Education .....		34.7	39	646	361	36278
Food Sales .....		0.0	39	1,541	282	0
Food Service .....		0.0	39	1,994	561	0
Health Care Inpatient .....		0.0	39	1,938	582	0
Health Care Outpatient .....		0.0	39	737	571	0
Lodging .....		0.0	39	777	117	0
Retail (Other Than Mall).....		0.0	39	577	247	0
Office .....		12.6	39	723	588	17002
Public Assembly .....		0.0	39	733	150	0
Public Order and Safety .....		0.0	39	899	374	0
Religious Worship .....		0.0	39	339	129	0
Service .....		0.0	39	599	266	0
Warehouse and Storage .....		0.0	39	352	181	0
Other .....		0.0	39	1,278	257	0
Vacant .....		0.0	39	162	47	0

### Section II: Pavement.....

Pavement.....		0.00				0
---------------	--	------	--	--	--	---

**Total Project Emissions:**

<b>53280</b>
--------------

Definition of Building Types

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

Sources: .....

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

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

Embodied Emissions Worksheet

**Section I: Buildings**

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

**Section II: Pavement.....**

All Types of Pavement.....			50
----------------------------	--	--	----

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

**Sources**

All data in black text

King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Residential floorspace per unit

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

Floorspace per building

EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)  
 Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003  
[http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed\\_tables\\_2003/2003set9/2003excel/c3.xls](http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls)

Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building

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

Average Materials in a 2,272-square foot single family home

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

Average window size

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

### **Embodied GHG Emissions.....Worksheet Background Information**

#### *Buildings*

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

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

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

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

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

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

#### *Pavement*

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

### **Special Section: Estimating the Embodied Emissions for Pavement**

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

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

The four studies, Meil (2001), Park (2003), Stripple (2001) and Treolar (2001) produced total GHG emissions of 4-34 MTCO<sub>2</sub>e per thousand square feet of finished paving (for similar asphalt and concrete based pavements). This estimate does not including downstream maintenance and repair of the highway. The average (for all concrete and asphalt pavements in the studies, assuming each study gets one data point) is ~17 MTCO<sub>2</sub>e/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 MTCO<sub>2</sub>e/thousand square feet, respectively, after accounting for maintenance of the roads.

Based on the above discussion, King County makes the conservative estimate that 50 MTCO<sub>2</sub>e/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 MTCO<sub>2</sub>e per lane mile of road (assuming the lane is 13 feet wide).

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

#### Sources:

Meil, J. A Life Cycle Perspective on Concrete and Asphalt Roadways: Embodied Primary Energy and Global Warming Potential. 2006. Available:

[http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/\\$FILE/ATTK0WE3/athena%20report%20Feb.%202%202007.pdf](http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/$FILE/ATTK0WE3/athena%20report%20Feb.%202%202007.pdf)

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

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

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

Energy Emissions Worksheet

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

Sources

All data in black text

King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Energy consumption for residential buildings

2007 Buildings Energy Data Book: 6.1 Quad Definitions and Comparisons (National Average, 2001)  
 Table 6.1.4: Average Annual Carbon Dioxide Emissions for Various Functions  
<http://buildingsdatabook.eren.doe.gov/>  
 Data also at: [http://www.eia.doe.gov/emeu/recs/recs2001\\_ce/ce1-4c\\_housingunits2001.html](http://www.eia.doe.gov/emeu/recs/recs2001_ce/ce1-4c_housingunits2001.html)

Energy consumption for commercial buildings and Floorspace per building

EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)  
 Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003  
[http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed\\_tables\\_2003/2003set9/2003excel/c3.xls](http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls)

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

Carbon Coefficient for Buildings

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

Residential floorspace per unit

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

average life span of buildings,  
estimated by replacement time method

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

(national average, 2001)

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

Note: At this time, KC staff could find no reliable data for the average life span of commercial buildings.

Therefore, the average life span of residential buildings is being used until a better approximation can be ascertained.

Sources:

**New Housing Construction,**

2001 Quarterly Starts and Completions by Purpose and Design - US and Regions (Excel)  
[http://www.census.gov/const/quarterly\\_starts\\_completions\\_cust.xls](http://www.census.gov/const/quarterly_starts_completions_cust.xls)  
 See also: <http://www.census.gov/const/www/newresconstindex.html>

**Existing Housing Stock,**

2001 Residential Energy Consumption Survey (RECS) 2001  
 Tables HC1:Housing Unit Characteristics, Million U.S. Households 2001  
 Table HC1-4a. Housing Unit Characteristics by Type of Housing Unit, Million U.S. Households, 2001  
 Million U.S. Households, 2001  
[http://www.eia.doe.gov/emeu/recs/recs2001/hc\\_pdf/housunits/hc1-4a\\_housingunits2001.pdf](http://www.eia.doe.gov/emeu/recs/recs2001/hc_pdf/housunits/hc1-4a_housingunits2001.pdf)

Transportation Emissions Worksheet

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

**Sources**

All data in black text

King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

# people/ unit

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

Residential floorspace per unit

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

# employees/thousand square feet

Commercial Buildings Energy Consumption Survey commercial energy uses and costs (National Median, 2003)  
 Table B2 Totals and Medians of Floorspace, Number of Workers, and Hours of Operation for Non-Mall Buildings, 2003  
[http://www.eia.doe.gov/emeu/cbeccs/cbeccs2003/detailed\\_tables\\_2003/2003set1/2003excel/b2.xls](http://www.eia.doe.gov/emeu/cbeccs/cbeccs2003/detailed_tables_2003/2003set1/2003excel/b2.xls)

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



vehicle related GHG emissions

Estimate calculated as follows (Washington state, 2006)\_

56,531,930,000 2006 Annual WA State Vehicle Miles Traveled

Data was daily VMT. Annual VMT was 365\*daily VMT.

<http://www.wsdot.wa.gov/mapsdata/tdo/annualmileage.htm>

6,395,798 2006 WA state population

<http://quickfacts.census.gov/qfd/states/53000.html>

8839 vehicle miles per person per year

0.0506 gallon gasoline/mile

This is the weighted national average fuel efficiency for all cars and 2 axle, 4 wheel light trucks in 2005. This includes pickup trucks, vans and SUVs. The 0.051 gallons/mile used here is the inverse of the more commonly known term "miles/per gallon" (which is 19.75 for these cars and light trucks).

Transportation Energy Data Book. 26th Edition. 2006. Chapter 4: Light Vehicles and Characteristics. Calculations based on weighted average MPG efficiency of cars and light trucks.

[http://cta.ornl.gov/data/tedb26/Edition26\\_Chapter04.pdf](http://cta.ornl.gov/data/tedb26/Edition26_Chapter04.pdf)

Note: This report states that in 2005, 92.3% of all highway VMT were driven by the above described vehicles.

[http://cta.ornl.gov/data/tedb26/Spreadsheets/Table3\\_04.xls](http://cta.ornl.gov/data/tedb26/Spreadsheets/Table3_04.xls)

24.3 lbs CO2e/gallon gasoline

The CO2 emissions estimates for gasoline and diesel include the extraction, transport, and refinement of petroleum as well as their combustion.

Life-Cycle CO2 Emissions for Various New Vehicles. RENew Northfield.

Available: <http://renewnorthfield.org/wpcontent/uploads/2006/04/CO2%20emissions.pdf>

Note: This is a conservative estimate of emissions by fuel consumption because diesel fuel, 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

EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)

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

[http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed\\_tables\\_2003/2003set9/2003excel/c3.xls](http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls)