

SEPA ENVIRONMENTAL CHECKLIST

A. Background

1. Name of proposed project, if applicable:

Terminal 46 Substation No.1 Replacement, Port of Seattle SEPA File No. 2024-02

2. Name of applicant:

Port of Seattle

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

Shannon Stragier
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Port of Seattle
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Seattle, Washington 98111
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4. Date checklist prepared:

April 19, 2024

5. Agency requesting checklist:

Port of Seattle

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

Construction of the project is anticipated to begin summer of 2024.

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

There are no plans for future additions, expansions, or further activities related to or connected with this proposal.

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

Geotechnical Engineering Services Report Revision No. 1 Terminal 46 Substation #1 Replacement (GeoEngineers 2023)

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.

The Coast Guard is evaluating several sites for expansion of its Base Seattle, including the southern NWSA-managed portion of Terminal 46. The southern portion of Terminal 46 does not overlap with the portion of Terminal 46 directly affected by this project.

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

City of Seattle Department of Construction & Inspections (SDCI)

- Demolition Permit
- Construction Permit
- Electrical Permit
- Mechanical 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.

The existing substation at Terminal 46 was installed more than 30 years ago. The electrical equipment is at the end of its service life and is not safe to maintain and does not meet National Electric Code requirements. The project will replace the existing substation with a new substation.

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).

The proposed substation will be located at Terminal 46. Terminal 46 is located at 401 Alaskan Way South in the City of Seattle within the southeast quadrant of Section 6, Township 24 North, Range 4 East. It is an existing urban, maritime industrial facility. Existing features south, north, east, and west of the Terminal include the US Coast Guard facility at Pier 36, Pier 48, Alaskan Way S, and the Elliott Bay, respectively.

The substation will be constructed in an upland area adjacent to the existing substation located in the northeast portion of the terminal, approximately 150 feet north of the Northwest Seaport Alliance office building.

Figures 1 and 2 represent a Vicinity Map and Project Location Map.

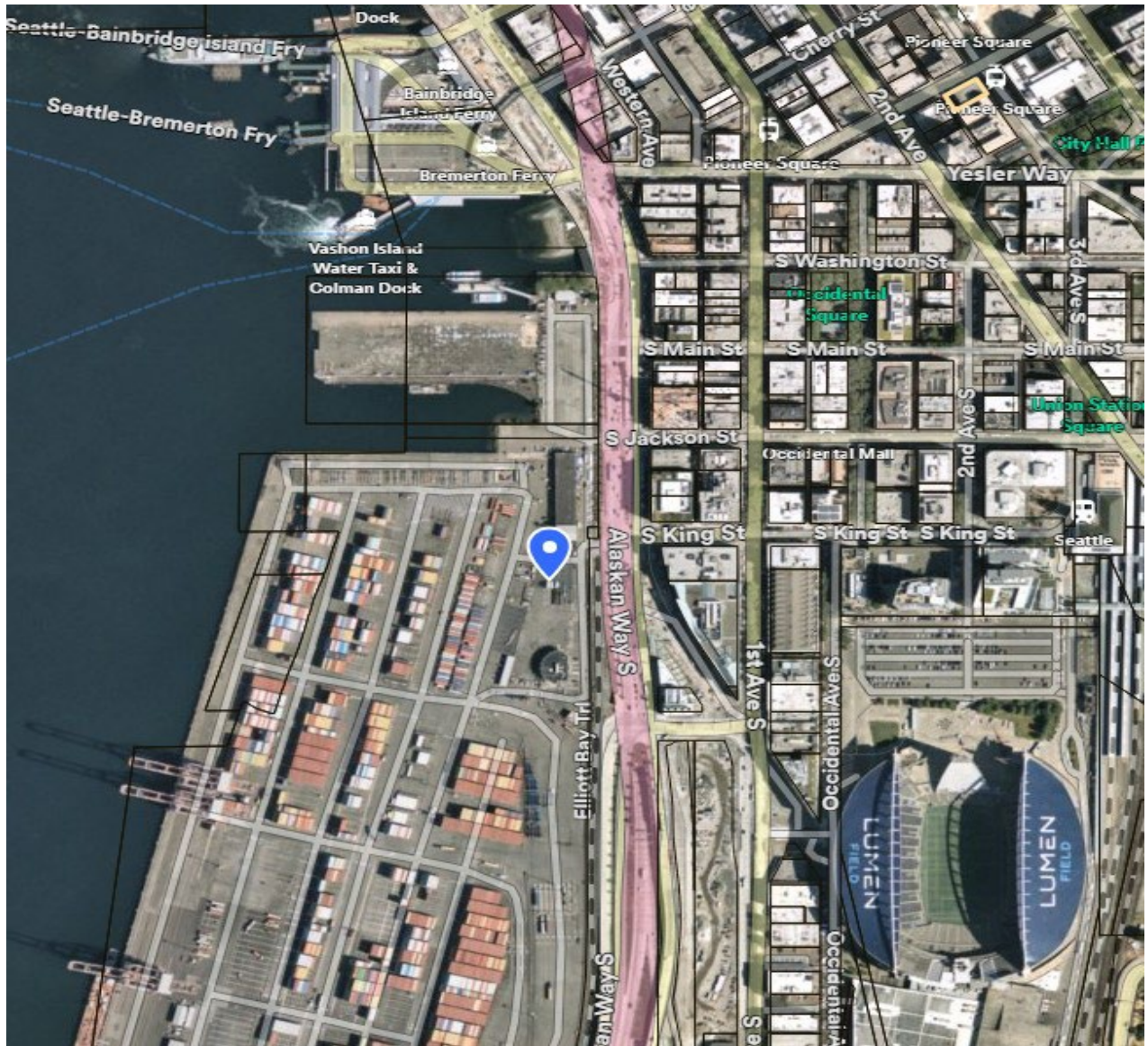


Figure 1
Vicinity Map

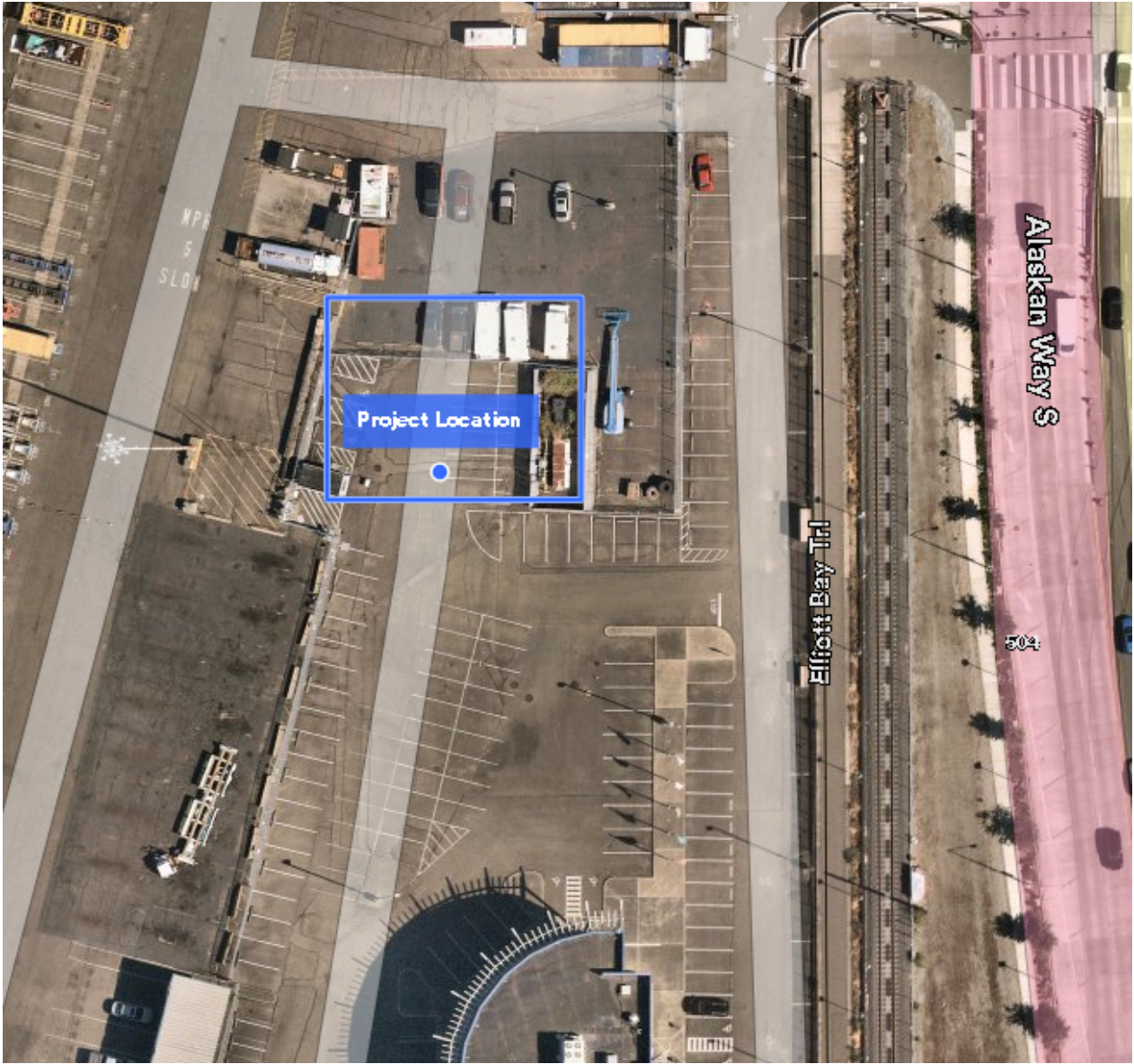


Figure 2
Project Location

B. Environmental Elements

1. Earth

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

The terminal consists of approximately 86.5 acres that include shoreline and upland areas. Approximately 99.9 percent of the site consists of paved surfaces for use as a container cargo marshalling area. Support buildings and parking are located in the northeast portion of the terminal.

The upland topography of the site is generally flat with an approximately two percent slope to allow for appropriate storm water drainage. Adjacent areas are also generally flat. The shoreline areas are primarily vertical bulkheads or steep riprap embankment located under the pier apron.

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

The steepest slopes at Terminal 46 are located in the shoreline area beneath the existing concrete container cargo pier. Beneath the pier, the shoreline consists of a riprap embankment, constructed with a slope of approximately 1.75:1. The upland edge of the under-pier area consists of a vertical steel bulkhead. The steepest slope near the project area is approximately 2 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.**

Terminal 46 is located on the filled former tideland area of Elliott Bay and the Duwamish River estuary. Fill ranging in depths of 15 to 25 feet underlies the existing impervious surfaces and consists of loose to dense silty sand and sand with gravel containing variable amounts of debris including wood, wood chips, sawdust and other materials. Fill material was dredged from the Duwamish Estuary and Elliott Bay in the early 1900s, and hydraulically deposited to raise the site and the surrounding areas to its present elevation. Natural alluvial sands and silts of the former tideland and estuary underlay the fill material. The subtidal substrate in the vessel berth area consists of sand and mud sediments.

The site is almost completely covered in impervious surfaces comprised of a combination of asphalt and concrete pavement. Pavement is typically 8 to 12 inches of compacted crushed rock or mixed crushed rock and aggregate as "base course", with 6 to 8 inches of overlaying surface pavement.

The site does not contain agricultural soils and has no previous, existing, or potential agricultural use.

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

Seattle is situated in a moderately active earthquake region where the Juan de Fuca plate is thrust beneath the North American plate along the toe of the continental slope (Galster and Laprade, August 1991). Soil liquefaction may occur on the site as a result of seismic shaking because the site was constructed on filled former tidelands. The City of Seattle Environmentally Critical Areas Maps identify the site as a Liquefaction-Prone Area (City of Seattle 2022). Liquefaction Prone Areas are environmentally critical areas usually associated with fill soils and/or a shallow groundwater table that lose substantial strength during earthquakes.

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.

A limited amount of grading and site disturbance would be required for the proposed substation replacement. Ground and site disturbance would take place in existing improved, impervious areas. Construction of the project would require excavation of approximately 800 cubic yards to a maximum depth of approximately 12.5 feet for installation of the substation vault and electrical duct banks. A total of 100 cubic yards of fill to a depth of approximately 2 feet will be required to match existing grade and restore the subfaces after removal of the existing substation. Fill will be acquired from a WSDOT approved source.

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

Limited and localized erosion could occur at the site during construction when existing asphalt surfaces are excavated and soils are removed from the work area and stockpiled. Site work associated with pavement demolition, substation demolition, and new pavement/substation installation would expose soils and increase the potential for erosion. Erosion potential is considered slight and insignificant due to the flat topography of the site. Implementation of a Temporary Erosion Sedimentation Control (TESC) plan would further minimize potential impacts due to soil erosion.

Operation of the substation will not cause erosion.

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

As under existing conditions, approximately 100 percent of the site under the proposal would be impervious surface. The project will not expand impervious surface coverage.

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

Comprehensive Drainage Control Plans (including Construction Best Management Practices and Erosion and Sediment Control Plans) would be submitted as part of a Construction Permit application, in accordance with City of Seattle code.

The substation will be designed in accordance with the current International Building Code and City of Seattle Building Code, including seismic and liquefaction design requirements. Operation of the substation will not result in erosion or other impacts to the earth.

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.

The proposed project could result in temporary localized increases in air emissions (primarily carbon monoxide and dust) due to construction vehicles, equipment, and activities.

To evaluate the climate change impacts of the proposed Terminal 46 Substation Replacement Project, a Greenhouse Gas Emissions Worksheet was prepared to estimate the emissions footprint for the lifecycle of the project on a gross-level basis (see Appendix A). The emissions estimates use the combined emissions from the following sources:

- Embodied Emissions – extraction, processing, transportation, construction and disposal of materials and landscape disturbance;
- Energy-related Emissions – energy demands created by the development after it is completed; and
- Transportation-related Emissions – transportation demands created by the development after it is completed.

The worksheet estimates are based on site use and substation size, but as mentioned above, the estimates also consider emissions associated with construction. The building type category used to estimate emissions for the substation is warehouse and storage. The building surrounding the substation is essentially a shell that is designed to protect the substation from vandalism and the elements and is not used for occupancy. Other building types account for occupancy of the building which increases the materials, construction, energy, and transportation demands. The estimated lifespan emissions for the proposed substation replacement project would be approximately 329 MTCO_{2e}. Based on the average building lifespan listed in the worksheet (62.5 years), the estimated annual emissions would be approximately 49 MTCO_{2e} (see Appendix A to this Checklist for the Greenhouse Gas Emissions Worksheet).

The proposed substation replacement project would be designed to conform to applicable regulations and standards of agencies regulating air quality in Seattle, including: the Environmental Protection Agency (EPA), Washington State Department of Ecology (DOE) and the Puget Sound Clean Air Agency (PSCAA).

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

The site is in an industrial area. Sources of off-site air emissions and odors are primarily generated from industrial activities and vehicle air emissions from principal transportation

corridors in the vicinity of the project site. These emissions are not expected to affect this proposal.

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

Operation of the substation will not produce air emissions or cause other impacts to air quality. During construction, contractors will be required to implement standard construction practices for dust suppression and to operate and maintain motor-powered equipment used for the proposed demolition activities consistent with existing air emissions requirements.

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.

Terminal 46 is located on the southeastern shore of Elliott Bay, a marine water body, north of the entrance to the East Waterway. The project site is more than 200 feet from the ordinary high water mark of Elliott Bay.

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

The project site is more than 200 feet from the ordinary high water mark of Elliott Bay. The project will not require any work over, in, or adjacent to Elliott Bay.

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 material will be placed in or removed from surface waters or wetlands.

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

No surface water withdrawals or diversions are included in this proposal.

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

Flood hazard areas are identified as Special Flood Hazard Areas (SFHA). SFHAs include areas that will be inundated by a flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the 100-year flood. The SFHA or flood zone associated with Elliott Bay is Zone VE. Zone VE is assigned to coastal areas with a 1% or greater chance of flooding and additional hazards associated with storm waves. No portion of the proposed project lies within SFHA.

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.

The proposal does not include any discharges of waste material to surface waters. Operating equipment at the site will be subject to best management practices (BMPs) and Spill Prevention, Containment and Countermeasures (SPCC) plans implemented to avoid and minimize potential releases of fuel and petroleum products used by construction equipment to the marine environment. Proposed demolition, grading, and paving activities will be controlled by best management practices intended to avoid and minimize potential releases of fugitive materials to the aquatic environment.

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 general description, purpose, and approximate quantities if known.

No groundwater will be withdrawn from a well, nor will water be discharged to ground water, as a result of this proposal. Groundwater will fluctuate seasonally and in response to tides and is expected to be encountered between 5 and 8 feet below ground surface (bgs); dewatering may be necessary for deeper portions of the excavation work. Generated dewatering liquid/water may require chemical profiling and appropriate handling and disposal procedures. Contractor will manage dewatering liquid collection and off-site treatment using a vacuum truck or similar equipment.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: 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.

The proposed project does not include any discharge of waste material into the ground. The proposed substation does not include restrooms or use potable water and would not connect to the city's wastewater conveyance systems.

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.

Stormwater from the Terminal 46 Substation Replacement Project site is collected by existing catch basins which discharge to existing stormwater conveyance pipe and eventually to Elliott Bay. The project will not alter the existing drainage patterns or the existing storm water drainage system at Terminal 46. Maintenance and operation of the Terminal 46 storm drainage system is controlled by a Port-wide best management practices and source control program consistent with the Washington Department of Ecology Storm Water Management Manual for the Puget Sound Basin (SWMM) guidelines.

Prior to construction, contractors will develop and follow a Stormwater Pollution Prevention Plan (SWPPP) to address any stormwater discharges resulting from the proposal and obtain

coverage under the National Pollution Discharge Elimination System Construction Stormwater General Permit, if necessary.

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

Only minimal volumes of waste materials will be generated during construction, i.e., debris due to demolition or dewatering liquid/water. These materials will be confined and collected as they appear. No materials will intentionally enter ground or surface water due to the present proposal.

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

The proposal does not alter or otherwise affect drainage patterns of the site.

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

During construction, all work will comply with an approved SWPPP and SPCC plan. Generated dewatering liquid/water is assumed to be contaminated and will require chemical profiling and appropriate handling and disposal procedures. Once construction is complete, the proposed project will restore affected upland areas to previous conditions. As stated in 3.c.1, no changes will be made to the existing drainage patterns or the existing storm water drainage system.

4. Plants

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

- deciduous tree: alder, maple, aspen, other
- evergreen tree: fir, cedar, pine, other
- 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: landscaping

The project site is located in an existing industrial area that is extensively developed and does not contain terrestrial riparian or wetland vegetation. Vegetation on Terminal 46 is limited to planters, trees in the adjacent street right of way, and weedy species growing in minor unpaved areas. Butterfly bush (*Buddleja davidii*) is growing in a small area of gravel surrounding the existing substation. Butterfly bush is a Class B noxious weed with mandatory control for select counties including Grays, Cowlitz, and San Juan Counties. Mandatory control is not required in King County; however, it will be removed with restoration of the area after removal of the existing substation.

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

Existing trees located in the right-of-way of, Alaskan Way South will not be affected by the proposed project. Butterfly bush located near the existing substation will be removed.

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

No threatened or endangered plant species are present within the project area and none are known to exist within Terminal 46 property.

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

No landscaping is planned at the site, as it will remain in substation use to support terminal operations for the Port of Seattle and its industrial tenants.

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

Butterfly bush (*Buddleja davidii*) is a Class B noxious weed present in a small area near the existing substation and will be removed. Management of butterfly bush is not mandatory in King County. No other noxious weeds or invasive species are known to be on or near the site.

5. Animals

a. List any birds and other animals which 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: seagull, pigeon, waterfowl
mammals: deer, bear, elk, beaver, other: small mammals, sea lions
fish: bass, salmon, trout, herring, shellfish, other perch, rockfish

Terminal 46 is an 86.5-acre site that is almost entirely paved. The asphalt-paved surface of the Terminal 46 active marine cargo terminal offers no significant habitat for birds or animals. Birds and small mammals tolerant of urban conditions may use and may be present on and near Terminal 46. Mammals likely to be present in the vicinity of the site include: eastern gray squirrel, mouse, rat, opossum, muskrat, and feral cats. Birds common to the area include: European starling, house sparrow, rock dove, American crow, seagull, western gull, Canada goose, American robin, and house finch. Additionally, bald eagles and ospreys are seasonally present in Elliott Bay, though neither have been recorded nesting in the area.

Elliott Bay is located more than 200 feet from the site. Species known to occur in Elliott Bay include sea lions, harbor seals, waterfowl, salmon, trout, herring, shellfish, perch, sole, and sculpin.

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

According to the Washington Department of Fish and Wildlife the following state listed Priority Species may occur in Elliott Bay adjacent to the project site:

- Steelhead (*Oncorhynchus mykiss*)
- Chinook salmon (*O. tshawytscha*)
- Sockeye salmon (*O. nerka*)
- Coho salmon (*O. kisutch*)
- Chum salmon (*O. keta*)
- Resident coastal cutthroat (*O. clarki*)

ESA-listed and proposed fish species that may occur in Elliott Bay adjacent to the project site include the following NOAA Fisheries- and USFWS-managed species:

- North American wolverine (*Gulo gulo luscus*) (Threatened)
- Chinook salmon (*O. tshawytscha*) Puget Sound ESU (Threatened)
- Steelhead trout (*O. mykiss*) Puget Sound ESU (Threatened)
- Bull trout (*Salvelinus confluentus*) Coastal/Puget Sound DPS (Threatened)
- Bocaccio rockfish (*Sebastes paucispinis*) Georgia Basin DPS
- Yelloweye rockfish (*Sebastes ruberrimus*) Georgia Basin DPS
- Killer whale (*Orcinus orca*) Southern Resident DPS (Endangered)
- Humpback whale (*Megaptera novaeangliae*) Mexico DPS (Threatened) and Central America DPS (Endangered)
- Marbled murrelet (*Brachyramphus marmoratus*) (Threatened)
- Yellow-billed cuckoo (*Coccyzus americanus*) (Threatened)
- Northwestern pond turtle (*Actinemys marmorata*) (Proposed Threatened)
- Monarch butterfly (*Danaus plexippus*) (Candidate)

Designated critical habitat near Terminal 46 includes:

- Puget Sound Chinook salmon marine critical habitat – nearshore
- Puget Sound steelhead critical habitat
- Coastal-Puget Sound bull trout critical habitat
- Nearshore rockfish critical habitat
- Deepwater adult rockfish critical habitat
- Southern Resident Killer Whale critical habitat (Area 2 – Puget Sound)

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

The Puget Sound area is part of the Pacific Flyway. Birds that inhabit the area vary seasonally due to migrations. Elliott Bay and the East Duwamish Waterway provide overwintering areas for grebes and other migratory waterfowl.

Elliott Bay is a significant migratory route for anadromous salmonids in the Green/Duwamish watershed. Both adults returning to spawn and juveniles emigrating to sea use the waterway for migration.

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

There are no proposed measures to preserve or enhance wildlife. The project site is more than 200 feet from Elliott Bay and the project site and surrounding areas are paved. There is

no habitat in the project site. The proposed substation would be of a similar height to the existing failed substation and adjacent structures; therefore, no impacts on the Pacific Flyway migration route or to migratory species are expected.

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

Invasive species found in King County include European starling, house sparrow and eastern gray squirrel. Washington State has no management or reporting requirements for these species.

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.

The proposal is the replacement of an existing substation. The substation provides electric power connection to support various Port of Seattle and tenant operations at Terminal 46.

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

No, the project would not affect adjacent properties use of solar energy.

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:

There are no proposed mitigation measures to reduce energy impacts. The components of the newer substation will conform to current energy efficiency standards that have been updated since the original substation was installed.

7. Environmental Health

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

The proposed project does not include any new activities at Terminal 46, therefore, no operational changes will result that have the potential to introduce environmental health hazards to the project area. Vehicles and equipment used for both construction activities and subsequent facility operations will include the use of fuels, oils, lubricants, and other petroleum-related products. These potentially hazardous materials will be subject to applicable local, state, and federal regulations and guidance pertaining to their use, handling, and storage. No increase in exposure is anticipated.

Demolition of existing buildings at the site will entail appropriate steps for removal and disposal of potentially hazardous materials contained as elements of the building's original construction and subsequent additions/modifications/maintenance to the building and its equipment or utilities, including asbestos materials and lead-containing paint. It is anticipated that removal of potentially hazardous materials will be accomplished prior to

building demolition. All disposal of building materials will be as required by federal, state, and local jurisdictions.

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

All Port of Seattle facilities share historical maritime industrial uses, and some sites have been identified as having suspected contamination.

At Terminal 46 historic petroleum underground storage tanks (USTs) were in upland areas. All known tanks have been removed and investigated under the UST rules. Unknown soil contamination may be encountered. If encountered, the appropriate investigation and cleanup will occur as required by MTCA.

The project does not fall within any known Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA/Superfund) or MTCA-designated cleanup site. If contamination is encountered, appropriate investigation will be coordinated with the U.S. Environmental Protection Agency and Washington State Department of Ecology.

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

Utility locations have been surveyed and are well documented at Terminal 46. If there are any underground hazardous liquid or gas transmission lines near any proposed earth-moving activities, the lines will be managed through the service provider and accounted for on final design drawings.

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

Hydraulic oil and fuel would be used and could be stored onsite during construction. There is a small risk of accidental spillage of fuels, oils, and/or hydraulic fluids associated with operation of construction equipment. Use of standard construction practices and the requirement for the contractor to comply with the Port's spill prevention and response procedures are expected to acceptably minimize this risk. No toxic or hazardous chemicals are anticipated to be produced or stored in relation to the proposed project.

4) Describe special emergency services that might be required.

No special emergency services are anticipated for the proposed project.

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

Potentially hazardous fuels, lubricants, and associated materials used for operation of motorized equipment as part of proposed construction activities will be subject to existing local, state, and federal controls for use, handling, and storage, with the objective of avoiding potential environmental health exposure and hazard. The contractor will be required to comply with the Port's spill prevention and response procedures and all local, state, and federal regulations, which are expected to acceptably minimize the risk.

b. Noise

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

Traffic noise associated with adjacent roads/highway is relatively high at certain times of day, particularly along Alaskan Way. The project site is within a working maritime terminal and the vicinity contains numerous noise sources from both commercial and industrial uses. There are no noise sources that will affect the proposed Project activities.

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.

Construction noise would be short-term and temporary and would occur during daytime hours. Typical construction noise activities would include demolition and substation construction and would employ equipment such as dump trucks, excavators, pavers, generators, and compressors. Surrounding uses include industrial and commercial use. The nearest residential use is approximately 624-feet to the east of the project area. The proposed project would comply with provisions of Seattle's Noise Code (SMC, Chapter 25.08); no noise variances are anticipated. This noise could be perceived by some people as intrusive and possibly annoying, but the low overall sound levels and compliance with Seattle's noise code would minimize the potential for significant impacts.

Once the substation is operational, no significant long-term noise impacts are anticipated.

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

The contractor will be required to comply with the City of Seattle Noise Ordinance (Seattle Municipal Code, Chapter 25.08), which limits construction noise to the hours between 7:00 AM to 10:00 PM weekdays, and 9:00 AM to 10:00 PM on weekends and holidays. If extended construction hours are necessary, the contractor will need to apply for a noise variance.

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.

Terminal 46 is situated at the edge of a City-designated Manufacturing Industrial Center (Duwamish Manufacturing Industrial Center); manufacturing industrial centers can be described as unique areas of concentrated industrial, manufacturing, and other compatible commercial uses with access to vehicle, water, and rail transportation. The area to the north and east of the T-46 site is designated as an Urban Center (Downtown City Center – including Pioneer Square); urban centers can be described as unique areas of concentrated employment and housing with direct access to high-capacity transit, and a wide range of supportive uses. Reflective of the land use designations, land uses in the vicinity of the site include a variety of water-oriented transportation, cargo terminal, commercial/ lodging/ multifamily residential (primarily associated with Pioneer Square), and sporting facility uses.

Immediately adjacent facilities support other maritime operations. North of Terminal 46 includes Pier 48 and the Washington State ferry terminal at Pier 50, Coleman Dock. Extensive U.S. Coast Guard facilities, USCG Sector Puget Sound, also referred to as Piers 36/37, are adjacent at the southern edge of Terminal 46.

The proposed project is to replace an existing substation within the boundaries of Terminal 46. The project will not affect current land uses on nearby or adjacent properties.

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 as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

The site has never been used as working farmlands or working forest lands. It was formerly part of the Duwamish River estuary, filled during the early 1900s. The "reclaimed" land that includes the site was developed almost immediately after filling.

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 proposal will not affect or be affected by working farms or forest land normal business operations.

c. Describe any structures on the site.

Terminal 46 has various structures to support maritime operations: (1) approximately 2,900 lineal feet of berthing area and four cranes, (2) Gate structures: Separate entrance and exit gates comprising a total of 18 truck lanes and seven truck scales; (3) Marine operations, administration, and maintenance and repair buildings: Two, dock-side marine operations buildings (totaling approximately 14,000 square feet), a three story administration building located adjacent to Alaskan Way (approximately 16,000 square feet), and a single combined maintenance and repair building totaling approximately 28,000 square feet adjacent and north of the administration building; and (4) Support infrastructure: including but not limited to parking, lighting, fiber optics, cameras, reefer racks, barriers and fences, three substations, sewer, water, and stormwater treatment.

The existing substation that will be removed as part of this proposal is 18 feet long, 4.5 feet wide, and 7 feet high.

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

The existing substation located between the administration building and the maintenance and repair building will be removed. This substation powers the administration building, maintenance, and repair building, receiving gate operations, site lighting, and other miscellaneous building power and electrical panels.

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

The site is zoned as Maritime, Manufacturing, and Logistics Unlimited 85 (MML U/85; SMC Chapter 23.50A Industrial and Maritime) within the Greater Duwamish Manufacturing/Industrial Center. This zone generally allows for industrial and certain commercial uses (City of Seattle Municipal Code 2024).

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

The project site is located in the Greater Duwamish Manufacturing/Industrial Center. Land in the Duwamish Manufacturing/Industrial Center is maintained for industrial uses including manufacturing, storage, and distribution (Seattle 2035 Comprehensive Plan).

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

Under the Seattle Municipal Code, Terminal 46 is classified as a waterfront lot (SMC 23.60A.924). The shoreline designation for the site is Urban Industrial (UI; SMC Chapter 23.60A.480). The project site is located outside of the shoreline jurisdiction.

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

Environmentally critical area overlays on and near Terminal 46 include liquefaction, wildlife habitat, and flood prone area. City of Seattle Critical Areas Maps show the proposed project site within a liquefaction zone. Liquefaction zones are environmentally critical areas and development must be designed to limit property damage and risk of injury or life. The project will be designed to meet the City of Seattle code requirements for liquefaction-prone areas.

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

There are no residents on the project site. There will be no change in the number of people who work at the project site as a result of the project.

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

The completed project will not displace any people.

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

No displacements will occur that would require measures to avoid or reduce impacts.

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

The proposed project supports maritime uses consistent with the zoning and comprehensive plan designations. As noted above, the project will not affect neighboring land uses.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

No agricultural or forest lands will be impacted.

9. Housing

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

The proposal does not provide housing.

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

No housing exists on-site and no housing will be eliminated as a result of this proposal.

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

No housing impacts would result from this proposal.

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 new substation height is 11 feet, which is 4 feet taller than the existing substation. The height is compliant with MML U-85 zoning.

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

The City of Seattle's public view protection codes (Seattle Municipal Code 25.05.675) are intended to "protect public views of significant natural and human-made features: Mount Rainier, the Olympic and Cascade Mountains, the downtown skyline, and major bodies of water including Puget Sound, Lake Washington, Lake Union and the Ship Canal, from public places consisting of specified viewpoints, parks, scenic routes and view corridors identified in Attachment 1 [to the SEPA code]". It also is City policy to protect public views of the Space Needle from designated public places.

The visual character of the approximately 86-acre Terminal 46 site is reflective of an international marine cargo terminal characterized by industrial, waterfront uses. The current visual character of the site is generally open and entirely covered in impervious surfaces, including buildings, roadways, surface parking areas, and cargo loading/unloading areas. The visual quality of the site fluctuates in terms of density and activity levels as shipping containers arrive and depart the terminal. Yard equipment including top picks, rubber-tired gantry cranes and yard hostlers are operated by longshoremen to move containers between ships and around the terminal. Local import containers are put in a stack when they come off ships to wait for delivery to local warehouses. Export containers are stacked to wait for loading to a specific vessel. Container cargo vessels serving Terminal 46 are commonly about 120 ft. high, 860 ft. in length, and 106 ft. wide.

The proposed project is not expected to result in significant impacts on views from City-designated public viewpoints, parks, scenic routes, or view corridors of significant natural and human-made features; or views of the Space Needle from City-designated public places. Both the current and new substation and associated infrastructure will be located behind a security fence. The new security fence will be the same height and similar in appearance to the existing security fence. Views are limited to the industrial aesthetic of the site and surrounding development including shipping cranes, containers, and parking lot. The substation replacement and fence will not obstruct views beyond what is currently experienced on site.

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

No measures are proposed to reduce or control the aesthetic impacts.

11. Light and Glare

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

The project will not add to or alter the existing lighting at Terminal 46.

Construction activities are anticipated to be performed during the day; however, depending on the final schedule of construction activities, temporary work lighting may be used to provide a safe work environment during low light conditions. Temporary lighting will be localized and for a short-term duration.

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

The substation housing is painted metal, and the substation will be surrounded by fencing. Light and glare from structure is not expected to create a safety hazard or interfere with views.

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

Off-site light sources will not affect the proposed project.

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

The project is not adding to or changing the existing lighting at Terminal 46; therefore, no measures to control light or glare are proposed as part of this project.

12. Recreation

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

There are currently no existing recreational facilities on Terminal 46 or public access to the Elliott Bay shoreline provided through Terminal 46. The Portside Trail is located immediately east of Terminal 46, which is a grade-separated pedestrian sidewalk and striped bicycle path. This approximately 0.75-mile public trail extends between South King Street to the north and South Massachusetts Street to the south and serves pedestrians and bicyclists.

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

The proposed project will not displace any existing recreational uses.

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

There will be no impacts on recreation; therefore, no measures are proposed to reduce or control impacts on recreation.

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 buildings, structures, or sites located on the project site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers (Washington Department of Archaeology and Historic Preservation [DAHP] online database, Washington Information System for Architectural and Archaeological Records [WISAARD]). The closest listed resource is the USS Nebraska Launching Site, which was located at historic Pier 42 (part of Terminal 46). Historical markers commemorating the USS Nebraska Launching Site and the Skinner and Eddy Shipyard were erected in 1965 and 1962. A National Register Historic Preservation (NRHP) nomination for the site and the historical markers was completed in 1969, and the site was listed in the Washington Historic Register on March 8, 1974. In 1979, Pier 42 was demolished when Terminal 46 was constructed of compacted fill between Piers 37 and 46. At that time, the original historical markers were moved to their current location along the pedestrian and bike path between Terminal 46 and the railroad tracks adjacent to Alaskan Way S.

East of Terminal 46 is the Burlington Northern Santa Fe Railway and Seattle International Gateway Yard Track, the Pioneer Square-Skid Road Historic District, and the Bemis Brothers Bag Company Building. These resources are across from Terminal 46 on the other side of Alaskan Way.

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.

Archeological sites dating to the early to mid-Holocene (the Holocene began about 11,700 years before present) are more commonly found in the region. Human land use was generally structured around the value of natural resources available in the local environments, including fresh water, terrestrial and marine food resources, forests and suitable terrain. Terminal 46 is within the traditional territory of the South Coast Salish people who spoke Lushootseed, including the Suquamish Indian Tribe and the Muckleshoot Indian Tribe, who have Usual and Accustomed fishing rights in the area.

Terminal 46 was historically tidal flat and later developed with various piers. The original pier at the bottom of South King Street was the Pacific Coast Steamship Company Pier D, which was renamed as Pier 46 in 1944. The pier was partially demolished in 1961 as part of a larger development to create the Port's first container shipping facility that opened in 1963 (old Terminal 46). The development project demolished several piers, filled aquatic areas behind a sheet pile bulkhead, and constructed a pier apron and freight shed. Previous geotechnical exploration borings in the project area generally found around 25 feet of fill soils above the alluvium and beach deposits (2002 Shannon and Wilson Report).

In turn, the late 1970s saw this facility enlarged further. Piers 37, 39, 42, 43, and the original Terminal 46 were consolidated into Terminal 46 as we know it today. The original structures were partially removed to construct a linear earth-fill embankment over which a pile-supported marginal wharf was built.

Archaeological studies conducted near Terminal 46 include those related to the SR 99 South Holgate Street to South King Street Viaduct Replacement Project, Washington Department of Transportation's (WSDOT) SR 519 Intermodal Access Project, Alaskan Way Viaduct and Seawall Replacement Project, East Duwamish Waterway Pier 35 Pilings, Yesler Way Stabilization Project, Elliott Bay Seawall Project, and Seattle Multimodal Project.

The Washington Department of Archaeology and Historic Preservation (DAHP) predictive model indicates the site and vicinity (including much of the Seattle waterfront) as "Very High Risk" area to contain cultural resources. Historical development, including extensive filling as outlined above, has drastically changed the shoreline converting tidelflat to an industrial waterfront. These changes likely disturbed or destroyed many potential precontact archaeological deposits that might have existed.

One archaeological site was identified on Terminal 46 during construction monitoring for a project related to the Alaska Way Viaduct Replacement Project and recorded in 2014. The site consists of brick, sandstone, and concrete foundations of three industrial structures and a burned deposit containing refuse scatter. The architectural materials at the site are associated with early twentieth-century industrial docks along the waterfront. WSDOT on behalf of Federal Highway determined that the site was not eligible for listing in the National Register of Historic Places (NRHP) (Riser and Graham 2014). The NRHP is a national program that coordinates and supports efforts to identify and evaluate America's historic and archeological resources.

Initial background research for the SR 99 Alaskan Way Viaduct and Seawall Replacement Project identified the approximate location of Ballast Island near Terminal 46. Ballast Island is an artificial landform created from ballast deposited by ships using the nearby docks. As the rock pile grew, nearby businesses used the stones to support expanding docks, but areas that were less stable became a gathering and camping location for Native Americans. Between the 1880s and early 1900s, Ballast Island served as an important meeting place for Native Americans traveling throughout the region. The site was determined eligible for listing in the NRHP in 2014 under Criterion A (Elder and Hofkamp 2015). The ethnographic record suggests the sites significance may extend beyond the cultural materials present and therefore introduces the possibility that the site may qualify as a traditional cultural property (TCP) under the NHPA (Dorpat 2006; Willis 1943). A TCP designation is a separate determination that extends beyond the cultural material present and recognizes the association with cultural practices or beliefs of a living community that are rooted in that community's history and important in maintaining the cultural identity of the community.

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.

Background research included review of relevant archaeological literature and the DAHP WISAARD database for previous cultural resources studies, archaeological site records, cemetery records, and historic properties listed in the NRHP or the Washington Heritage Register (WHR) near Terminal 46. The statewide predictive model layer on WISAARD was reviewed for probability estimates for archaeological resources within and near Terminal 46.

The City of Seattle Department of Neighborhoods Landmarks List was reviewed to identify City-designated landmarks.

The project is located within the previously disturbed areas of Terminal 46 located on approximately 25 feet of fill. Ground penetrating radar was used to locate utilities and any other subsurface features within the project area, and no subsurface obstructions were found. Therefore, the project is not expected to encounter precontact archaeological deposits or historic-period archaeological deposits within the boundaries of the project area.

The proposed project is small in nature, consists of replacing existing infrastructure, and does not impact existing uses or operations on the terminal. Therefore, the project is not expected to indirectly impact any cultural or historic resources outside the boundaries of Terminal 46.

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

The proposed project will remain within previously developed areas and does not change any use or operations on the property. If resources of potential archaeological significance are encountered during excavation, the project will follow an Inadvertent Discovery Plan that follows the Ecology template and work would stop immediately, and City of Seattle Department of Construction and Inspections and the DAHP would be notified. Project activities will abide by all regulations pertaining to discovery and excavation of archaeological resources, including but not limited to Chapters 27.34, 27.53, 27.44, 79.90 RCW and Chapter 25.48 WAC, as applicable, or their successors.

14. Transportation

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.

Terminal 46 is located west of Interstate Highway 5, west of Highway 99, and west of Alaskan Way South. Alaskan Way South forms a continuous margin at the east side of Terminal 46. The Portside Trail (described further under Public Access) and the Burlington Northern Santa-Fe railroad spur separate Terminal 46 from Alaskan Way South up to South King Street. Two access points, South King Street and South Jackson Street are located at the terminal's north end and are used by employee and service vehicles. Only the South Jackson Street intersection accesses Pier 46 directly.

Adjacent to the north portion of the project site (South Jackson Street) and extending to South Atlantic Street, Alaskan Way includes four lanes of travel north and south. Grade-separated pedestrian sidewalk and striped bicycle path, with a combined width of approximately 12 feet, are present on the west side of Alaskan Way, parallel to the Terminal 46 perimeter fence.

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?

Terminal 46 is approximately 0.3 mile from King Street Station, a major bus and train hub for the region. King County Metro buses travel Alaskan Way South between State Route 99 and Columbia Street. Colman Dock ferries, King County Water Taxi, Link Light Rail, and additional bus routes are located approximately 0.3 to 0.5 miles and northeast of Terminal 46.

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 will not require any new or improvements to roads, streets, pedestrian, bicycle, or state transportation facilities.

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

Terminal 46 is adjacent to a Burlington Northern Santa Fe rail line spur for transportation of the imported and exported goods, but the terminal does not access the rail line. The terminal itself is used for the transport of goods via vessel and truck. The proposal is intended to replace an existing failed substation. Accordingly, the proposal is intended to support current Port maritime operations and use would occur in the vicinity of water transportation. The proposal would not use or interfere with rail or air transportation.

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 non-passenger vehicles). What data or transportation models were used to make these estimates?

No new vehicular trips per day would be generated by the completed project. Physical inspection and maintenance will occur every three years. There will be limited construction truck traffic for soil removal and import of construction materials. Work will occur on site at Terminal 46 and will not impact public roadways.

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 project will not interfere with, affect, or be affected by the movement of agricultural and forest products.

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

No measures to reduce or control vehicle or truck transportation impacts are proposed as part of the project. Traffic alterations at Terminal 46 due to construction are located on Port property and is not publicly accessible.

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.

The proposed project will not result in an increased need for public services.

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

The proposed project will not alter or impact use and activity on the site, and the demand for emergency public services would not be anticipated to change. It is anticipated that adequate service capacity is available within the area and city as a whole 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.

Terminal 46 includes all necessary utility infrastructure to run a terminal, including electric, natural gas, water, solid waste, sanitary sewer, telephone, stormwater, etc. The proposed project includes a new permanent substation and associated infrastructure to replace the existing substation and infrastructure. The proposed new permanent Substation would connect to the Seattle City Light electric power grid and distribute electric power to existing Terminal 46 uses.

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 project will replace an existing substation. No expansion in electrical usage is proposed as part of this project. The project will not require additional utilities beyond what is currently available at the site.

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.

Signature: Shannon Stragier

Name of Signee: Shannon Stragier

Position and Agency/Organization: Sr. Environmental Management Specialist

Date Submitted: 4/19/2024

References

City of Seattle, 2024. Seattle Department of Construction and Inspections GIS. Accessed: April and May 2021. Available at:

<https://www.arcgis.com/home/item.html?id=19614cf9403444a88036c47c5d567a97>

DAHP (Washington State Department of Archaeology and Historic Preservation), 2024. DAHP Washington Information System for Architectural and Archaeological Records Data (WISAARD) database. Accessed on January, 2024. Available at:

<https://wisaard.dahp.wa.gov/>

Durkin, B., L. Waldroop, and H.L. Miller, 2020. Cultural Resources Technical Report for the Port of Seattle's T-46 Cruise Terminal Development. Report on file at the Port of Seattle, Seattle, Washington

WDFW (Washington Department of Fish and Wildlife), 2024. Priority Habitats and Species Maps. Accessed January, 2024. Available at: <https://geodataservices.wdfw.wa.gov/hp/phs/>

USFWS (U.S. Fish and Wildlife Service), 2024. Endangered Species Act status reviews and listing information. Accessed January, 2024. Available at: <https://ecos.fws.gov/ipac/>

Shannon and Wilson 2002. Geotechnical Engineering Report for the Port of Seattle Terminal 46 Redevelopment Project

Appendix A

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.

Section I: Buildings						
Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO2e)			Lifespan Emissions (MTCO2e)
			Embodied	Energy	Transportation	
Single-Family Home.....	0		98	672	792	0
Multi-Family Unit in Large Building	0		33	357	766	0
Multi-Family Unit in Small Building	0		54	681	766	0
Mobile Home.....	0		41	475	709	0
Education		0.0	39	646	361	0
Food Sales		0.0	39	1,541	282	0
Food Service		0.0	39	1,994	561	0
Health Care Inpatient		0.0	39	1,938	582	0
Health Care Outpatient		0.0	39	737	571	0
Lodging		0.0	39	777	117	0
Retail (Other Than Mall).....		0.0	39	577	247	0
Office		0.0	39	723	588	0
Public Assembly		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		0.4	39	352	181	229
Other		0.0	39	1,278	257	0
Vacant		0.0	39	162	47	0
Section II: Pavement.....						
Pavement.....		2.00				100
Total Project Emissions:						329

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/cbeecs/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
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	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

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

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

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

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

Average window size

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

Pavement Emissions Factors

Embodied GHG Emissions.....Worksheet Background Information

Buildings

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

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

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

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

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

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

Pavement

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

Special Section: Estimating the Embodied Emissions for Pavement

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

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

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

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

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

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

Sources:

Meil, J. A Life Cycle Perspective on Concrete and Asphalt Roadways: Embodied Primary Energy and Global Warming Potential. 2006. Available: [http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/\\$FILE/ATTKOWE3/athena%20report%20Feb.%202%202007.pdf](http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/$FILE/ATTKOWE3/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/rappporter/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

Energy consumption for commercial buildings and Floorspace per building

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

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

Carbon Coefficient for Buildings

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

Residential floorspace per unit

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

average 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

See also: <http://www.census.gov/const/www/newresconstindex.html>

Existing Housing Stock,

2001 Residential Energy Consumption Survey (RECS) 2001

Tables HC1:Housing Unit Characteristics, Million U.S. Households 2001

Table HC1-4a. Housing Unit Characteristics by Type of Housing Unit, Million U.S. Households, 2001

Million U.S. Households, 2001

http://www.eia.doe.gov/emeu/recs/recs2001/hc_pdf/housunits/hc1-4a_housingunits2001.pdf

Transportation Emissions Worksheet

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

Sources

All data in black text

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

people/ unit

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

Residential floorspace per unit

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

employees/thousand square feet

Commercial Buildings Energy Consumption Survey commercial energy uses and costs (National Median, 2003)
 Table B2 Totals and Medians of Floorspace, Number of Workers, and Hours of Operation for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbeecs/cbeecs2003/detailed_tables_2003/2003set1/2003excel/b2.xls

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

vehicle related GHG emissions

Estimate calculated as follows (Washington state, 2006)_

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

Data was daily VMT. Annual VMT was 365*daily VMT.
<http://www.wsdot.wa.gov/mapsdata/tdo/annualmileage.htm>

6,395,798 2006 WA state population

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

8839 vehicle miles per person per year

0.0506 gallon gasoline/mile

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

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

http://cta.ornl.gov/data/tedb26/Edition26_Chapter04.pdf

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

http://cta.ornl.gov/data/tedb26/Spreadsheets/Table3_04.xls

24.3 lbs CO2e/gallon gasoline

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

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

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

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